ESSAYS IN GLOBAL LINKAGES AND BUSINESS CYCLES

by Çiğdem Akın

B.A., June 1998, Boğaziçi University

M.A., June 2000, International University of Japan

M.Phil., May 2005, The George Washington University

A Dissertation submitted to

The Faculty of
Columbian College of Arts and Sciences
of The George Washington University
in partial fulfillment of the requirements
for the degree of Doctor of Philosophy

August 31, 2009

Dissertation directed by

Frederick L. Joutz

Professor of Economics

The Columbian College of Arts and Sciences of The George Washington University certifies that Çiğdem Akın has passed the Final Examination for the degree of Doctor of Philosophy as of April 29, 2009. This is the final and approved form of the dissertation.

ESSAYS IN GLOBAL LINKAGES AND BUSINESS CYCLES

Çiğdem Akın

Dissertation Research Committee:

Frederick L. Joutz, Professor of Economics, Dissertation Director

Marco Cipriani, Assistant Professor of Economics and International Affairs, Committee Member

Ana Fostel, Assistant Professor of Economics, Committee Member

© Copyright 2009 by Çiğdem Akın
All rights reserved.

Dedication

I would like to dedicate this dissertation

to the loving memory of my mother, Asst. Prof. Dr. Sebahat Akın.

Acknowledgments

This dissertation reflects the fruits of the relationships with many inspiring people. I owe my gratitude to everyone who has contributed to this accomplishment.

Most importantly, none of this would have been possible without my family, to whom this dissertation is dedicated to. I would like to express my very special gratitude to the one person whom I owe everything, the sweetest and most devoted mother of all, Sebahat Akın. She passed away in the middle of my doctoral studies and did not have a chance to see me complete it. However, her unconditional love, sacrifice, unwavering faith and confidence in my abilities, are what have shaped me to be the person I am today.

My thanks also go to my father, Metin Akın, who showed me the true worth of hard work. He has been my voice of reason and source of wisdom when I need someone to help me put my toils in perspective. He is the person, who nurtured the belief that I can achieve anything in life once I put my mind into it. He has encouraged me to explore the distant corners of the world so that I could reach the highest potential in my intellectual and personal development. Without his visionary and inspiring personality, I could not have found the strength to overcome many hurdles in this arduous journey and be successful.

I also would like to thank my aunts, uncles, and other members of my extended family for their constant support during the long years of my education. In particular, my aunt, Hanife Haymanalı helped me endure the stressful times with her optimistic attitude towards life and good humor. Finally, my heartfelt thanks go to Deniz Olcan, my dearest cousin, who was my emotional cheer, counselor and advocate during the entire process.

Besides my family, I would like to express my deepest and most sincere appreciation to my dissertation advisor, Prof. Frederick L. Joutz, for his encouragement and heartfelt guidance. He has been an outstanding advisor supporting me every step of the way when I faced challenges. He not only provided extremely perceptive, helpful, and appropriate comments, as well as technical suggestions to the initial drafts of my work, but also he was available for advice about my future career choices and other non-academic matters. Without his commitment, I would not be able to accomplish this dissertation.

In addition, the first essay would not have been possible without the guidance of Prof. Graciela L. Kaminsky at the initial stages of my graduate studies. While I was deciding on my dissertation topic, she provided valuable insights about the potentially interesting research areas. I am grateful to her for the constructive criticisms, and for enforcing strict standards for conducting empirical research, and teaching me how to effectively communicate my research results.

I would also like to thank the other members of my dissertation committee, Prof. Marco Cipriani and Prof. Ana Fostel for their continuous encouragement on my work, and thought provoking questions during my defense. I am also grateful to Dr. Robert P. Flood, who was one of the external examiners in my dissertation defense committee, for his insightful comments and detailed suggestions. Finally, I am grateful to my other external examiner, Prof. Tara Sinclair, who not only proof-read earlier versions of the essays, but also suggested many stylistic and substantive changes to help improve my arguments.

My enormous debt of gratitude can hardly be repaid to all of the faculty members of the Department of Economics for providing a collegial learning environment and lending a sympathetic ear to my questions and concerns throughout the process. In particular, I would

like to thank the department chair, Prof. Robert Phillips, Unit II academic advisor, Prof. Bryan Boulier, and Prof. Sumit Joshi for providing guidance at critical junctures of my graduate studies. I also truly appreciated the financial support that I received from the Department of Economics as a graduate teaching assistant. I am also grateful to Dean Michael Moses, Ms. Iva Beatty, advisors at the International Services Office, Mr. Guennadi Bratichko, Ms. Jared McGrath and Ms. Amy Fisher for assisting me with the administrative matters. I also would like to thank all of the secretaries at the Department of Economics for efficiently running things.

My graduate studies would not have been the same without the network of friends at the George Washington University. I am particularly thankful to Yaroslava Babych, Eun Jue Chung, Ayhan Çil, Subika Farazi, Elaine Frey, Anastasia Guscina, Zhaoyang Hou, Fenohasina Maret, Aleksandra Markovic, Amine Mati, Rei Odawara, Nilanjana Sarkar, and Jevgenijs Steinbuks. Their generous support and care helped me stay focused on my doctoral studies. They made the life in Washington D.C. enjoyable during all these years.

I would also like to thank my life-long friends Elif Şişli and Jürgen Reichert for their example of scholarship. Finally, I am deeply indebted to Dr. Raj Chhikara, my mentor at the Asian Development Bank Institute in Japan, who provided me the guidance to pursue doctoral studies in the United States.

My work experience at the International Monetary Fund significantly contributed to the progress of my studies and professional development. I would like to acknowledge the generous financial support from the IMF, which partially funded my education at the GWU. I have been fortunate to work amongst a group of very talented and accomplished economists at the Research Department of the IMF. As a summer intern, I participated in a

project about the global business cycles with Dr. Eswar Prasad and Dr. M. Ayhan Kose. Both of these distinguished economists provided valuable suggestions on the earlier drafts of my first essay in this dissertation. At the end of this internship, Dr. Ayhan Kose and I co-authored a research paper on the changing nature of North-South growth linkages, which finally became the second essay of my dissertation. During this process, Dr. Kose continually stimulated my analytical thinking, challenged me to develop research skills, and greatly assisted me in improving my scientific writing. Thanks to his assistance, this paper was published in the Journal of Asian Economics and as an IMF Working Paper, and was cited by the Economist and the Wall Street Journal.

As a research assistant, I worked on a project about the global consumption risk sharing patterns with Dr. Robert P. Flood. I would like to thank Prof. Kaminsky for introducing me to such a distinguished scholar. This project directly inspired the topic of the third essay in my dissertation. Dr. Flood generously shared his institutional knowledge about the IMF while allowing me to work on my own research. I have benefited a great deal from the extensive use of the IMF resources. I have gotten access to valuable datasets, learned new econometric tools, attended conferences, and participated in training programs, which provided a fitting complement to the theoretical work at the GWU. In this context, I am indebted to Dr. Akito Matsumoto for patiently teaching me new programming skills, and technical knowledge. Last but not least, I would like to express my heartfelt thanks to Ms. Rosalind Oliver, and my colleagues, Zeynep Elif Aksoy, Selim Elekdağ, Neşe Erbil, Herman Kamil, and Jelena Kmezic for their friendship at the IMF.

Abstract of Dissertation

Essays in Global Linkages and Business Cycles

This dissertation analyzes the effects of the globalization phenomenon on economic integration patterns and business cycles from three distinct perspectives.

The first essay looks at the major economic linkages explaining real GDP correlations for 47 countries during the 1970-2003 period using GMM-IV and simultaneous equations estimations. Results show that trade integration especially in the form of intra-industry trade and similarities in economic structure are the most important determinants of output correlations. While synchronization increases for country pairs with high degrees of financial openness, on average, global financial integration has a positive but weak effect. However, there is a strong feedback from financial openness to trade integration.

The second essay examines the changing nature of growth spillovers between developed economies and developing countries driven by the process of globalization. The essay uses macroeconomic and sectoral variables for 106 countries over the period 1960–2005. The panel regression results indicate that the impact of the Northern economic activity on the Emerging South has declined during the globalization period (1986–2005). In contrast, the growth linkages between the North and Developing South have been rather stable over time. The North and Emerging South economies have started to exhibit more intensive intra-group growth spillovers.

The third essay investigates the wealth effects on the durables and non-durables consumption in Turkey. The vector error correction models testing life-cycle and

permanent income hypotheses are developed using quarterly data for the 1987-2006 period. This essay uses an originally constructed housing wealth series in addition to the stock market capitalization and bank deposits as proxies for the stock market and financial wealth respectively. Results show that in the long run, the non-durables consumption is not significantly affected by the stock market wealth in contrast to the durables consumption, while an increase in the housing wealth raises the consumption of non-durables, but has no effect on the consumption of durables.

The fourth essay looks at the housing market characteristics in Turkey and develops a methodology to estimate the housing wealth using primary sources. The fifth essay analyzes the financial wealth allocation and characteristics of the financial system in Turkey.

Table of Contents

Dedication iv

Acknowledgments v

Abstract of Dissertation ix

Table of Contents xi

List of Figures xviii

List of Tables xxiv

Chapter 1: Introduction 1

Chapter 2: Multiple Determinants of Business Cycle Synchronization 12

2.1: Introduction 12

2.2: Background on Theoretical and Empirical Literature 17

2.2.1: Trade in Goods and Services 18

2.2.2: Financial Linkages 20

2.2.3: Similarity in Economic Structure 23

2.2.4: Institutional Similarity 24

2.2.5: Economic Integration and Macroeconomic Similarity 24

2.2.6: Common Shocks 25

2.3: Data and Methodology 25

2.3.1: Data 26

2.3.2: Descriptive Statistics and Stylized Facts about Synchronization 35

2.3.3: Descriptive Statistics and Stylized Facts about Linkages Affecting Synchronization 38

2.4: Econometric Methodology 41

2.5: Conclusion 51

Chapter 3: Changing Nature of North-South Linkages:

Stylized Facts and Explanations 76

3.1 Introduction……...76

3.2 What Do We Know About the North-South Linkages?.....81

3.2.1 Characterizing the North-South Economic Linkages Over Time……..81

3.2.2 Quantifying the Extent of Linkages between the North and South……...83

3.2.3 Determining the Underlying Forces of Business Cycle Co-movement…….84

3.3 Evolution of International Economic Linkages……85

3.3.1 Changes in the Size of Distribution of Countries……..86

3.3.2 Changes in the Dynamics of Trade and Sectoral Output……...87

3.3.3 Changes in Financial Linkages…….91

3.3.4 How to Characterize the North-South Linkages? Theory and Evidence…...93

3.4 Understanding Growth Linkages…….96

3.4.1 How to Measure Aggregate Economic Activity?.....96

3.4.2 Stylized Facts about Growth Linkages……101

3.5 Quantifying Growth Spillovers……..104

3.5.1 Results from the Benchmark Regressions……...106

3.5.2 Robustness Exercises……..111

3.6 Conclusion…….115

Chapter 4: Stock Market Fluctuation, Housing Wealth and

Consumption Behaviour in Turkey 137

4.1 Introduction……137

4.2 Review of the Theoretical Literature……..141

4.2.1 The Effects of Stock Market Wealth on Consumption……145

4.2.2 The Effects of Housing Wealth on Consumption……148

4.3 Review of the Empirical Literature……151

4.3.1 OECD Economies……...151

4.3.2 Emerging Market Economies……..153

4.3.3 Turkey……..156

4.4 Data……160

4.5 Methodology……..177

4.6 Empirical Results……...187

4.6.1 Modeling the Wealth Effects on Non-Durables Consumption in Turkey...189

4.6.2 Modeling the Wealth Effects on Durables Consumption in Turkey……...200

4.7 Conclusion……..210

Chapter 5: Housing Market Characteristics and Estimation of Housing Wealth in Turkey…….....302

5.1 Introduction……302

5.2 Home Ownership Patterns in Turkey…….305

5.3 Housing Demand Characteristics in Turkey……...307

5.4 Residential Construction Sector in the Economy……...312

5.5 Housing Finance in Turkey……..315

5.5.1 Housing Finance by the Government……315

5.5.2 Housing Finance by the Mortgage Markets……320

5.6 Squatter Settlements……...326

5.7 Estimation of the Housing Wealth…….330

5.8 Conclusion…….339

Chapter 6: Allocation of Financial Wealth in Turkey…….....366

6.1 Introduction……366

6.2 Macroeconomic Developments in Turkey…….369

6.3 Allocation of Financial Wealth in Turkey……..374

6.4 Non-Bank Financial Institutions……377

6.4.1 Characteristics of the Stock Market in Turkey

and Other Emerging Markets……..378

6.4.2 Analysis of Investor Profiles in the Istanbul Stock Exchange…..……...381

6.4.3 Foreign Portfolio Investment in the Istanbul Stock Exchange...…….386

6.4.4 Domestic Institutional Investors……..389

6.5 Conclusion…….393

Chapter 7: Conclusion.....431

References.....441

Appendices:

Chapter 2:

Appendix 2.1 Data Sources and Descriptions 483

Chapter 3:

Appendix 3.1: Summary Statistics.....487

Appendix 3.2-a: Coefficient Estimates of the Benchmark GDP Growth Regressions Using Output-Weighted Indices…….488

Appendix 3.2-b: Coefficient Estimates of the Benchmark Sectoral Growth Regressions…….489

Appendix 3.3: Controlling Outliers in the Benchmark Growth Regressions.....490

Appendix 3.4-a: Coefficient Estimates of the Full Model for the GDP Growth Regressions……...……..491

Appendix 3.4-b: Coefficient Estimates of the Full Model for the Industry and Services Growth Regressions.……..492

Appendix 3.5-a: Regional Extensions of the Benchmark and Full Regression Models (GDP and Industry Growth)…….....493

Appendix 3.5-b: Regional Extensions of the Benchmark and Full Regression Models (Services and Agriculture Growth)…..494

Appendix 3.5-c: Coefficient Estimates from the Benchmark Regressions

Figure A: Growth Impact of the North……..…….495

Figure B: Growth Impact of the Emerging South……...496

Appendix 3.6: List of Countries……...497

Appendix 3.7: Data Sources and Descriptions…….498

Chapter 4:

Appendix 4.1: Data Sources and Descriptions……507

Chapter 5:

Appendix 5.1: Data Sources and Descriptions……513

Chapter 6:

Appendix 6.1: Chronology of Major Legal, Economic, Political and Financial Events in Turkey……516

Appendix 6.2: Data Sources and Descriptions…….523

List of Figures

Figure 2.1: Evolution of Band-Pass Filtered Output Correlations……...74

Figure 2.2: Average Band-Pass Filtered Output Correlations……..75

Figure 3.1: Evolution of Trade and Financial Liberalization…….128

Figure 3.2: Trade Openness……...128

Figure 3.3: Direction of Trade Flows……129

Figure 3.4-a: Financial Integration……130

Figure 3.4-b: Composition of Financial Assets and Liabilities……...……...131

Figure 3.5-a: Comparison of Group-Wide GDP Indices……...132

Figure 3.5-b: Comparison of Trade Weighted Emerging South GDP Growth across Different Geographical Regions……..133

Figure 3.6: Cross-Group Correlations (10 Year Rolling Window Using Output Weighted Indices)……..134

Figure 3.7: Growth Impact of the North……135

Figure 3.8: Growth Impact of the Emerging South……...136

Figure 4.1-a: IMKB-100 Index and Market Value of Stock Units Held by Foreign Banks, Brokerage Houses or Individuals in Istanbul Stock Exchange…….265

Figure 4.1-b: Annual Share of Foreign Investors in Total Market Value and Share of Foreign Purchases in Total Value Traded in Istanbul Stock Exchange……265

Figure 4.2: Capital Inflows to Turkey……266

Figure 4.3: Components of the Net Private Disposable Income……267

Figure 4.4: Share of Household Credit in Total Credit Given by Deposit Banks in Turkey.....267

Figure 4.5: Graphical Analysis of the Variables……268

Figure 4.5-a: Real Per Capita Final Consumption Excluding Durables…….268

Figure 4.5-b: Real Per Capita Consumption of Durables……...269

Figure 4.5-c: Real Per Capita Net Private Disposable Income……..270

Figure 4.5-d: Real Per Capita Housing Wealth……..271

Figure 4.5-e: Real Per Capita Time, Savings, and Foreign Currency Deposits…….272

Figure 4.5-f: Real Per Capita Istanbul Stock Exchange Market Capitalization…….273

Figure 4.5-g: Real Per Capita Bank Credit to Private Sector…….274

Figure 4.5-h: CPI Based Real Effective Exchange Rate……275

Figure 4.6: Joint Plots of the Explanatory Variables with the Dependent Variable
(Real Per Capita Final Consumption Excluding Durables)……..276

Figure 4.6-a: Real Per Capita Net Private Disposable Income and
Real Per Capita Final Consumption Excluding Durables……..…276

Figure 4.6-b: Real Per Capita Housing Wealth and
Real Per Capita Final Consumption Excluding Durables…….276

Figure 4.6-c: Real Per Capita Time, Savings, and Foreign Currency Deposits and
Real Per Capita Final Consumption Excluding Durables……277

Figure 4.6-d: Real Per Capita Istanbul Stock Exchange Market Capitalization and
Real Per Capita Final Consumption Excluding Durables……277

Figure 4.6-e: Real Per Capita Bank Credit to Private Sector and
Real Per Capita Final Consumption Excluding Durables……278

Figure 4.6-f: CPI Based Real Effective Exchange Rate and
Real Per Capita Final Consumption Excluding Durables……278

Figure 4.7: Joint Plots of the Explanatory Variables with the Dependent Variable (Real Per Capita Consumption of Durables)……279
Figure 4.7-a: Real Per Capita Net Private Disposable Income and Real Per Capita Consumption of Durables……...279
Figure 4.7-b: Real Per Capita Housing Wealth and Real Per Capita Consumption of Durables……..……279
Figure 4.7-c: Real Per Capita Time, Savings, and Foreign Currency Deposits and Real Per Capita Consumption of Durables……...280
Figure 4.7-d: Real Per Capita Istanbul Stock Exchange Market Capitalization and Real Per Capita Consumption of Durables……...280
Figure 4.7-e: Real Per Capita Bank Credit to Private Sector and Real Per Capita Consumption of Durables……...281
Figure 4.7-f: CPI Based Real Effective Exchange Rate and Real Per Capita Consumption of Durables……281
Figure 4.8: Misspecification and Stability Tests for VAR System in Levels for Non-Durables Consumption……..282
Figure 4.9: Misspecification and Stability Tests for Unconditional Vector Error Correction Model for Non-Durables Consumption……284
Figure 4.10: Misspecification and Stability Tests for Conditional Vector Error Correction Model for Non-Durables Consumption……...286
Figure 4.11: Misspecification and Stability Tests for Final Conditional Vector Error Correction Model for Non-Durables Consumption……..288

Figure 4.12: Misspecification and Stability Tests for Parsimonious Conditional Vector Error Correction Model for Non-Durables Consumption……...290

Figure 4.13: Misspecification and Stability Tests for VAR System in Levels for Durables Consumption……292

Figure 4.14: Misspecification and Stability Tests for Unconditional Vector Error Correction Model for Durables Consumption……...294

Figure 4.15: Misspecification and Stability Tests for Conditional Vector Error Correction Model for Durables Consumption……..296

Figure 4.16: Misspecification and Stability Tests for Final Conditional Vector Error Correction Model for Durables Consumption……..298

Figure 4.17: Misspecification and Stability Tests for Parsimonious Conditional Vector Error Correction Model for Durables Consumption……..300

Figure 5.1: Income from Ownership of Dwellings……353

Figure 5.2: Distribution of Real and Imputed Mean Housing Wealth by Income Groups……...353

Figure 5.3: Distribution of Dwelling Stock in Cities by Date of Construction……..354

Figure 5.4: Share of Building Construction in GDP……..355

Figure 5.5: Share of Building Construction by Public and Private Sector in Gross Fixed Capital Formation……355

Figure 5.6: Annual Changes in Consumer Price Index for All Items and Housing……...356

Figure 5.7: Average Annual Interest Rates……356

Figure 5.8: New Buildings and Additions According to Construction Permits…….357

Figure 5.9: Completed and Partially Completed New Buildings and Additions According to Occupancy Permits…….357

Figure 5.10: New Dwelling Units According to Construction Permits……..358

Figure 5.11: New Dwelling Units According to Occupancy Permits……358

Figure 5.12: Average Mortgage Debt as a Share of GDP (2001-2005)…….359

Figure 5.13: Allocation of Total Credit Given by Deposit Banks……..360

Figure 5.14: Share of Household Credit in Total Credit Given by Deposit Banks……361

Figure 5.15: Allocation of Household Credit Given by Deposit Banks…….362

Figure 5.16: Maturity of Consumer Credit for Housing in 2006……...363

Figure 5.17: Real Price Per Square Meter Floor Area……...364

Figure 5.18: Quarterly Residential Floor Area Construction in Square Meters…….364

Figure 5.19: Stock of Floor Area of Dwellings in Square Meters after Depreciation……365

Figure 5.20: Real Per Capita Housing Wealth……...365

Figure 6.1: Percentage Distribution of Consolidated Government Budget……423

Figure 6.2-a: Average Annual Interest Rates……424

Figure 6.2-b: Annual Changes in Consumer Price Index for All Items and Interest Rates on 3 Month-Time Deposits……..424

Figure 6.3: IMKB-100 Index and Monthly Returns……..425

Figure 6.4: Total Number of Domestic and Foreign Active and Identified Investors……426

Figure 6.5: Market Value of Stock Units held by Foreign Banks, Brokerage Houses or Individuals under the Custody of Clearing and Settlement Center (TAKASBANK) of the Istanbul Stock Exchange……427

Figure 6.6: IMKB-100 Index and Value of the Stock Transactions Realized on Behalf and Account of Foreign Banks, Brokerage Houses or Individuals……428
Figure 6.7: Share of Foreign Investors in Total Market Value of Stock Units Held Under the Custody of Clearing and Settlement Center of the Istanbul Stock Exchange and Annual Share of Foreign Purchases in Total Value Traded……..429
Figure 6.8: Net Purchases by Foreign Banks, Brokerage Houses and Individuals and Monthly Return on IMKB-100 Index……430

List of Tables

Table 2.1: Selected Survey of Empirical Literature…….53

Table 2.2: Countries Included in the Sample…….....54

Table 2.3: Ranking of Average Output Correlations……...55

Table 2.4: Ranking of Average Bilateral Trade Measures……...56

Table 2.5: Ranking of Average Financial Openness…….....58

Table 2.6: Ranking of Average Macroeconomic Similarity……59

Table 2.7: Ranking of Average Structural Similarity……..60

Table 2.8: Summary Statistics of Data Used in GMM-IV Estimation (I-III)……...61

Table 2.9: Summary Statistics of Data Used in GMM-IV Estimation (IV-VI)……...62

Table 2.10: Summary Statistics of Data Used in 3SLS Estimation…….63

Table 2.11-a: GMM-IV and OLS Estimation with Trade Integration Variables…….64

Table 2.11-b: OLS Estimation with Trade Integration Variables……65

Table 2.12-a: GMM-IV Estimation of the Full Model with Financial Integration
And Policy Variables……66

Table 2.12-b: OLS Estimation of the Full Model with Financial Integration
And Policy Variables……67

Table 2.13-a: GMM-IV Diagnostic Tests of the Estimation
with Trade Integration Variables ……...…….68

Table 2.13-b: GMM-IV Diagnostic Tests of the Estimation of the Full Model
with Financial Integration and Policy Variables…….69

Table 2.14-a: Three Stage Least Squares Estimation: Model I……70

Table 2.14-b: Three Stage Least Squares Estimation: Model II……..71

Table 2.14-c: Three Stage Least Squares Estimation: Model III…..……...72

Table 2.15: Marginal Effects of One Standard Deviation Increase in Variables

on Average Band-Pass Filtered Output Correlations……73

Table 3.1: Size Distribution of Groups……..119

Table 3.2: Average Growth Rates of Macroeconomic and Sectoral Aggregates……...119

Table 3.3: Changes in the Sectoral Composition……...120

Table 3.4: Changes in the Composition of Trade……..121

Table 3.5-a: Intra-Industry Trade Intensity……122

Table 3.5-b: Intra-Industry Trade Intensity……123

Table 3.6: Contribution to World GDP Growth……124

Table 3.7-a: Cross-Group Correlations (Output Weighted Indices)……...……....125

Table 3.7-b: Correlations between North and Emerging South

(Correlations with Output Weighted Emerging South Index)…….125

Table 3.7-c: Correlations between North and Emerging South

(Correlations with Trade Weighted Emerging South Indices)……125

Table 3.8: Intra-Group Correlations (Trade Weighted Indices)…….126

Table 3.9: Intra-Group Correlations (Trade Weighted Indices)…….126

Table 3.10: Benchmark GDP Growth Regressions……...127

Table 4.1: Annual Growth Rates of the Variables…….214

Table 4.2: Chronology of Major Legal, Economic, Political

and Financial Events in Turkey…….215

Table 4.3: Augmented Dickey Fuller Test…….....216

Table 4.4: HEGY Seasonal Unit Root Test……..217

Modeling the Wealth Effects on Non-Durables Consumption (GCFINEXLDR)

Table 4.5-a: Lag Length Selection…….219

Table 4.5-b: VAR System Model Comparison using F and χ^2 Tests…….219

Table 4.6: VAR System in Levels…….220

Table 4.7-a: F Tests on Regressors……222

Table 4.7-b: F Tests on Significance of Each Variable……..222

Table 4.7-c: F Tests for Lag Exclusion…….222

Table 4.8-a: Residual Diagnostics for Individual VAR Equations……223

Table 4.8-b: Residual Diagnostics and
Vector Misspecification Tests for VAR System……223

Table 4.8-c Correlation of Residuals…….223

Table 4.9: Johansen Cointegration Test…….224

Table 4.10: Unconditional Vector Error Correction Model……...225

Table 4.11-a: F Tests on Regressors……..227

Table 4.11-b: F Tests on Significance of Each Variable……227

Table 4.11-c: Lag Exclusion Tests…….…...227

Table 4.12-a: Residual Diagnostics for Individual Equations
in Unconditional VEC Model…….228

Table 4.12-b: Residual Diagnostics and Vector Misspecification Tests
for Unconditional VEC System……...228

Table 4.12-c: Correlation of Residuals……..228

Table 4.13-a: Restrictions on β Coefficients and Weak Exogeneity Tests
on α Adjustment Coefficients……...229

Table 4.13-b: Multivariate Stationarity Test……..229

Table 4.14: Conditional Vector Error Correction Model……...230

Table 4.15-a: Residual Diagnostics for Individual Equations
in Conditional VEC Model……..232

Table 4.15-b: Residual and Vector Misspecification Tests
for Conditional VEC Model……232

Table 4.15-c: Correlation of Structural Residuals……..232

Table 4.16: Final Conditional Vector Error Correction Model……..233

Table 4.17-a: F Tests on Regressors……..237

Table 4.17-b: F Tests on Significance of Each Variable……237

Table 4.17-c: Tests on Significance of Each Lag……..237

Table 4.18-a: Residual Diagnostics for Equations in Final Conditional VEC Model……238

Table 4.18-b: Residual and Vector Misspecification Tests
for Final Conditional VEC Model……...238

Table 4.18-c: Correlation of Residuals……..238

Table 4.19: Parsimonious Conditional Vector Error Correction Model……239

Table 4.20-a: Residual Diagnostics for Equations
in Parsimonious Conditional VEC Model.....241

Table 4.20-b: Residual Diagnostics and Vector Misspecification Tests
for Parsimonious Conditional VEC Model…….241

Table 4.20-c: Correlation of Residuals……..241

Modeling the Wealth Effects on Durables Consumption (GCDR)

Table 4.21-a: Lag Length Selection……...242

Table 4.21-b: VAR System Model Comparison using F and χ^2 Tests……...242

Table 4.22: VAR System in Levels……...243

Table 4.23-a: F Tests on Regressors……..245

Table 4.23-b: Tests on Significance of Each Variable……...245

Table 4.23-c: F Test for Lag Exclusion……245

Table 4.24-a: Residual Diagnostics for Individual VAR Equations……..246

Table 4.24-b: Residual Diagnostics
and Vector Misspecification Tests for VAR System……...246

Table 4.24-c: Correlation of Residuals……..246

Table 4.25: Johansen Cointegration Test……...247

Table 4.26: Unconditional Vector Error Correction Model……...248

Table 4.27-a: F Tests on Regressors……..250

Table 4.27-b: F Tests on Significance of Each Variable……250

Table 4.27-c: Lag Exclusion Tests……....250

Table 4.28-a: Residual Diagnostics for Individual Equations
in Unconditional VEC Model……251

Table 4.28-b: Residual Diagnostics and Vector Misspecification Tests
for Unconditional VEC System……...251

Table 4.28-c: Correlation of Residuals……..251

Table 4.29-a: Restrictions on β Coefficients and Weak Exogeneity Tests
on α Adjustment Coefficients……...252

Table 4.29-b: Multivariate Stationarity Test……..253

Table 4.30: Conditional Vector Error Correction Model……...254

Table 4.31-a: Residual Diagnostics for Individual Equations
in Conditional VEC Model…….256

Table 4.31-b: Residual and Vector Misspecification Tests
for Conditional VEC Model……256

Table 4.31-c: Correlation of Structural Residuals……..256

Table 4.32: Final Conditional Vector Error Correction Model……..257

Table 4.33-a: F Tests on Regressors……..260

Table 4.33-b: Tests on Significance of Each Variable……...260

Table 4.33-c: Tests on Significance of Each Lag……..260

Table 4.34-a: Residual Diagnostics for Equations in Final Conditional VEC Model.....261

Table 4.34-b: Residual and Vector Misspecification Tests
for Final Conditional VEC Model……...261

Table 4.34-c: Correlation of Residuals……..261

Table 4.35: Parsimonious Conditional Vector Error Correction Model……262

Table 4.36-a: Residual Diagnostics for Equations
in Parsimonious Conditional VEC Model.....264

Table 4.36-b: Residual Diagnostics
and Vector Misspecification Tests for VEC System……...264

Table 4.36-c: Correlation of Residuals……..264

Table 5.1: Rate of Homeownership in Urban Areas……..341

Table 5.2: Distribution of Household Disposable Income…….342

Table 5.3: Income Distribution in Turkey…….....343

Table 5.4: Population Characteristics in Turkey……344

Table 5.5: Urban Population Characteristics in Turkey…….....345

Table 5.6: Characteristics of the Housing Stock in Turkey……...346

Table 5.7: Top Five Cities with the Largest Share
in Building and Dwelling Stock in 2000……346

Table 5.8: New Buildings and Additions According to the Construction Permits
by Type of Investor……...347

Table 5.9: Completed and Partially Completed New Buildings and Additions
According to the Occupancy Permits by Type of Investor……...348

Table 5.10: New Dwelling Units According to the Construction Permits
by Type of Investor.....349

Table 5.11: New Dwelling Units According to the Occupancy Permits
by Type of Investor.....350

Table 5.12: Annual Growth in Private Investment in Construction Sector and GDP.....351

Table 5.13: New Dwelling Units According to Construction and Occupancy Permits
under the Amnesty Law……..352

Table 6.1: Domestic and Foreign Debt Outstanding……..397

Table 6.2: Capital Inflows to Turkey…….398

Table 6.3-a: Financial Asset Allocation…….……399

Table 6.3-b: Size of Financial Assets in the Economy…….….400

Table 6.3-c: Percentage Distribution of Financial Assets……..401

Table 6.4: Investment Portfolio Choices of Domestic and Foreign Residents……...402

Table 6.5: Estimated Gold Stock……...402

Table 6.6: Market Capitalization as Percentage of GDP……...403

Table 6.7: Value Traded as Percentage of GDP……404

Table 6.8: Turnover Ratio……..405

Table 6.9: Number of Listed Companies……...406

Table 6.10: Market Concentration: Ten Largest Companies in Comparison to
Total Domestic Market Capitalization and Value Traded……...407

Table 6.11: Financial Intermediation to the Private Sector……407

Table 6.12-a: IMKB-100 Index and Annual Returns……408

Table 6.12-b: Turkish Lira Based IMKB-100 Index
Maximum and Minimum Monthly Returns……..409

Table 6.13: Breakdown of Identified and Active Accounts Held
under the Custody of Clearing and Settlement Center
and Central Registry Agency of Istanbul Stock Exchange……..410

Table 6.14-a: Breakdown of Investors by Category, Portfolio Size, and Nationality……411

Table 6.14-b: Percentage Distribution of Investors
by Category, Portfolio Size, and Nationality……412

Table 6.15-a: Breakdown of Individual Investors and Portfolio Sizes
by Age Groups in 2006……413

Table 6.15-b: Percentage Breakdown of Individual Investors and Portfolio Sizes
by Age Groups in 2006……414

Table 6.16: Distribution of Domestic Investors by Provinces in 2006……..415

Table 6.17: Investment by Foreign Banks, Brokerage Houses or Individuals in Istanbul Stock Exchange…….416

Table 6.18: Distribution of Domestic and Foreign Capital Raised by IPOs and SPOs…..417

Table 6.19: Historical Consolidated Portfolio Structure of Mutual Funds

Type A Mutual Funds…….418

Type B Mutual Funds…….419

All Mutual Funds……420

Table 6.20: Total Net Assets of Mutual Funds in Emerging Markets……....421

Table 6.21-a: Historical Consolidated Portfolio Structure of Pension Plans……..422

Table 6.21-b: Distribution of Pension Plan Participants by Age Categories….....422

Chapter 1: Introduction

My dissertation analyzes the effects of the globalization phenomenon on economic integration patterns and business cycles with a particular emphasis on emerging market economies from three distinct perspectives.

The phenomenon of globalization and the synchronized slowdown of major world economies alongside the contagious nature of financial crisis in emerging markets have recently incited the interest in understanding the propagation and synchronization of business cycle fluctuations across national borders. Identifying the degree of synchronization and analyzing the global, regional as well as country-specific determinants of international fluctuations are relevant from a number of perspectives including short-run domestic and international policy coordination as well as assessment of the long-run feasibility of monetary unions.

Chapter 2 of my dissertation presents the first essay, which looks at the multiple determinants of business cycle synchronization in a unified framework for 47 countries including 27 emerging markets for 1970-2003.

My research contributes to the synchronization literature along several dimensions. First, the essay examines the intensity of economic linkages across the world for the oil shock, debt crisis and globalization periods. I characterize synchronization trends among different groups of countries with diverse regional, geographical and institutional characteristics. The results show that bilateral correlations are on average unchanged for all countries but there are significant variations among income and regional groups, within which correlations have either increased or decreased over time.

Then I conduct an econometric analysis of multiple mechanisms behind effective economic integration and the propagation of international fluctuations in a unified framework for a large sample of countries. The literature has so far neglected measuring the relative importance of various transmission channels simultaneously and given the data limitations, previous studies have focused on cross-sectional analysis of mainly industrialized economies.

Third, my essay extends and complements the existing literature on trade integration by introducing bilateral trade intensity and intra-industry trade measures separately for a large sample of countries. I control for the nature of trade and free trade area membership. I contribute to the literature by constructing a trade partner similarity measure for both developed and emerging market economies in order to capture the spillovers from common trading partners.

There is already a broad consensus that trade linkages and similarities in economic structure enhance synchronization. However the link with the financial integration is the least researched area both in the context of developed and developing countries. The fourth main contribution of my first essay is that effective bilateral financial integration is measured by using gross private flows to GDP ratios of country pairs. This indicator provides a comprehensive and consistent measure of financial openness for a large sample of developed and emerging market economies in a longer time period covering 1970-2003.

The results from the GMM-IV and simultaneous equations estimations show that trade integration especially in the form of intra-industry trade and similarities in economic structures are the most important determinants of output correlations. While synchronization increases for country pairs with high degrees of financial openness, on

average, global financial integration has a positive but weak effect in the single equation framework. However, results from simultaneous equations show that there is strong feedback from financial openness to trade integration. There are no statistically significant effects on synchronization from trade partner similarity, free trade area membership or being a commodity exporter when macroeconomic policy measures are controlled for. On the other hand, similarity in idiosyncratic fiscal shocks increases synchronization while bilateral real exchange rate volatility has no significant effect. Oil price shocks increase co-movement between countries with similar oil import dependencies.

Chapter 3 of my dissertation presents the second essay, which looks at the changing nature of growth spillovers between developed economies, the North, and developing countries, the South in the context of the profound changes that have been taking place in the trade and financial linkages in the global economy over the past two decades. This essay was co-authored with an IMF economist, Dr. M. Ayhan Kose while I was a research assistant at the Financial Studies Division of the International Monetary Fund Research Department.

My second essay contributes to the literature on the North-South linkages along several dimensions. First, sectoral interactions are examined in addition to the conventional macroeconomic channels of interdependence to have a better understanding of the changing nature of linkages between these two groups. Second, I utilize a comprehensive dataset of 106 countries covering the 1960-2005 period in three distinct sub-periods. The first period of 1960-72 corresponds to the Bretton Woods fixed exchange rate regime. The second period of 1973-85 is associated with a number of common shocks. Finally, the third period, 1986-2005, represents the globalization era where there has been a substantial

increase in the volume of trade and financial flows. By opening their trade and capital accounts during the globalization period, a number of emerging market economies have differentiated themselves from other developing countries in the South.

Third, unlike the traditional North-South literature, the South is considered to be composed of two groups of countries, labeled as the Emerging South and the Developing South. This is based on the extent of a country's integration in the global economy. In particular, the 106 countries in the dataset are divided into three groups of countries. The North is composed of 23 "core" OECD countries, the Emerging South includes 23 emerging markets, and the Developing South contains 60 developing countries.

The essay documents the stylized facts about the evolution as well as composition of trade, financial integration and economic structures of these three groups of economies. Furthermore the contribution of these groups to world economic growth is analyzed over time. The results suggest that the Emerging South economies have increasingly become major players in the global economy because of their rapid economic growth fueled by the dramatic changes in their sectoral structure and international trade and financial linkages. As a result of these changes, the nature of interactions between the Emerging South and North has evolved from one of dependence to multifaceted interdependence.

The stylized facts on the growth linkages across these groups indicate that there has been a noticeable pattern of convergence within each group of the North and Emerging South countries during the globalization period. In particular, growth fluctuations in aggregate output and production of industry and service sectors across the North countries have become more correlated. Similarly, the growth rates of output and industrial production of the Emerging South economies have become more strongly associated with

those of their Emerging Southern trading partners. Cross-group correlations of growth fluctuations suggest that the Emerging South economic activity has appeared to diverge from that of the North in the globalization period.

Using a panel regression framework that controls for other growth determinants as well as common shocks, the econometric results in the essay indicate that the North economies have continued to play a dominant role in explaining the growth dynamics in the rest of the world during the globalization period. However consistent with the stylized facts, the impact of the Northern economic activity on the Emerging South has declined during the globalization period. In contrast, the growth linkages between the North and Developing South have been found to be rather stable over time. The findings also suggest that the North and Emerging South economies have started to exhibit more intensive intra-group growth spillovers. In particular, the effects of the growth from Northern trade partners on Asian emerging market economies have started to decline and they have been experiencing more intra-group growth spillovers during the globalization period in contrast to Latin America.

Chapter 4 of my dissertation presents the third essay. I investigate the effects of fluctuations in the stock market and housing wealth on the consumption behavior in the context of a particular emerging market economy, Turkey. The broadening of equity ownership, deregulation of mortgage markets as well as the recent volatility in worldwide equity prices and housing markets following the sub-prime mortgage crisis in the United States have recently stimulated the interest in the potential impact of fluctuations in major asset prices on the real economy. Despite the fact that emerging market economies have experienced substantial financial sector development over the last two decades, studies

investigating the wealth effects of these major asset categories on aggregate consumption are relatively scarce and essentially focus on the OECD economies.

This essay is the first attempt in the literature to explicitly investigate the role of the stock market, housing, and financial wealth in determining the durables and non-durables consumption behaviour for the Turkish economy. I develop vector error correction models using quarterly time series data for the 1987-2006 period.

A major contribution of the essay is that the effects of housing wealth is estimated using an originally constructed quarterly housing wealth series based on primary data on occupancy permits, dwelling stocks from building census and residential floor area prices. Furthermore stock market wealth is estimated using stock market capitalization. Time, savings, and foreign currency deposits in the banking system are used as a proxy for the financial wealth. I estimate models for the durables consumption and non-durables consumption to capture the possible distinct wealth effects of these asset categories. Consistent with the life-cycle and permanent-income hypotheses, net private disposable income, credit to private sector and consumer price index based real exchange rate fluctuations are also controlled for in the vector error correction model as a proxy for income, liquidity constraints and import demand as well as depreciation of non-indexed assets respectively.

My main finding is that in the long-run, non-durables consumption is not significantly affected by the stock market wealth in contrast to the durables consumption. On the other hand, an increase in housing wealth raises the consumption of non-durables in the long-run, but has no effect on consumption of durables. This result is consistent with the fact that home ownership is spread much more evenly over the population in Turkey

while equity ownership is limited. The movements in the stock market capitalization, which is a reflection of foreign capital flows, functions as a leading indicator of the boom-bust periods, and reflects the consumer confidence about the future economic conditions. Although the coefficient estimates appear small, the stock market fluctuations are associated with the durables consumption in Turkey, which are highly sensitive to the cyclical conditions and income uncertainty in the economy.

I find a significant impact from the elimination of liquidity constraints on consumption of durables and non-durables. Even though the coefficient estimates from the cointegrating vector do not indicate any distinct long-run relationship between the durables consumption and housing wealth, the high coefficient capturing the elasticity of durables consumption with respect to bank credit may incorporate the collateral channel, through which the housing wealth affects the household consumption spending. Housing assets constitute the most important form of collateral available to the households because they are less concentrated among certain segments of the population compared to financial assets. The estimated housing wealth series in this paper, based on urban dwellings with occupancy permits, allows the collateral channel to be effective because the housing asset is legally recognized in formal transactions in financial institutions or can be transferred legally to next generations as bequest.

Another set of findings is that in the long-run, increases in financial wealth measured by savings move in the opposite direction with both durables and non-durables consumption. One possible interpretation of this result is that consumers might be using accumulated financial wealth in the banking system to finance their consumption in the long-run. Disposable income has no influence on the consumption of non-durables in the

long-run indicating evidence in favor of the permanent-income hypothesis. On the other hand, increases in disposable income raises the consumption of durables, which indicates that the consumption of durable goods in Turkey is strongly determined by the uncertainty about real income and employment expectations.

Finally, real appreciation of the Turkish Lira has a significant and positive effect on the consumption of durables indicating that elimination of the risk of depreciation of non-indexed assets creates a wealth perception and stimulates the import demand and consumption of durables. On the other hand, real depreciation of the Turkish Lira significantly increases the consumption of non-durables. This result is consistent with the fact that in economies that have persistent and chronic inflation, real interest rates will be negative and therefore savings will be low.

The short-run coefficients show positive wealth effects from the stock market capitalization and financial savings for both durables and non-durables consumption. There are negative effects on non-durables consumption from increases in the housing wealth. This result can be explained by the fact that increases in housing expenses can lower the consumption of households in the short-run.

There are two complementary essays to the analysis investigating the role of stock market, housing and financial wealth in determining the durables and non-durables consumption in Turkey.

Chapter 5 of my dissertation contains the fourth essay, which provides a comprehensive look at the housing market characteristics during the 1987-2006 period in Turkey. The analysis shows that the home ownership is one of the most preferred forms of wealth accumulation for households in Turkey. Furthermore, as a consequence of high

population growth, declining household sizes, massive urbanization, and internal migration from rural to metropolitan areas, the rate of housing construction has not been able to match the rate of household formation, and this has created an excessive demand for affordable housing in Turkey.

Residential construction is an important driver of the gross fixed capital formation and is highly sensitive to the cyclical conditions of the Turkish economy. The private sector is the dominant player in the residential construction. Home ownership is predominantly financed through household savings. The public sector and financial institutions such as mortgage markets have been unable to facilitate affordable housing due to an unfavorable macroeconomic climate caused by high inflation, high interest rates, and lack of institutional infrastructure. As a consequence, the excess demand for housing in Turkey has been met by the construction of unauthorized dwellings in squatter settlements. The supply of high quality and licensed housing for middle and low income households, and the rehabilitation as well as legalization of these squatter settlements are major issues shaping the housing policies in Turkey.

On the basis of these characteristics, this essay develops a methodology to estimate the housing wealth in Turkey using primary sources on housing stock, residential construction figures and average floor area prices obtained from the building census, construction and occupancy permit statistics. The previous studies approximate the housing wealth using total number of households in the population. Since there is a substantial quantity of undocumented and unauthorized dwelling stock in Turkey, using the total number of households to estimate the housing wealth would include the illegal housing. However they are not recognized as an asset in the formal economic system. In contrast,

this essay estimates the urban and legal housing wealth associated with the dwellings with occupancy permits. By this way, the constructed housing wealth series can be used in the estimation of the wealth effect on consumption of durables and non-durables through the collateral channel, which allows home owners to borrow from financial institutions. I compare the movements of the estimated housing wealth series with the developments in the construction sector. They appear consistent and should serve as a means to avoid omitted variable bias in econometric models.

Chapter 6 of my dissertation contains the fifth essay, which analyzes the financial wealth allocation and the characteristics of the financial system in Turkey during the 1987-2006 period. The development, functioning, and structure of the Turkish financial system, and its pattern of integration in world financial markets have been conditioned by growing public sector borrowing requirements and the lack of price stability in Turkey for the last two decades. The main finding of this essay is that the lack of attractive investment opportunities in capital markets, limited development of non-bank financial institutions, and the crowding-out effect from excessive government borrowing contributed to the mobilization of formal savings mainly towards the bank deposits with a significant degree of dollarization, and sovereign debt securities in Turkey. The mutual funds and private pension plans, which play limited roles in the Turkish financial system, have also predominantly invested in public debt instruments.

When the characteristics of the investor profiles in the Istanbul Stock Exchange are analyzed, the foreign institutional investors have a predominant share in the total equity portfolio. As a result, movements of the stock market index are mainly driven by stock transactions realized on behalf of the foreign investors. On the other hand, the share

of domestic institutional investors in the stock market is very limited in comparison to the other world stock markets. The domestic investors are mainly composed of individuals with small portfolio holdings. These findings clearly reveal that the stock ownership is not the preferred way of allocating financial wealth by the domestic investors in Turkey.

Finally, Chapter 7 of my dissertation summarizes the major findings of the essays and evaluates the relevance of these results in the context of the recent global crisis following the sub-prime mortgage market meltdown in the United States. The chapter concludes with suggestions for methodological extensions and future research directions.

Chapter 2: Multiple Determinants of Business Cycle Synchronization

2.1 Introduction

The phenomenon of globalization and the synchronized slowdown of major world economies alongside the contagious nature of financial crisis in emerging markets have recently incited the interest in understanding the propagation and synchronization of business cycle fluctuations across national borders. Identifying the degree of synchronization and analyzing the global, regional as well as country-specific determinants of international fluctuations are relevant from a number of perspectives including short-run domestic and international policy coordination as well as assessment of the long-run feasibility of monetary unions.

There are several venues through which economies can move together. Countries that pursue similar fiscal and monetary policies or have strong trade and financial integration can experience co-movements in business cycle fluctuations because of international transmission of idiosyncratic shocks. Synchronization can also happen due to common shocks such as sharp movements in world interest rates or oil prices. Theoretically however these channels can influence output correlations in either way. Therefore, literature on business cycles has failed to provide us with any explicit directions as to how cross country linkages will move synchronization when we take into account the complexity and varying degree of intensity of these channels across the world.

Given the theoretical ambiguity, few empirical studies so far have attempted to measure the importance of individual transmission channels on business cycle

synchronization.[1] Frankel and Rose (1998) find that closer international trade links result in more closely correlated business cycles for 20 industrialized countries. Gruben, Koo and Millis (2003) extend the paper by Frankel and Rose by separating the effects of intra and inter-industry trade flows for the same OECD countries and find that intra-industry trade contributes more to synchronization. Calderón, Chong and Stein (2007) find for 147 countries that higher bilateral trade intensity leads to higher business cycle synchronization. In a complementary paper, the same authors show that the impact of trade intensity is stronger for members of free trade areas. Shin and Wang (2003) find, using a panel study of 12 Asian countries, that synchronization is strengthened only when increased trade is accompanied by more intra-industry trade.

Imbs (2004) indicates that specialization patterns have a sizeable impact on business cycle synchronization reflecting the differences in GDP per capita. He finds that the impact of trade intensity and other channels on correlations becomes smaller if sectoral production structures are significantly asymmetric.

Despite the evidence on trade and similarity of economic structure, there are only three papers that focus on the role of financial integration alongside other channels. Imbs (2004) looks at the trade in goods, financial openness and specialization for mainly developed countries and finds that financial linkages significantly increase synchronization even though countries also get more specialized and less correlated as a result. In a subsequent paper, Imbs (2006) confirms the previous results for a core of 12 developed and periphery of 31 developing countries. Finally, Otto, Voss and Willard (2003) look at number of directions for business cycle synchronization using an extensive database for 22

[1] Table 2.1 summarizes a selected survey of the empirical literature.

OECD economies. They find that intensity of trade, financial integration, exchange rate stability, similarity of economic structures and a common propensity to adopt new technologies all act to increase synchronization.

Few papers explicitly look at the role of fiscal and monetary policy alongside other channels and mainly find that convergence of fiscal policies lead to higher synchronization while there is no clear evidence for the role of monetary policy similarity and exchange rate stability.[2]

In summary, there is already a broad consensus that trade linkages and similarities in the economic structures enhance synchronization. However the link with the financial integration is the least researched area both in the context of developed and developing countries. Furthermore the literature has so far neglected measuring the relative importance of various transmission channels simultaneously and the existing studies have limited their scope mainly to developed countries. From this perspective, this paper contributes to the literature by looking at the multiple determinants of business cycle synchronization in a unified framework for 47 countries including 27 emerging markets for 1970-2003.

This paper extends and complements the existing literature on trade integration by introducing bilateral trade intensity and intra-industry trade measures separately for a large sample of countries. In addition to controlling for the nature of trade and free trade area membership, trade partner similarity measure is introduced for the first time for both

[2] For example, Darvas, Rose and Szapáry (2005) show using a panel of 21 OECD countries and a cross section of 115 countries that fiscal convergence is systematically associated with synchronized business cycles. Clark and van Wincoop (2001) find no effect for European countries concluding that net effect of fiscal policy on cycle correlations can be small when country specific fiscal shock is both a source and a stabilizer of business cycles. Bergman (2004) shows that European business cycles are more synchronized during the flexible exchange rate period and monetary policy differentials contribute to synchronization. In contrast, Clark and van Wincoop (2001) find no evidence for monetary policy coordination and exchange rate

developed and emerging market economies in order to capture the spillovers from common trading partners.

Despite the fact that data on bilateral trade flows have been widely available, bilateral foreign direct investment positions as well as data on portfolio and debt holdings are fairly new to the literature covering mainly the period of globalization in the 1990s. Existing studies have predominantly used binary indicators of financial integration measures mainly in the context of developed countries. Another main contribution of this paper is that effective bilateral financial integration is measured by using gross private flows to GDP ratios of country pairs. This indicator provides a comprehensive and consistent measure of financial openness for a large sample of developed and emerging market economies in a longer time period covering 1970-2003.

Finally, macroeconomic similarity measures as well as impact of oil prices are controlled in order to explain the relative importance of idiosyncratic policy and global common shocks.

Taken together, in contrast to the previous literature, this paper utilizes a more comprehensive dataset covering various characteristics of country pairs in a longer time period.

The first part of the paper explains the data and empirical methodology to calculate various linkages that are theoretically relevant for co-movements. Business cycle synchronization is defined bilaterally as the contemporaneous correlation of cyclical components of real GDP of two countries. In this part, the paper looks at the intensity of economic linkages across the world for the oil shock, debt crisis and globalization periods

---

stability. Kose, Prasad and Terrones (2003a) also find no association between monetary policy similarity and

and identifies synchronization trends among different group of countries with diverse regional, geographical and institutional characteristics. Results show that bilateral correlations are on average unchanged for all countries but there are significant variations among income and regional groups, within which correlations have either increased or decreased over time. Regional clusters within European Union countries and among Japan, Korea, Hong Kong and the ASEAN countries have become more evident from the oil shock period to globalization in comparison to Latin America and the G-7.

The second part of the paper conducts GMM-IV and simultaneous equations regressions over the determinants of business cycle synchronization for the entire period of 1970-2003 and calculates the marginal effects of significant linkages on bilateral output correlations.

Consistent with the previous literature, results show that bilateral trade intensity, intra-industry trade and similarity in economic structures are the most important determinants of output correlations. There are no statistically significant effects from trade partner similarity. Integration especially in the form of intra-industry trade has the highest marginal effect on average correlations therefore it is the main driving force behind effective economic integration and successful optimum currency areas.

The main finding of the paper is that on average global financial integration, measured as the sum of gross private flows to GDP ratios of country pairs, has a positive but weak (if not insignificant) effect. However the relationship is non-linear and synchronization increases for country pairs with high degrees of financial openness. Results from simultaneous equations estimation shows that there are strong indirect effects

---

correlations with G-7 aggregates in consumption and output.

from financial openness. Countries that have high degrees of trade integration are also the pairs that engage in higher volumes of international financial transactions. Financial globalization boosts trade integration and leads to convergence in economic structures and therefore indirectly increases output synchronization.

In contrast to the previous literature, this paper finds no statistically significant effect from free trade area membership when similarities in macroeconomic policies are accounted for. Although regional economic integration has been an integral part of globalization, formation of free trade areas is not a guarantee for higher synchronization if member countries have low degrees of trade and financial integration, diverse macroeconomic fundamentals and lack of policy coordination. Specifically, similarity in idiosyncratic fiscal shocks increases output correlations while bilateral real exchange rate volatility has no statistically significant effect. Finally the results show that oil price shocks increase output co-movements for pairs with similar oil import dependencies.

The remainder of the paper is organized as follows. Section 2 discusses the theoretical and empirical literature. Section 3 describes the data and methodology and provides stylized facts about economic linkages and evolution of output correlations. Section 4 conducts an econometric analysis to statistically identify the channels affecting synchronization and measures the marginal effects of significant variables. The final section concludes.

2.2 Background on Theoretical and Empirical Literature

There has been a burgeoning research that has examined how integration affected the synchronization of business cycles. Most of these recent studies predominantly focus on identifying the changing nature of co-movements. Although important common

conclusions have been reached, depending on the country coverage, time period as well as econometric techniques used in the analysis, there are still diverse findings about the evolution of synchronization.[3] There are various transmission channels related to how fluctuations in one country can spillover into other economies. However theory fails to provide us with any explicit directions as to how enhanced cross country linkages will move business cycle synchronization when we take into account the complexity and varying degree of intensity across the world. Given this perspective, the following section discusses the channels of business cycle synchronization.

2.2.1 Trade in Goods and Services

Trade is an important linkage between countries. Theoretically, however, there is no consensus on whether increased trade intensity leads to more or less correlation of cycles.

The effects of trade on output and investment co-movements depend on the intrinsic characteristics of trade partners and on the nature of their relationships. For example, Kenen (1969) and Krugman (1993) argue that if trade takes place mainly Heckscher-Ohlin type as usually observed in developing countries, specialization would induce the industrial structures of the trading countries to diverge resulting in less synchronized business cycles. In contrast, Kose and Yi (2001) propose that if trade is

[3] Within the literature that focuses on OECD countries, Lumsdaine and Prasad (2003), Kose, Otrok and Whiteman (2005), Canova, Ciccarelli and Ortega (2007) find that there is evidence of a world business cycle and an increase in co-movements with the globalization. Another stream of literature by Stock and Watson (2005), Helbling and Bayoumi (2003) and Bordo and Helbling (2003) however finds little tendency towards increasing international synchronization. Few studies simultaneously examine both developed and developing countries. Kose, Otrok and Whiteman (2003) show that world factor is more important in explaining fluctuations for the developed economies whereas regional and country-specific factors are more important for developing economies. Kose, Prasad and Terrones (2003a) find that on average there is little evidence that co-movements have recently become more synchronized at a global level and any observed increase in spillovers through trade and financial integration is mostly limited to industrial countries.

mainly of intra-industry type or vertical specialization in various stages of production through outsourcing, then greater trade integration is likely to lead to a higher synchronization as a result of symmetric industry-specific shocks.

Frankel and Rose (1998) also show that trade facilitates the transmission of aggregate shocks across countries when positive shock in one country increases demand for goods produced in other countries. The magnitude of such spillover depends on the intensity of trade among countries. In addition to demand spillovers, Coe and Helpman (1995) show that the process of trade integration could foster diffusion of productivity, knowledge and technological shocks.

Another dimension of the impact of trade on synchronization can be observed if countries trade intensively with similar trade partners. Calibration results of a theoretical model built by Kose and Yi (2002) with a three country set-up, international financial autarky and complete markets with transportation costs show that for small countries that constitute a small share of world GDP, what matters for their GDP correlation is not so much the absolute changes in bilateral trade but their indirect trade with the rest of the world. Therefore in empirical analysis, they suggest controlling for intensity of third party trade.

In summary, the total effect of trade intensity on cycle correlation is theoretically ambiguous and presents a question that could only be solved empirically. More generally, the mechanisms by which international trade affects business cycle synchronization should be understood only when intra- and inter-industry trade effects are accounted for separately. Important differences in the pattern of trade and specialization among country pairs suggest that the impact of trade integration on cyclical correlations may differ

substantially between developing and developed countries. In addition, co-movements can be enhanced if countries trade intensively with same group of countries. From this perspective, free trade agreements can augment the impact of bilateral trade through demand spillovers from similar trade partners.

2.2.2 Financial Linkages

Financial market linkages are another widely acknowledged mechanism for the international transmission of business cycle shocks. Over the last two decades both developing countries and industrialized economies have experienced a greater degree of financial openness as measured by the successive reductions of capital account restrictions and an increasing amount of cross border holdings of international assets and liabilities. Greater policy openness fostered a strong increase in both short-term and long-term capital flows and generated higher correlations and co-movements between financial markets around the world. Economists however have divergent opinions on how to interpret these figures for the real economy. Similar to trade, financial linkages have intricate and ambiguous effects on business cycle synchronization. At the same time, the impact of the financial channel could be highly non-linear depending on the degree of financial integration.

In theory, Backus, Kehoe and Kydland (1992) shows that if international capital markets are well integrated, by being insured against idiosyncratic shocks, countries can afford to exploit comparative advantage further. Specialization in production will expose the economies to more industry or country specific shocks and therefore lower the correlations of output and investment. Meanwhile diversification of consumption risk through international asset trade will increase the consumption correlations. Kalemli-

Ozcan, Sørensen and Yosha (2003) provide the empirical evidence for OECD countries and the U.S. states that higher financial market integration indeed enhances specialization and leads to less symmetric output fluctuations.

Although these papers indicate a risk sharing effect for industrialized economies, for most developing countries, financial integration happens to increase idiosyncratic macroeconomic fluctuations by creating periodic crises and boom-bust cycles of growth. International financial integration can potentially promote domestic financial sector development which in turn can help to moderate macroeconomic volatility. Unfortunately, for developing economies insufficient levels of financial integration have perpetuated the underdeveloped nature of domestic financial system which inadvertently attracts more volatile and pro-cyclical short-term capital flows.[4]

There is also another stream of literature that contrary to the predictions of Backus, Kehoe and Kydland, finds higher GDP and investment correlations as a result of financial integration. As discussed by Aizenman and Noy (2004), global financial integration is strongly linked with trade openness and reinforces the positive effect on business cycle synchronization in output and investment. Furthermore, the composition of capital flows can have a significant influence on the degree of synchronization. Jansen and Stockman (2004) show that FDI linkages act a lot like intra-industry trade. FDI not only adds to the capital formation of the country but also helps to transmit supply shocks globally by

[4] Kose, Prasad, and Terrones (2003b) find for a large group of industrial and developing countries over the period 1960-1990 that increasing financial openness has been linked with rising relative volatility, but only up to a certain threshold. Their coefficient estimates indicate that economies with gross flows higher than 50 percent of GDP have improved consumption smoothing possibilities and reduced relative output volatility. However such levels of gross capital flows are typically experienced over sustained periods of time only by some industrial countries.

allowing companies to become part of the transnational production network facilitating technology and skill transfer.

International capital flows have important implications for the business cycle dynamics across the world. A large body of literature on contagion argues that capital flows to different countries in particular to developing countries in the same region are synchronized due to simultaneous liberalization of capital markets, shifts in liquidity conditions in industrial countries triggering flows into riskier markets in search for higher yields, or the herd behavior of international investors in response to changes in global risk aversion.[5]

As investors herd or capital flows follow similar patterns, financial integration has made the local financial asset prices more responsive to world or regional financial conditions inducing increasing co-movements of equity and bond markets across the world. Therefore financial spillovers through integrated markets may influence corporate and household wealth and balance sheets across the world creating synchronized changes in private investment and consumption during business cycles. Linkages through equity investments may also explain synchronization of business cycles between regions that are weakly linked in macroeconomic fundamentals.

With increasing globalization of banking business, the conditions of the banking system in advanced economies can strongly influence the magnitude and volatility of international bank flows. Increasing leverage in the global banking system can reinforce synchronized business cycle expansions in economies with heavy reliance on external financing of investment and consumption as well as pro-cyclical growth in credit and asset

[5] See Calvo et.al. (2001), Fanelli and Rozada (2004), Kim et. al. (2003), Kodres and Pritsker (2002).

prices leading to a buildup of financial imbalances. At the same time, "sudden stops" in external financing by common lenders in response to banking stress in financial centers can be associated with synchronized economic downturns, particularly for borrowers with large exposures to short-term foreign currency denominated debt. Increasing non-performing loans and defaults by corporations can deteriorate bank balance sheets across the world. Increasing counterparty risks can cause further spillovers to other countries' banks creating a vicious circle of loss of confidence and credit crunch with severe implications for the global economic activity. Therefore, the possibility of "financial accelerator" effects implies that the business cycle synchronization as a consequence of international capital flows and correlated financial shocks could be very strong for financially integrated economies (see IMF, 2001a).

2.2.3 Similarity in Economic Structure

Another important determinant of co-fluctuations is the similarity of production patterns at the sectoral level even after holding financial and trade integration constant. Imbs (2001) empirically documents a long-run upward trend in the extent of business cycle synchronization as economies grow, become increasingly diversified and converge to similar production structures as they grow rich. Poor countries however are typically characterized by limited diversification associated with little co-fluctuations because they share few sectors with the rest of the world. Furthermore, dependence on production of non-fuel primary commodities creates vulnerability to terms of trade fluctuations affecting the idiosyncratic volatility. Given the evidence, the similarity of economic structure at the sectoral level is an important determinant of synchronization.

2.2.4 Institutional Similarity

Historical, legal as well as institutional similarity and common characteristics can also make countries more susceptible to particular types of shocks or similar propagation mechanisms and thus may increase co-movements.

2.2.5 Economic Integration and Macroeconomic Similarity

Over the last decades, countries have engaged themselves in various forms of cooperation. Although findings point out the positive influence of economic integration, actual effects on business cycle correlations depend on the inherent characteristics of participating countries and on the nature of their relationships. It might be the case that trade and financial integration with diverse macroeconomic fundamentals as well as lack of policy coordination might expose countries to asymmetric shocks and have dampening effects on synchronization.

As demonstrated with the European Union experiment, nominal macroeconomic convergence in government balance, public debt and inflation rates is a critical precondition for monetary integration. Standard real business cycle models find that idiosyncratic fiscal shocks, i.e. increases in government spending, have a strong, persistent and positive impact on output. Fatás and Mihov (2003) empirically show that governments that use discretionary fiscal policy aggressively induce significant macroeconomic volatility of output. Related with that, studies show there are major differences between developed and developing countries in terms of fiscal policy behavior. While OECD countries can smooth out large components of demand shocks with countercyclical fiscal policy, emerging markets often fail to do so due to a weak tax base, high dependence on commodity markets and borrowing constraints during growth slowdowns. Kaminsky,

Reinhart and Végh (2004) find that for developing countries, the capital flow cycle and macroeconomic cycle reinforce idiosyncratic shocks in output because discretionary fiscal policy is highly pro-cyclical for most developing countries and markedly so among the middle income countries. In conclusion, similarity in fiscal policy behavior could be an important factor affecting business cycle co-movements.

Although the optimal currency area literature points out potential benefits from having stable exchange rates such as reduced transaction costs for trade and financial flows and a high degree of monetary policy coordination, the association between exchange rate stability and the synchronization of business cycles is both theoretically and empirically unclear. [6]

2.2.6 Common shocks

Analysis of synchronization should control for common shocks in order to fully understand the impact of other transmission channels. Rise in oil prices are usually associated with recessions and it is known that cycles are globally more synchronized during such periods.

2.3 Data and Methodology

Given the theoretical and empirical background, the following section of the paper will describe the data, methodology and the stylized facts about the economic linkages and evolution of the output correlations. Section 4 will conduct econometric analysis to identify the channels affecting synchronization in a unified framework and measure the marginal effects of variables.

---

[6] Clark et. al. (2004) finds no negative association between exchange rate volatility and trade and investment flows. On the real side of the economy, Baxter and Stockman (1989) provide evidence that there are no systematic differences in the behavior of output, consumption and government consumption spending under alternative exchange rate systems. Kouparitsas (2003) finds that degree of co-movement of G-7 and ERM countries during postwar era is only affected by the changing nature of underlying shocks and the propagation mechanisms irrespective of the exchange rate regime.

2.3.1 Data

Countries included in the study:

There are 47 countries in this study, 27 of which are emerging market economies. Table 2.2 gives the list of countries classified according to regional groups.

Measurement of Variables:

- Business Cycle Synchronization:

Business cycle synchronization is measured bilaterally by computing the simple contemporaneous correlation between cyclical components of annual real GDP in local currency prices for country i and j over the time span τ following Frankel and Rose (1998).[7]

$$\rho_{\tau}^{Y} = corr\,(y_i, y_j) = \frac{\text{cov}(y_i, y_j)}{\sqrt{\text{var}(y_i)} \times \sqrt{\text{var}(y_j)}}$$

In order to isolate the cyclical component, the logarithm of real GDP is de-trended using band-pass filter proposed by Baxter and King (1999).[8]

---

[7] Most studies in the synchronization literature use the simple bilateral correlation coefficients in order to measure the strength and direction of the association between the cyclical components of the annual real GDP of two countries. Another commonly used bilateral measure includes the concordance index developed by Harding and Pagan (2002). The concordance index measures a non-parametric statistic for "concordance," which describes the proportion of the time that the cycles of two series spend in the same phase. The concordance index is a useful complementary concept to the correlation analysis, which measures the periodicity of co-movement by providing information on the clustering of turning points. Measurement of coherences is another commonly used methodology, which calculates the lead-lag correlations between two variables in the frequency domain. Unlike static correlations used mainly with annual series, this technique is more suitable for high-frequency data.

[8] There are several techniques used in the business cycle literature to decompose economic variables into trend and cycle. (See Inklaar, 2005 for a discussion) The most straightforward filtering technique is first differencing, which removes the trend of the time series. This method however puts a larger weight on higher frequencies and induces a phase shift in the peaks and troughs of the differenced series.

Most studies apply the Hodrick-Prescott (HP) filter, the Baxter-King (BK) and Christiano-Fitzgerald (CF) band pass filters. The HP filter minimizes the deviations of the series from the trend component, subject to a predetermined smoothness parameter. The HP filter can be interpreted as a high pass filter that removes fluctuations with a frequency of more than 32 quarters and puts those fluctuations into the trend component. In this sense, HP filter defines the business cycle with a periodicity of eight years or less. The HP filter however faces several criticisms. In addition to the arbitrary choice of smoothness parameter, the filter has been found to artificially amplify the business cycle frequencies and induce spurious cycles. HP filtered data also shows more serial correlation than first-differenced data. Furthermore if one-time permanent shock

Cross sectional data is constructed for the 1970-2003 period for the econometric analysis. However in order to capture the stylized facts about the time variation in the strength of synchronization as well as differences in economic linkages of regional and income groups, the data is split into three separate time periods.

Period 1: 1970-79 capturing the era of oil shocks

Period 2: 1980-89 capturing the era of debt crisis in developing countries

Period 3: 1990-2003 capturing the era of globalization

Construction of Major Variables that Affect Business Cycle Synchronization:

Trade Related Variables:

- Bilateral Trade Intensity:

Average intensity of bilateral international trade between countries i and j during the period τ relative to their combined GDP is approximated by Trade1 measure.

$$Trade1_{\tau}(i,j) = \frac{1}{T}\sum_{t}\frac{X^{t}_{i,j} + M^{t}_{i,j}}{Y^{t}_{i} + Y^{t}_{j}}$$

where $X^{t}_{i,j}$ denotes total merchandise exports from country i to j in year t. $M^{t}_{i,j}$ represents imports to i from j. Y^{t}_{i} and Y^{t}_{j} denote nominal GDP of country i and j measured in U.S.

---

occurs, the filter generates shifts in the trend that do not actually exist. Therefore the HP filter smoothes out the effects of sudden structural breaks in previous and subsequent periods.

The band-pass filter developed by Baxter and King (1999) is a widely used and the preferred method in the synchronization literature. Main advantage of the band-pass filter is that it eliminates both the high frequency fluctuations of less than 6 quarters, which may be due to measurement errors and low frequency fluctuations of more than 32 quarters reflecting long term growth components, while retaining only the cyclical components of the series. Baxter and King (1999) estimate the weights for the two-sided filter using frequency domain arguments. Isolating frequencies between 6 and 32 quarters is consistent with the historical NBER business cycles. This approach is often preferred to the HP filter, as the highly irregular short-term fluctuations can be excluded. CF band-pass filter quantitatively yields similar results to the BK band-pass filter.

The BK band-pass filter is also the filter of choice in this analysis. Results obtained in this paper are also replicated with first differencing and HP filter and robust to any of these detrending techniques. For the sake of brevity, they are not reported but are available upon request from the author.

dollars at time t. The annual trade volume measures are in nominal terms converted to U.S. dollars.

Trade2 is a measure of average bilateral trade relative to total trade of the two countries.

$$Trade2_{\tau}(i,j) = \frac{1}{T}\sum_{t} \frac{X^{t}_{i,j} + M^{t}_{i,j}}{X^{t}_{i} + M^{t}_{i} + X^{t}_{j} + M^{t}_{j}}$$

Bilateral trade data is obtained from the IMF Direction of Trade Statistics.

- Intra-industry Trade:

In order to control for the effects of intra-industry trade alongside the volume of trade, a measure of intra-industry trade intensity by Grubel and Lloyd (1975) is used.

$$Intratrade_{\tau}(i,j) = \frac{1}{T}\sum_{t} \left(1 - \frac{\sum_{k} \left| X^{k}_{i,j,t} - M^{k}_{i,j,t} \right|}{\sum_{k} (X^{k}_{i,j,t} + M^{k}_{i,j,t})}\right)$$

where $X^{k}_{i,j,t}$ is total nominal exports of product k from country i to country j at time t and $M^{k}_{i,j,t}$ is total nominal imports of product k from country j to country i at time t. Bilateral annual intra-industry trade data for 81 industries using four-digit (ISIC)classification during 1976-99 is obtained from Trade and Production Database of Nicita and Olarreaga 2006).

- Trade Partner Similarity:

Similarity of trade partners can influence synchronization if country pairs trade intensively with the same economies. In order to control for the third country demand spillovers, trade partner index is constructed following Thellesen (2003):

$$Tradepartner_{\tau}(i,j) = \frac{1}{T}\sum_{t}\sum_{s \neq i,j}^{N} \left| \frac{X^{t}_{i,s} + M^{t}_{i,s}}{Y^{t}_{i}} - \frac{X^{t}_{j,s} + M^{t}_{j,s}}{Y^{t}_{j}} \right|$$

where $X^{t}_{i,s}$ is the total nominal exports from country i to country s at time t and $M^{t}_{i,s}$ is total nominal imports from country s to country i divided by nominal GDP of country i in U.S.

dollars. $X^t_{j,s}$ is total nominal exports from country j to country s and $M^t_{j,s}$ is total nominal imports from country s to country j divided by nominal GDP of country j. The absolute difference of trade intensities of country i and j with country s is aggregated for the rest of n countries in the sample and averaged for the time period. Low index refers to high trade partner similarity.

- FTA Membership:

In order to test whether free trade area membership enhances the international transmission of business cycle shocks, FTA measure is constructed from the fraction of years that a free trade agreement or customs union is in place for any country pair for the given time period.

Variables Related to Financial Integration:

- ITO Capital Account Openness Measure:

The IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) indices provide a binary indicator of restrictions on financial flows based on official statements of national authorities. To reflect the evolution of capital account restrictions over time, Chinn and Ito (2002) develop continuous measures using the AREAER indices. This paper calculates the degree of financial integration between country pairs i and j by taking the period average of the sum of Chinn and Ito measures of two countries. This index takes higher values when pairs of countries have officially more open capital account regimes.

$$ITO_\tau(i,j) = \frac{1}{T}\sum_t (ITO_i^t + ITO_j^t)$$

De-jure measures fail to fully capture the extent of enforcement and effectiveness of capital controls and reflect the actual degree of international financial asset transactions. Nevertheless ITO measure will be used as an instrument for the de-facto global financial integration.

- Global Financial Integration:

Despite the evidence on trade and similarity of economic structures, the link between synchronization and financial integration is the least researched area in the synchronization literature. Although data on trade flows are widely available, bilateral foreign direct investment positions are fairly new to the literature.[9] Furthermore the extent of portfolio and debt holdings among developing countries is limited and global financial flows have clearly been dominated by flows from developed countries.[10] Indirect measures of equity and bond market integration through comparison of real returns are predominantly available for developed economies.[11] Thus given these limitations,

[9] Forbes and Chinn (2004) use the BIS database to measure bank lending from country i to country j and OECD Direct Investment Statistics to measure stock of foreign direct investment from country i to country j as share of country i's GDP. Otto, Voss and Willard (2003) obtain stocks and flows of the inward and outward foreign direct investment positions from the OECD Direct Investment Statistics. The major shortcoming of these datasets is that they are available on a bilateral basis only for a few developed OECD economies from the 1980s onward and only unidirectional for a few emerging markets from the 1990s onward with missing data points. Herrero and Ruiz (2006) use bilateral data on FDI and portfolio equity flows using Spanish Balance of Payments for the period of 1998-2003.

[10] The Coordinated Portfolio Investment Survey (CPIS) provides direct observations on bilateral asset holdings of 67 source and 223 destination countries. Holdings can be decomposed into equities and short and long-term debt securities. Imbs (2006) uses this survey for a core of 12 developed and periphery of 31 developing countries together with capital and current account restriction indices to measure the degree of financial integration. Although this paper is an important contribution to the synchronization literature by studying the direct and indirect effects of disaggregated capital flows, the paper suffers from major limitations. The fact that components of CPIS are highly correlated among themselves and some economies were absent from the data set due to underreporting in the survey, has created multi-collinearity problems in the estimation. Another limitation is that the survey data is available for only 2001 and 2002.

[11] Otto, Voss and Willard (2003) look at bilateral spreads in returns of debt instruments and compare the mean absolute spread in the real returns of two countries' stock indices as a measure of equity market integration for OECD countries.

comprehensive and consistent measures of effective financial integration for both developed and developing countries have so far been difficult to achieve.

One methodology to overcome this shortcoming has been developed by Imbs (2004) using the Lane and Milesi-Ferretti (2001) dataset reporting cumulative external positions for a large sample of developing and industrial economies.[12] Major problem with this methodology is that it is hard to interpret the results for countries that are both issuers and recipients of capital flows like the United States and countries showing relatively balanced net external positions like the European Union members. Only the Netherlands, Switzerland, Japan and Germany in the Lane and Milesi-Ferretti dataset display net issuer position for an extended period of time whereas other developed and developing countries are net recipients of capital flows if not switchers. Furthermore, the effect of flows from third countries to the country pair in study could not be captured by this measure. Lane and Milesi-Ferretti (2001) show that net foreign assets positions are inversely related to real interest rate differentials and other fundamentals like relative output level, public debt and demographic factors. Therefore, measure by Imbs reflects the extent of interest rate differential between countries rather than level of financial integration.

Given these limitations in the existing methodologies, this study constructs a general measure of global financial integration over the period τ.

---

[12] Imbs (2004) argues that two countries with massively positive (negative) net foreign assets holdings will tend to be both issuers (recipients) of capital flows and should experience less bilateral flow than two economies where one is structurally in surplus and the other in deficit. The bilateral financial integration measure will be higher for pairs of countries with diverging external positions that are more likely to lend and borrow from each other than pairs of countries with similar external positions. Lane and Milesi-Ferretti dataset is used to construct:

$$Finance_{\tau}(i,j) = \frac{1}{T}\sum_{t}\left|\left(\frac{NFA}{GDP}\right)_{i,t} - \left(\frac{NFA}{GDP}\right)_{j,t}\right|$$

NFA refers to net foreign asset position of country i and j, namely the accumulated sum of net positions in foreign direct investment, equities and debt.

$$Finglobalization_{\tau}(i,j) = \frac{1}{T}\sum_{t}((\frac{GPF}{GDP})_{i,t} + (\frac{GPF}{GDP})_{j,t})$$

The ratio of gross private capital flows (GPF) to GDP in U.S. dollars is obtained from the World Development Indicators for 1970-2003 and the GPF measure is the sum of the absolute values of direct, portfolio and other investment inflows and outflows recorded in the financial accounts of balance of payments statistics, excluding changes in the assets and liabilities of monetary authorities and general government. Given the fact that this study covers a wide range of issuer as well as recipient countries with different FDI, portfolio as well as debt flow intensities, gross measure is a better proxy for studying the effects of global financial integration on synchronization patterns.

Variables Related to Economic Structure:

- Similarity of Economic Structure:

Krugman index of concentration is used extensively in the synchronization literature to measure similarity in sectoral production patterns.

$$Structure_{\tau}(i,j) = \frac{1}{T}\sum_{t}\ \sum_{s=1}^{S}\ \left|\frac{GDP_{i,s}}{GDP_{i}} - \frac{GDP_{j,s}}{GDP_{j}}\right|$$

where $GDP_{i,s}$ denotes the value added in U.S. dollars of sector s in country i and GDP_i is the nominal GDP in U.S. dollars at year t. $Structure_{\tau}(i,j)$ is a broad measure of the average of discrepancies in the GDP shares of agriculture, industry and services sectors of countries i and j over the period τ .[13]

[13] Industry refers to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). Agriculture corresponds to ISIC divisions 1-5. Services correspond to ISIC divisions 50-99. Sectoral data is from the World Development Indicators.

- Primary Commodity Exporter:

Excessive dependence on production of non-fuel primary commodities creates vulnerability to terms of trade fluctuations. Commodity dummy is constructed for pairs of countries whose average ratios of primary commodity export share (of merchandise exports) to manufacturing export share both exceed 1 for the period τ. Export share data is obtained from World Development Indicators.

$$Commoditydummy_{\tau}(i,j) = 1 \quad \text{if} \quad \frac{1}{T}\sum_{t}\left(\frac{\%X_{agricultur\,e+food+ores\&metals}}{\%X_{manufactur\,ing}}\right)^{t}_{i,j} > 1$$

Institutional Similarity Variables:

-Common Language:

A dummy variable is introduced for countries that share a common language. Common language is a proxy for the historical, legal as well as institutional similarity between countries.

Macroeconomic Similarity and Policy Coordination Variables:

- Fiscal Policy:

Fiscal shocks have strong, persistent and positive impact on output. Several papers in the literature have measured fiscal policy similarity using correlation coefficient or mean absolute difference of budget deficit to GDP ratios of country i and j for the period τ.[14] One major problem with this variable is that primary balance as a proportion of GDP is strongly determined by the cyclical stance of the economy. For example, tax revenues increase in good times therefore the government budget surplus is endogenous to the cycle.

Given this limitation, this paper will look at the period average of the absolute differences in the government spending to GDP ratios of country i and j.

$$Govtspending_{\tau}(i,j) = \frac{1}{T}\sum_{t}\left|\left(\frac{Govtspending}{GDP}\right)_{i,t} - \left(\frac{Govtspending}{GDP}\right)_{j,t}\right|$$

Data for general government final consumption expenditure includes government current expenditures for purchases of goods and services including compensation of employees as well as the expenditures on national defense and security.

The government spending differential has already been used in the previous literature as an instrument for the budget deficit correlation however it will be better to introduce it directly as a measure of fiscal policy similarity.[15] In this paper, averaging the government spending differences over a long period of time will eliminate any concerns arising from cyclicality but will give us an indicator of degree of convergence in the government spending behavior.

- Exchange Rate Stability

One measure of monetary policy coordination is fixity of exchange rates. Otto, Voss and Willard (2003) suggested using period standard deviation of quarterly difference in logarithms of the bilateral real exchange rate between country i and j at time t.

$$RER^{t}(i,j) = E^{t}_{i,j} \times \frac{CPI_{j,t}}{CPI_{i,t}} \qquad Realexchrate_{\tau}(i,j) = \sigma(\Delta \log\ RER^{t}(i,j))$$

Bilateral rates are calculated from IMF International Financial Statistics using nominal exchange rates of both countries vis a vis U.S. dollar and consumer price index of country i and j.

---

[14] Van Wincoop and Clark (2001), Thellesen (2003), Shin and Wang (2003), Bergman (2004) and Darvas et. al. (2005)

[15] As mentioned in the theoretical review, increasing government spending can be an automatic stabilizer. At the same time, aggressively used discretionary fiscal policy can increase idiosyncratic output volatility. Furthermore the macroeconomic cycle is often reinforced by pro-cyclical government spending in the case of developing countries.

Global Shocks

- Oil Dependency and Oil Shock Index

In order to identify the pairs of countries that are net fuel exporters for the period τ, net-fuel-exporter dummy is constructed.

$$Net\text{-}fuel\text{-}exporterdummy_t(i,j) = 1 \text{ if } (\frac{1}{T}\sum_t (\frac{M_{fuel} - X_{fuel}}{Y})^t_{i,j}) < 0$$

Proxy for the effects of oil price on pairs of countries with similar net fuel import dependencies is captured by the following index used by Frankel and Rose (1998).

$$Oil_\tau(i,j) = \frac{1}{T}\sum_t (P^t_{OIL} \times (\frac{M_{fuel} - X_{fuel}}{Y})_{i,t} \times (\frac{M_{fuel} - X_{fuel}}{Y})_{j,t})$$

Oil index is constructed by taking the period average of the product of real price of oil (nominal average crude oil price deflated by world CPI at 2000) and net fuel imports to GDP ratios of country i and j. M_{fuel}, X_{fuel} and GDP values are all in current U.S. dollars.

2.3.2 Descriptive Statistics and Stylized Facts about Synchronization

Having identified the methodology to measure the business cycle synchronization and the linkages affecting co-movements, this section of the paper presents the descriptive statistics and the stylized facts about the evolution of synchronization. In Figure 2.2.1, countries are grouped in geographical regions and according to free trade areas. Positive and negative output correlations that are significant at 10 percent and 5 percent levels are shaded to indicate the highly synchronized and countercyclical pairs.

Several interesting observations can be made from these correlation matrices in terms of clusters of highly synchronized country groups. It can be seen that for the oil shock period, real GDP cycles of the G-7 countries including Japan are highly synchronized among each other. Real GDP cycles of small open economies such as

Switzerland, Austria, Belgium, Denmark, the Netherlands and Portugal in Europe; Chile in Latin America and Korea, Hong Kong and the ASEAN countries in Asia are highly correlated with some countries of the G-7 group.

Looking at the 1980-89 debt crisis period, it can notably be seen that real GDP correlations become highly significant for some Latin American countries like Chile, Mexico, Paraguay, Uruguay, Bolivia and Peru. In Asia, during this period, output cycles become significantly correlated among the ASEAN countries such as Indonesia, Malaysia, Philippines and Singapore. In Europe, GDP cycles of small open economies like Belgium, Finland, Sweden, Greece, Portugal and Spain are highly correlated among themselves and with European members of the G-7 group. Strong intra-group synchronization can no longer be observed among the G-7.

During the globalization period, formation of the European Union has created a strong regional cycle. There is a clear pattern of bifurcation in correlations among the G-7 members of the continental Europe and the United States, Canada and the United Kingdom.[16] Japan with the exception of Italy no longer exhibits strong co-movement with the rest of G-7 mainly due to the recession after the burst of the stock market bubble and the banking crisis in the early 1990s.

With the formation of the NAFTA, American and Canadian output cycles become significantly synchronized. There is no apparent cycle from any of the other regional integration arrangements in Latin America. Mexico displays predominantly negative correlations with the rest of Latin America due to the Tequila crisis.

[16] Stock and Watson (2005) also identify the emergence of two groups within the G-7 consisting of Euro-zone countries and English speaking countries, within which correlations have increased but across which correlations have dropped.

In Asia, the cyclical association between Japan, Korea, Hong Kong and the ASEAN countries becomes highly visible with the globalization. On the other hand, Australia, New Zealand, China and India do not exhibit a strong cyclical relationship with this group of countries. In fact, Australian output is countercyclical to Japan and Korea.

In Table 2.3 and Figure 2.2, average bilateral output correlations are computed and the correlations are compared for each period on the basis of income and regional groups. Results show that for all countries, there is no discernible change in the degree of output synchronization across time periods.[17] Developed countries have the highest bilateral correlations in all periods in comparison to other income groups. Bilateral output correlations among developed country pairs are the highest in the oil shock period and unchanged from 1980-89 to 1990-2003. For emerging market pairs, there is evidence that output correlations are increasingly becoming more synchronized. On the contrary, synchronization between the developed and emerging market countries declines during the globalization period.[18]

Looking at the regional trends, for Europe, synchronization steadily increases in 1980-89 and 1990-2003 relative to the oil shock period. For the European Union, bilateral output correlations are higher in the globalization period although average output correlations are almost same as during the oil shock period. For the G-7 group, correlations are the highest in the 1970s and decline steadily over time in the 1980s and 1990s.[19]

---

[17] This result is consistent with the findings of Kose, Prasad and Terrones (2003a). They also show that the common global factor has not significantly changed the extent of business cycle co-movement across sub-periods and on average there is little evidence that co-movements have become more synchronized during the period of globalization.

[18] Kose et. al (2003a) also show that for developing countries correlations of individual country output and consumption growth fluctuations with the fluctuations of G-7 aggregates decline in the 1990s.

[19] Heathcote and Perri (2004) find similar results for declining cross country correlations among G-7 countries.

In Latin America, regional bilateral synchronization is the highest during the debt crisis period but somewhat declined in the globalization period although still higher than in the 1970s. Finally for Asia, average bilateral correlations increase with the globalization in comparison to any other period. Average correlations among Japan, Korea, Hong Kong and the ASEAN group are more than double the average correlations in the entire Asian region.

When we look at the magnitudes of average correlations in Table 2.3, the ranking of the regions tends to change over time. For the oil shock period, the G-7 countries have the highest bilateral synchronization. During the debt crisis period, Latin American averages become the highest among all the regions followed by the G-7 and the European Union. During the globalization period, Japan, Korea, Hong Kong and the ASEAN group have the highest correlations exceeding the level of synchronization within the European Union and the G-7. Latin America drops towards the end of the ranking although they are higher than the oil shock period.

In the following section, averages of major variables affecting business cycle synchronization will be compared in order to identify any congruence with the synchronization trends in the world. Tables 2.4 - 2.7 give the descriptive statistics and stylized facts about trade, financial integration, macroeconomic and structural similarity measures.

2.3.3 Descriptive Statistics and Stylized Facts about Linkages Affecting Synchronization

Trade Integration:

Table 2.4 shows that for all countries and income groups, on the average, bilateral trade volume, intra-industry trade intensity and diversification of trade partners are rising

from 1970-79 to the globalization period. There is also an increasing trend towards formation of free trade areas. For emerging market economies, when country pairs with Singapore and Hong Kong are excluded, it can be clearly seen that trade integration is roughly the same for the 1970s and 1980s but trade intensity and intra-industry trade have substantially accelerated with the globalization together with trade partner diversification and FTA formation.

At the regional level, there is a secular rising trend in all trade integration measures for the European Union and Asian pairs. Trade volume and intra-industry trade intensity of European and G-7 pairs as well as pairs in the Americas are roughly the same in the oil shock and debt crisis periods but they dramatically increase with the globalization. Trade partner diversification and FTA formation increase substantially in the 1990s.

When average magnitudes are compared, the ranking of trade intensity measures is roughly unchanged across all time periods. Highest trade integration, FTA formation and trade partner similarity measures are observed among developed country pairs like the G-7 and the European Union. Japan, Korea and the ASEAN group increase their trade intensity in the 1990s. Latin America has the lowest trade integration. In terms of trade partner similarity, Latin American pairs have the most similar trading partners in all periods. Trade partner diversification increases overall for Asia and Japan, Korea and the ASEAN pairs over time.

Financial integration:

For all the countries in Table 2.5, there is a secular trend towards financial globalization in terms of higher gross private flows to GDP ratios and capital account openness. Both measures significantly increase in the globalization period. Capital account

restrictions in emerging markets, particularly in Latin America, got more severe in the 1980s and were substantially liberalized in the 1990s.

Comparatively, the ranking of financial integration changes over time. The highest financial integration and openness in capital account regime are observed in all periods among the developed countries, in particular the European Union and the G-7 pairs. Latin American pairs have declining gross private flows to GDP ratios while Asia experiences progressive global financial integration and liberalization of capital account regime.

Macroeconomic Similarity:

Table 2.6 shows that for all countries, average differences in government spending to GDP ratios are roughly similar for each period. It is observed that government spending behavior of the developed-emerging market pairs are significantly divergent giving support to the view that there are differences in discretionary fiscal policy between developed countries and emerging markets.

Real exchange rates are the most stable among developed country pairs while emerging market pairs have the greatest volatility. There is virtually no bilateral real exchange rate variation in Asia. Real exchange rate variation in Latin America and the Americas is higher than the average of real exchange rate variability in all countries especially in the 1980s.

Structural Similarity:

Table 2.7 shows that for all country pairs, similarity in economic structure is roughly unchanged across periods. Developed-emerging market pairs have the most divergent economic structures. G-7 and the European Union pairs have the most similarity.

Over the decades, there is a substantial decline in the number of country pairs that are non-fuel primary commodity exporters due to export diversification. Emerging market

pairs had 43 percent commodity producers in the 1970s and this figure drops to 34 percent in the 1980s and to 7 percent in the 1990s. Share of commodity exporters has substantially declined in all regions and drops from 22 percent to almost 1 percent in Asia. In Latin America, during the 1970s, all countries were commodity exporters and this figure drops to 46 percent of the group in the 1990s. Export diversification has significantly increased in Asia as can be seen in Table 2.4. Latin America is still a predominantly commodity producing region despite export diversification. Furthermore the highest number of net-fuel exporting pairs can be found in Latin America.

2.4 Econometric Methodology

There are in total 1081 bilateral correlations for 47 countries included in the study. However due to missing data, results are obtained using a smaller number of bilateral correlations. Econometric estimation of the full model is conducted using GMM-IV method for the entire period of 1970-2003.[20]

$$\rho_{\tau}^{Y}(i,j) = \alpha_1 + \alpha_2 T_{i,j} + \alpha_3 F_{i,j} + \alpha_4 M_{i,j} + \alpha_5 S_{i,j} + \alpha_6 X_{i,j} + \varepsilon \qquad (2.1)$$

Tables 2.11a-b and Tables 2.12a-b show the GMM-IV and OLS estimation results. Tables 2.13a-b show the diagnostic tests for each specification. Durbin-Wu-Hausman tests clearly indicate that trade variables are endogenous and need to be instrumented with standard gravity variables.[21] First stage results and instrument quality tests show that

[20] $T_{i,j}$ captures the bilateral trade integration using fta and logarithms of trade1, trade2, intratrade and tradepartner measures. $F_{i,j}$ captures the financial globalization of the country pairs using logarithm of finglobalization measure. $M_{i,j}$ includes the logarithm of govtspending and logarithm of realexchrate measures that are used in the regression to estimate the effects of fiscal policy similarity and the bilateral real exchange rate volatility. $S_{i,j}$ includes variables related to similarity of economic structure such as logarithm of structure, commoditydummy and oil measures. Finally $X_{i,j}$ captures fixed characteristics such as geographical region and common language.

[21] Larger economies have higher trade volumes therefore logarithm of the product of average real GDPs of two countries is a good instrument to capture the overall economic size of the country pairs. The logarithm of the product of average populations of two countries is another instrument for bilateral trade intensity and intra-industry trade because big countries have higher volumes of trade. Finally distance matters because geographical proximity facilitates the trade integration between countries.

gravity variables are appropriate instruments for trade measures therefore estimation results are robust to weak identification or under-identification problems. Over-identification tests and C-statistics show that excluded instruments are orthogonal to the errors and other variables like finglobalization, govtspending, realexchrate are truly exogenous and need not be instrumented. Despite the fact that Pagan-Hall statistics fail to reject the null that errors are homoscedastic, estimation of the models is still conducted with GMM-IV method. In the absence of heteroscedasticity, GMM-IV is still asymptotically no worse than two-stage least squares instrumental variables estimation in large samples. However major advantage of GMM-IV is that it provides a robust estimation when observations from the same group are correlated with each other but not with observations from other groups.[22]

The first three specifications in Table 2.11-a are related with trade integration and structural similarity variables. Trade1, trade2 and intratrade are introduced separately in order to test whether or not bilateral trade volume relative to total GDP as well as total trade of two countries or degree of intra-industry trade between country pairs affects output correlations. Furthermore country pairs with more than one standard deviation above or below the average trade integration measure are given a dummy variable. In the regression analysis, dummy variables are interacted with the trade measures to distinguish the effects of high and low degrees of trade integration.[23]

---

[22] For the synchronization variable, there might be a problem with independence of observations when one country's idiosyncratic business cycle influences the correlation coefficients with the rest of the countries in the sample. For example German-Japan correlation over 1970-2003 period may not be independent from German-France correlation. Clark and van Wincoop (2001) and Thellesen (2003) thus use GMM-IV method precisely to address this problem.

[23] Table 2.8 shows that there are 113 country pairs that have very high trade1 and trade2 measures and 102 pairs with very high intra-industry trade integration. When we identify these country pairs, they mainly correspond to G-7 group, rich OECD countries as well as some pairs from Japan, Korea, Hong Kong and ASEAN group. There are in total 102 country pairs with very low bilateral trade integration and 106 pairs with very low intra-industry trade integration. They are mainly emerging market country pairs like Indonesia-

Results from the first three specifications show that bilateral trade intensity, intra-industry trade and similarity in economic structures are the most important determinants of bilateral output correlations. There are no statistically significant effects from trade partner similarity when bilateral trade intensity relative to GDP and intra-industry trade is controlled for. These results do not give support to the conclusion of Kose and Yi (2002) that for small countries what matters for their GDP correlation is not so much their bilateral trade but their indirect trade with the rest of the world. However there is a weak effect from trade partner diversification when bilateral trade relative to total trade measure is used. This result is in line with the stylized facts that highly synchronized countries in the sample have gone through expansion of trade links with the rest of the world and diversification of trade partners during the globalization period.

Consistent with the previous literature, results also give support to the hypothesis that progressive increase in bilateral trade intensity enhances the output synchronization. Given the fact that countries identified with high degrees of trade integration are mainly composed of developed countries, differential coefficient estimates are clearly supportive of the findings by Calderón et. al, (2007) that the impact of trade integration is significantly higher for the sample of developed countries.

The following three specifications in Table 2.12-a look at the full model by including financial integration and macroeconomic similarity measures. In order to distinguish the impact of different degrees of financial openness, country pairs with more than one standard deviation above or below the average logarithm of finglobalization

---

Venezuela that are geographically remote commodity producers or structurally asymmetric developed-emerging market country pairs like Japan-Uruguay.

measure are given a dummy variable to identify the pairs with high and low degrees of financial openness.[24] In the regression analysis these dummy variables are interacted with finglobalization measure to estimate the differential effect of varying degrees of openness on synchronization.

Although trade integration measures are all significant, on the average, global financial integration has a positive but weak effect in the fifth and sixth specifications when bilateral trade relative to total trade and intra-industry trade measures are used.[25] This result is consistent with the theoretical findings that financial linkages can have offsetting effects on real co-movements. While financial integration can in principle reduce country specific income risk through asset diversification, and reduce the correlation between outputs because of increased specialization, at the same time, it can increase the transmission of shocks that affect real variables across borders. Given the fact that this study covers a wide range of issuer as well as recipient countries with varying degrees of financial market development and FDI, portfolio as well as debt flow intensities, the effects of financial openness on synchronization patterns, on average, can be ambiguous.

Financial linkages can lead to higher degrees of synchronization of output fluctuations when financial sectors become more integrated with the global financial system. In fact, according to the coefficient estimates in Table 2.12-a, country pairs with very high degrees of financial openness that is quantified as the sum of gross foreign assets

[24] Table 2.9 shows that 114 country pairs have high degrees of financial globalization. Pairs with United Kingdom, Hong Kong, Singapore and Netherlands are included in this category because these countries are international financial and banking centers. 74 pairs have low degrees of financial globalization. Specifically pairs with Bolivia, Colombia, Peru, Morocco, Egypt, Indonesia, India, Turkey and Greece fall into the category of low financial openness.

[25] The financial openness coefficient ceases to be significant when the bilateral trade volume to GDP ratio is controlled for. This result indicates that strong bilateral trade integration relative to the size of the economies dominates the effects from openness to international capital flows.

and liabilities relative to GDP, experience higher output correlations. In other words, the impact of the financial channel could be highly non-linear depending on the degree of global financial integration of the country pairs. This result is consistent with the argument that business cycle synchronization could be strong for economies with very high degrees of financial openness. First of all, global financial integration, in particular in the form of FDI linkages, reinforces the positive effects of trade openness on business cycle synchronization in output. Second, countries that are more financially open tend to be affected by common disturbances in global financial markets such as shifts in liquidity conditions or changes in global risk aversion. As investors herd or international capital flows follow similar patterns, spillovers to local asset prices through integrated markets can increase synchronized changes in real economic activity among country pairs with very high degrees of financial openness. Finally, heavy reliance on international banking loans can increase the sensitivity to conditions in financial centers and reinforce the synchronized business cycle expansions and downturns in economies with large exposures to foreign debt.

In contrast to the findings of Calderón (2003), there is no statistically significant evidence that free trade area membership increases synchronization when similarity of macroeconomic policy measures is accounted for. Specifically, results are supportive of the findings by Darvas et. al. (2005) that similarity in idiosyncratic fiscal shocks increases bilateral output synchronization while bilateral real exchange rate volatility has no statistical effect. Nevertheless fiscal policy does not have a significant influence when intra-industry trade intensity is controlled.

All these results shed some light on the stylized fact that regional economic integration in Latin America has failed to generate significant cyclical co-movements in contrast to other sub-regional arrangements in the world. First of all, Latin America has the lowest intra-regional trade integration and intra-industry trade and is still predominantly dependent on commodity exports. Furthermore as observed by Arroyo (2002), levels of trade openness are also different among countries. While the Central American countries and Mexico are very open, Mercosur countries are relatively closed. The Andean Community has an intermediate level of openness. Trade partner similarity is the highest in Latin America in comparison to all other regions. For example trade with the United States, Canada and the European Union exceeds intra-regional trade for Mercosur countries. Latin American countries have the lowest global financial integration measures in comparison to other regions. With the exception of the NAFTA, there is also little evidence for intra-regional financial integration. In contrast, major sources of international banking and equity flows come from the European Union, the United States, Canada and Japan. Finally when it comes to macroeconomic convergence and volatility, regional arrangements in Latin America suffer from periodic exogenous shocks, divergent macroeconomic and fiscal performance and the exchange rate instability among members. Considering these factors, despite high correlations observed during the 1980s due to the debt crisis, there is hardly any evident trend for regional synchronization when contrasted with the NAFTA, the ASEAN and the European Union. Thus formation of free trade areas is not a guarantee for higher degree of synchronization if member countries have low trade and financial integration, asymmetric economic structures, diverse macroeconomic fundamentals as well as lack of policy coordination.

Finally, results from all the specifications indicate that oil price shocks increase synchronization for pairs with similar oil import dependencies.

Equation (2.1) provides an estimate of the total effects of transmission channels on cycle synchronization. Coefficient estimates in the reduced form contain not only the direct effect of the variable on cycle synchronization but also the indirect effects emanating through other variables. In order to separate direct and indirect impact of economic linkages on business cycle synchronization and identify the feedback between variables, three-stage-least-squares simultaneous equations system similar to Imbs (2006) is estimated. [26]

[26] In a model of simultaneous equations with endogenous variables, a necessary but not sufficient condition for identification is known as the order condition, which states that in order for an equation to be identified, the number of exogenous variables not appearing in the equation must be at least as great as the number of endogenous variables appearing on the right hand side of the equation. A necessary and sufficient condition for identification, on the other hand, is called the rank condition, which states that, an equation is identified if and only if at least one nonzero determinant of order can be constructed from the equations of the variables excluded from that particular equation, but included in the other equations of the model. (See Greene, 2008 and Wooldridge, 2002) The linear simultaneous equations system as a whole is identified if it is possible to derive unique values of the structural coefficients from the reduced form of the linear system. Unless the rank condition is satisfied for each equation, the system is unidentified. (See Baum, Schaffer, Stillman, 2007b). A rule of thumb for rank condition implies that identification of an equation is possible if that equation excludes one or more variables that are present elsewhere in the model. In addition, if every equation has its own predetermined variable, the entire model is identified.

In the above simultaneous equations model, the first equation measures the output synchronization using the same variables and logarithmic transformation as in GMM-IV model. Identification of this system requires distinct instruments for $T_{i,j}$, $F_{i,j}$ and $S_{i,j}$. Gravity measures are used as instruments for trade equation. ITO capital account openness measure instruments for financial globalization suggesting that countries with higher levels of capital account liberalization can engage in greater volumes of financial asset transaction in international capital markets. ITO measure is not introduced in logarithms. Other instruments are logarithms of product of population and distance. For structure equation, logarithm of average real per capita differential between two countries is used as an instrument for economic similarity on the basis of the argument by Imbs (2001) that economies diversify and converge to similar productive structures as they develop. The econometric estimation routine developed by Baum (2007a) verifies that the order and rank condition is satisfied for each equation in the model as well as the entire system, therefore the simultaneous equations model is identified. These results are available from the author upon request.

$$\rho_{\tau}^{Y}(i,j) = \alpha_1 + \alpha_2 T_{i,j} + \alpha_3 F_{i,j} + \alpha_4 M_{i,j} + \alpha_5 S_{i,j} + \alpha_6 X_{i,j} + \varepsilon_{i,j}^{1} \quad (2.1)$$

$$T_{\tau}(i,j) = \beta_1 + \beta_2 F_{i,j} + \beta_3 S_{i,j} + \beta_4 I_{i,j}^{T} + \varepsilon_{i,j}^{2} \quad (2.2)$$

$$F_{\tau}(i,j) = \gamma_1 + \gamma_2 T_{i,j} + \gamma_3 S_{i,j} + \gamma_4 I_{i,j}^{F} + \varepsilon_{i,j}^{3} \quad (2.3)$$

$$S_{\tau}(i,j) = \eta_1 + \eta_2 T_{i,j} + \eta_3 F_{i,j} + \eta_4 I_{i,j}^{S} + \varepsilon_{i,j}^{4} \quad (2.4)$$

Tables 2.14 a-b-c show the results from three-stage least squares (3SLS) estimation of the three models using different trade integration measures.[27] Results from the first equations show that trade integration variables in all specifications have comparable and similar coefficient estimates to the full GMM-IV model. The structure variable is highly significant as a determinant of output correlations. The oil measure has a statistically positive but weak effect on output synchronization. Government spending similarity, real exchange rate measure, FTA membership, common language and trade partner similarity give the expected coefficient signs but have no statistically significant effect on synchronization when direct and indirect effects of variables are controlled for.

Interestingly, direct effect of financial globalization on output synchronization becomes insignificant in the first equation in all three specifications. This result together with the GMM-IV estimates gives us a very different conclusion than the one reached by Imbs (2006) using bilateral financial asset holdings obtained from the CPIS data and de-jure financial openness indicators. His results show that financial integration has a strong direct impact on output correlations. The findings of this paper however show that financial

[27] Summary statistics in Table 2.10 show that the number of observations is lower than the GMM-IV model because data for the ITO measure is not available for Hong Kong and Hungary. One advantage of excluding Hong Kong and Hungary is that they fall into the category of countries with high financial integration. Therefore omission of financial outliers from the estimation will give more robust results regarding the effects of financial globalization.

integration measured by gross financial flows to GDP influences output correlations only indirectly through trade and structural convergence.

Trade equations in Model I and Model III show that financial openness increases bilateral trade volume to GDP ratio and intra-industry trade intensity. These results are consistent with the findings by Tamirisa (1999) that financial frictions through capital controls and exchange rate restrictions often aggravate the segmentation of goods markets and dampen the trade flows by creating additional transaction costs. Furthermore structural similarity stimulates bilateral trade integration and intra-industry trade. Gravity variables all have the expected coefficient signs showing that larger economies trade more and geographical proximity increases bilateral trade.

The finance equations show that countries that have high degrees of trade integration and intra-industry trade are also the pairs that engage in higher volumes of international financial transactions. Results are consistent with the study by IMF (2002b) indicating the complementary nature of trade and financial integration. First of all, export-import related financial flows and greater demand for financial instruments to hedge the risks associated with trade openness significantly stimulate the deepening of domestic financial markets. Development of financial institutions facilitates integration into the global capital markets by creating an infrastructure for portfolio-equity flows and foreign direct investment. Furthermore trade openness often improves the country's ability to borrow from international capital markets and therefore relaxes the liquidity constraints for mainly export oriented domestic firms.

Differences in economic structures stimulate financial integration giving support to the view that countries that are specialized in production diversify their idiosyncratic output

and consumption risk by engaging in international asset transactions in global capital markets. Small country pairs are found to be more financially open.

Finally, the structure equation shows that bilateral trade integration, intra-industry trade as well as financial openness increase convergence in economic structures between countries. This finding gives support to the existing literature that FDI induced intra-industry trade flows increases the integration of various stages of production through outsourcing. Disparity between development levels of two countries lead to divergence in the economic structures.

Table 2.15 measures the direct and indirect effects of a one standard deviation increase in variables on the average band-pass filtered output correlations estimated using 3SLS method. Results show that the total effect of bilateral trade increases average output correlations from 0.11 to about 0.20. The total effect of financial globalization is not significant. A one standard deviation increase in structural similarity increases average correlations from 0.11 to about 0.16.

Indirect effects of each variable are calculated using the coefficient estimates of the system.[28] Although total effect of financial globalization is very small and statistically insignificant, financial integration effects output correlations mainly through its impact on bilateral trade integration and intra-industry trade. The effect of one standard deviation increase in combined gross private flows to GDP ratios of two countries leads to an increase in average output correlations by about 0.058 in Model I and 0.063 in Model III.

[28]Total effect of T_{ij} on ρ^{Y}_{ij} is given by $\acute{\alpha}_2$ coefficient in the first equation. However this coefficient incorporates both the direct and the indirect effects of trade measure. One standard deviation increase in trade measure increases financial globalization through third equation so effect of trade through financial globalization is given by $\gamma_{2*}\acute{\alpha}_{3.}$ Indirect impact of trade through structure equation is given by $\eta_2*\acute{\alpha}_{5.}$ Furthermore trade will impact F_{ij} which in return leads to an effect on S_{ij} and ultimately on output correlations. This effect is given by $\gamma_2* \eta_3* \acute{\alpha}_5$. Finally trade effect operating through S_{ij} which in turn changes F_{ij} is given by $\eta_2* \gamma_3* \acute{\alpha}_3$.

Similarly financial globalization leads to a convergence in economic structures that in turn increases trade integration. The effect of this relationship is an increase in average output correlations by around 0.004 and 0.007 in first two models and Model III respectively. Furthermore financial globalization has statistically significant indirect effects operating through structure. The impact on structural similarity increases average output correlations by around 0.02 and effects through trade and structure increases average correlations by 0.006 in Model I and 0.007 in Model III although this result is not robust in Model II.

In summary, findings of the 3SLS estimation confirm that trade integration, especially in the form of intra-industry trade, is the main driving force behind output synchronization followed by the structural similarity. However macroeconomic variables cease to have any significant effect when direct and indirect effects of linkages are controlled for. Oil price shocks increase bilateral output co-movements for country pairs with similar fuel import dependencies. Direct effect from financial globalization is not statistically significant. However financial globalization boosts trade integration and leads to convergence in economic structures and therefore indirectly effects synchronization.

2.5 Conclusion

Over the last few decades, there has been a resurgence in the interest for globalization and how economic integration affects the co-movement of business cycles across countries. This study looks at the multiple channels of business cycle synchronization in a unified framework and identifies the mechanisms behind effective economic integration and propagation of international fluctuations. The study introduces new variables such as trade intensity, intra-industry trade, trade partner similarity, free trade area membership, economic similarity, global financial integration, and macroeconomic

policy similarity measures as well as global oil shock to explain the linkages behind synchronization of 47 countries including 27 emerging markets for the 1970-2003 period.

The first part of the paper looks at the evolution of major economic linkages and the bilateral contemporaneous correlations of GDP for the oil shock, debt crisis and globalization periods. Results show that bilateral correlations are on average unchanged for all countries but there is a significant variation among income and regional groups, within which correlations have either increased or decreased over time. Regional cyclical clusters in the European Union and among Japan, Korea, Hong Kong and the ASEAN countries have become more evident from the oil shock period to globalization in comparison to Latin America and the G-7.

The second part of the paper conducts a GMM-IV and simultaneous equations estimations. Results show that bilateral trade intensity, intra-industry trade and similarity in economic structures are the most important determinants of output correlations. On average global financial integration has a positive but weak (if not insignificant) effect. However the relationship is non-linear and synchronization increases for country pairs with higher degrees of financial openness. Simultaneous equations estimation shows that there is a strong positive feedback from financial openness to trade integration. Formation of free trade areas is not a guarantee for higher synchronization if member countries have low degrees of trade and financial integration, diverse macroeconomic fundamentals as well as lack of policy coordination.

Table 2.1: Selected Survey of Empirical Literature

Authors	Sample	Variables Affecting Synchronization	Method
Frankel and Rose (1998)	21 OECD Countries (1959-1993)	trade intensity, oil dependency	2SLS IV Panel Regression
Clark and Van Wincoop (2001)	EMU countries (1963-1997)	border, economic structure std. of annual bilateral nominal exchange rates std. of average annual nominal interest rates correlation of budget deficit to GDP ratio	Cross Sectional GMM-IV
Calderón, Chong and Stein (2007)	147 countries (1960-1999)	trade intensity, economic structure, FTA membership	2SLS IV Panel Regression
Gruben, Koo and Millis (2003)	20 OECD Countries (1965-1998)	trade intensity and intra-industry trade	2SLS IV Panel Regression
Imbs (2001)	49 countries (1950-1992)	economic structure	Cross Sectional 2SLS IV
Imbs (2004)	24 Countries (OECD+ Peru, Philippines, Israel, Chile) (1980-2000)	trade intensity NFA/GDP differences, IMF AREAR index economic structure	Cross Sectional Simulteaneous Equation System
Otto, Voss and Willard (2003)	22 OECD countries (1980-2000)	trade intensity, economic structure FDI intensity, long-term interest rate spreads standard deviation of real equity returns exchange rate volatility short-term interest rate spreads common legal origin, technology adoption	Cross Sectional 2SLS IV
Thellesen (2003)	OECD (1980-2002)	trade intensity, trade partner similarity economic structure correlation of budget deficit to GDP ratio std. of average annual nominal interest rates std. of annual bilateral nominal exchange rates	Cross Sectional GMM-IV
Imbs (2006)	12 developed and 31 developing countries (2001)	trade, economic structure bilateral asset holdings from CPIS survey	Cross Sectional Simulteaneous Equation System
Herrero and Ruiz (2006)	Spain and 104 countries (1990-2003)	trade intensity, economic structure bilateral FDI and portfolio equit flows exchange rate volatility, oil dependency	Cross Sectional Simulteaneous Equation System
Shin and Wang (2003)	12 Asian economies (1976-1997)	trade intensity, intra-industry trade index budget deficit/GDP correlations M2/GDP correlations	2SLS IV Panel Regression

Table 2.2: Countries Included in the Study

Americas	**Asia**	**Europe**	
Developed Countries	Developed Countries	Developed Countries	Emerging Markets
Canada F	Australia C,F	Austria	Hungary
United States	Japan	Belgium	Poland
	New Zealand C	Denmark F	Romania
		England F	Turkey C
Emerging Markets	Emerging Markets	Finland	
Argentina C,F	China F	France	
Bolivia C,F	Hong Kong	Germany	
Brazil C	India	Greece C	
Chile C	Indonesia C, F	Italy	
Colombia C,F	Korea	Netherlands	Middle East - Africa
Mexico C,F	Malaysia C	Norway F	Emerging Markets
Paraguay C	Philippines C	Portugal	Egypt C,F
Peru C,F	Singapore	Spain	Israel
Uruguay C	Thailand C	Sweden	Morocco C
Venezuela F		Switzerland	S. Africa C,F

Notes: C and F denote a commodity exporter and fuel exporter respectively in the 1970-79 period. Emerging markets are classified according to the Morgan Stanley Capital International definition. Hong Kong and Singapore are also regarded as emerging markets.

Table 2.3: Ranking of Average Output Correlations

Band-Pass Filtered Output Correlations					
1970-79		1980-89		1990-2003	
All Countries	0.121	All Countries	0.117	All Countries	0.122
Developed Countries	0.395	Developed Countries	0.285	Developed Countries	0.280
Developed-Emerging Markets	0.092	Developed-Emerging Markets	0.083	Emerging Markets	0.157
Emerging Markets	0.018	Emerging Markets	0.077	Developed-Emerging Markets	0.043
G-7	0.810	Latin America	0.400	Japan, Korea, Hong Kong+ASEAN	0.673
Japan, Korea, Hong Kong+ASEAN	0.546	G-7	0.382	European Union	0.448
European Union	0.469	European Union	0.353	G-7	0.340
Asia	0.265	Americas	0.345	Asia	0.325
Europe	0.154	Japan, Korea, Hong Kong+ASEAN	0.278	Europe	0.269
Americas	0.071	Europe	0.227	Latin America	0.191
Latin America	0.014	Asia	0.166	Americas	0.138

Notes: This table reports the averages of bilateral band-pass filtered output correlations calculated for each period using countries in corresponding income and regional groups.

Table 2.4: Ranking of Average Bilateral Trade Measures

trade1 %					
1970-79		1980-89		1990-2003	
All Countries	0.186	All Countries	0.217	All Countries	0.276
Developed Countries	0.453	Developed Countries	0.521	Developed Countries	0.555
Emerging Markets	0.136	Emerging Markets	0.180	Emerging Markets	0.278
Developed-Emerging Markets	0.112	Developed-Emerging Markets	0.134	Developed-Emerging Markets	0.177
G-7	0.822	G-7	1.000	G-7	1.043
European Union	0.690	European Union	0.817	European Union	0.901
Europe	0.554	Europe	0.542	Japan, Korea+ASEAN (exc. Singapore)	0.748
Japan, Korea+ASEAN (exc. Singapore)	0.330	Japan, Korea+ASEAN (exc. Singapore)	0.456	Europe	0.611
Asia exc. Hong Kong, Singapore	0.214	Asia exc. Hong Kong, Singapore	0.297	Asia exc. Hong Kong, Singapore	0.502
Americas	0.144	Americas	0.166	Americas	0.251
Latin America	0.108	Latin America	0.132	Latin America	0.214
trade2%					
1970-79		1980-89		1990-2003	
All Countries	0.477	All Countries	0.480	All Countries	0.533
Developed Countries	1.270	Developed Countries	1.275	Developed Countries	1.299
Developed-Emerging Markets	0.321	Developed-Emerging Markets	0.313	Emerging Markets	0.375
Emerging Markets	0.272	Emerging Markets	0.300	Developed-Emerging Markets	0.366
G-7	3.375	G-7	3.478	G-7	3.464
European Union	1.573	European Union	1.608	European Union	1.719
Japan, Korea+ASEAN (exc. Singapore)	1.102	Japan, Korea+ASEAN (exc. Singapore)	1.239	Japan, Korea+ASEAN (exc. Singapore)	1.572
Europe	1.098	Europe	1.073	Asia exc. Hong Kong, Singapore	1.234
Asia exc. Hong Kong, Singapore	0.868	Asia exc. Hong Kong, Singapore	0.945	Europe	1.161
Americas	0.821	Americas	0.819	Americas	1.030
Latin America	0.564	Latin America	0.601	Latin America	0.817
intratrade					
1970-79		1980-89		1990-2003	
All Countries	0.132	All Countries	0.144	All Countries	0.200
Developed Countries	0.305	Developed Countries	0.332	Developed Countries	0.382
Developed-Emerging Markets	0.106	Developed-Emerging Markets	0.127	Developed-Emerging Markets	0.187
Emerging Markets	0.061	Emerging Markets	0.069	Emerging Markets	0.121
G-7	0.440	G-7	0.446	G-7	0.523
European Union	0.393	European Union	0.432	European Union	0.484
Europe	0.320	Europe	0.339	Europe	0.392
Japan, Korea+ASEAN (exc. Singapore)	0.140	Japan, Korea+ASEAN (exc. Singapore)	0.199	Japan, Korea+ASEAN (exc. Singapore)	0.350
Americas	0.133	Asia exc. Hong Kong, Singapore	0.166	Asia exc. Hong Kong, Singapore	0.287
Asia exc. Hong Kong, Singapore	0.124	Americas	0.137	Americas	0.183
Latin America	0.122	Latin America	0.120	Latin America	0.164

Table 2.4: Ranking of Average Bilateral Trade Measures (continued)

tradepartner similarity(*)					
1970-79		1980-89		1990-2003	
All Countries	0.421	All Countries	0.491	All Countries	0.594
Emerging Markets	0.484	Emerging Markets	0.562	Emerging Markets	0.699
Developed-Emerging Markets	0.429	Developed-Emerging Markets	0.497	Developed-Emerging Markets	0.594
Developed Countries	0.307	Developed Countries	0.349	Developed Countries	0.391
Europe	0.275	Europe	0.304	Japan, Korea+ASEAN (exc. Singapore)	0.506
European Union	0.255	Japan, Korea+ASEAN (exc. Singapore)	0.297	Asia exc. Hong Kong, Singapore	0.467
Asia exc. Hong Kong, Singapore	0.254	Asia exc. Hong Kong, Singapore	0.296	Europe	0.334
G-7	0.235	European Union	0.286	Americas	0.314
Japan, Korea+ASEAN (exc. Singapore)	0.229	G-7	0.272	European Union	0.314
Americas	0.209	Americas	0.237	G-7	0.314
Latin America	0.199	Latin America	0.222	Latin America	0.298
fta membership					
1970-79		1980-89		1990-2003	
All Countries	0.061	All Countries	0.082	All Countries	0.165
Developed Countries	0.347	Developed Countries	0.451	Developed Countries	0.562
Emerging Markets	0.000	Emerging Markets	0.006	Emerging Markets	0.084
Developed-Emerging Markets	0.000	Developed-Emerging Markets	0.001	Developed-Emerging Markets	0.079
European Union	0.577	European Union	0.797	European Union	1.000
Europe	0.386	Europe	0.501	Europe	0.747
G-7	0.286	G-7	0.286	Latin America	0.400
		Japan, Korea+ASEAN (exc. Singapore)	0.067	Japan, Korea+ASEAN (exc. Singapore)	0.343
		Latin America	0.027	G-7	0.319
		Asia exc. Hong Kong, Singapore	0.024	Americas	0.312
		Americas	0.018	Asia exc. Hong Kong, Singapore	0.137

Notes: This table reports the averages of bilateral trade integration measures calculated for each period using countries in corresponding income and regional groups. * indicates that trade similarity measure is ranked in order to display the trade partner diversification

Table 2.5: Ranking of Average Financial Openness

finglobalization					
1970-79		1980-89		1990-2003	
All Countries	0.151	All Countries	0.184	All Countries	0.433
Emerging Markets	0.157	Developed Countries	0.220	Developed Countries	0.503
Developed-Emerging Markets	0.151	Developed-Emerging Markets	0.188	Developed-Emerging Markets	0.443
Developed Countries	0.145	Emerging Markets	0.154	Emerging Markets	0.379
Europe	0.158	G-7	0.225	European Union	0.559
Latin America	0.146	European Union	0.218	Europe	0.528
European Union	0.144	Europe	0.213	G-7	0.427
G-7	0.143	Americas	0.163	Japan, Korea+ASEAN (exc. Singapore)	0.270
Americas	0.142	Latin America	0.163	Asia exc. Hong Kong, Singapore	0.248
Japan, Korea+ASEAN (exc. Singapore)	0.125	Japan, Korea+ASEAN (exc. Singapore)	0.124	Americas	0.248
Asia exc. Hong Kong, Singapore	0.093	Asia exc. Hong Kong, Singapore	0.119	Latin America	0.246
ito					
1970-79		1980-89		1990-2003	
All Countries	0.027	All Countries	0.417	All Countries	2.192
Developed Countries	0.423	Developed Countries	1.800	Developed Countries	4.201
Developed-Emerging Markets	0.072	Developed-Emerging Markets	0.541	Developed-Emerging Markets	2.325
Emerging Markets	-0.279	Emerging Markets	-0.710	Emerging Markets	0.465
Americas	0.862	G-7	2.822	G-7	4.459
Japan, Korea+ASEAN (exc. Singapore)	0.719	Japan, Korea+ASEAN (exc. Singapore)	1.854	European Union	3.945
Latin America	0.599	Asia exc. Hong Kong, Singapore	1.538	Europe	3.670
G-7	0.557	European Union	1.209	Asia exc. Hong Kong, Singapore	2.366
Asia exc. Hong Kong, Singapore	0.212	Europe	0.867	Japan, Korea+ASEAN (exc. Singapore)	2.178
European Union	0.045	Americas	-0.271	Americas	1.182
Europe	-0.246	Latin America	-1.136	Latin America	0.570

Notes: This table reports the averages of bilateral sum of gross capital flows to GDP ratios and Chinn-Ito capital account openness calculated for each period using countries in corresponding income and regional groups.

Table 2.6: Ranking of Average Macroeconomic Similarity

govtspending					
1970-79		1980-89		1990-2003	
All Countries	0.065	All Countries	0.072	All Countries	0.066
Developed Countries	0.051	Developed Countries	0.052	Developed Countries	0.046
Emerging Markets	0.057	Emerging Markets	0.054	Emerging Markets	0.052
Developed-Emerging Markets	0.076	Developed-Emerging Markets	0.090	Developed-Emerging Markets	0.082
Latin America	0.030	Latin America	0.033	Japan, Korea, Hong Kong+ASEAN	0.028
Japan, Korea, Hong Kong+ASEAN	0.032	Japan, Korea, Hong Kong+ASEAN	0.034	G-7	0.037
G-7	0.035	G-7	0.039	Asia	0.040
Asia	0.041	Asia	0.045	European Union	0.042
Americas	0.046	European Union	0.052	Latin America	0.047
European Union	0.053	Americas	0.052	Americas	0.055
Europe	0.059	Europe	0.067	Europe	0.059
realexchrate					
1970-79		1980-89		1990-2003	
All Countries	0.059	All Countries	0.088	All Countries	0.059
Developed Countries	0.031	Developed Countries	0.035	Developed Countries	0.030
Developed-Emerging Markets	0.060	Developed-Emerging Markets	0.088	Developed-Emerging Markets	0.061
Emerging Markets	0.078	Emerging Markets	0.120	Emerging Markets	0.074
European Union	0.028	European Union	0.025	European Union	0.020
Europe	0.032	Europe	0.034	G-7	0.037
G-7	0.035	Japan, Korea, Hong Kong+ASEAN	0.042	Europe	0.037
Asia	0.043	G-7	0.042	Asia	0.051
Japan, Korea, Hong Kong+ASEAN	0.047	Asia	0.043	Japan, Korea, Hong Kong+ASEAN	0.051
Americas	0.101	Americas	0.186	Americas	0.072
Latin America	0.116	Latin America	0.211	Latin America	0.079

Notes: This table reports the averages of bilateral differences in government spending to GDP ratios and real exchange rate volatility calculated for each period using countries in corresponding income and regional groups.

Table 2.7: Ranking of Average Structural Similarity

structure					
1970-79		1980-89		1990-2003	
All Countries	0.293	All Countries	0.281	All Countries	0.259
Developed Countries	0.159	Developed Countries	0.122	Developed Countries	0.099
Emerging Markets	0.307	Emerging Markets	0.300	Emerging Markets	0.287
Developed-Emerging Markets	0.347	Developed-Emerging Markets	0.332	Developed-Emerging Markets	0.296
G-7	0.119	G-7	0.100	European Union	0.086
European Union	0.174	European Union	0.131	G-7	0.090
Europe	0.221	Latin America	0.218	Europe	0.169
Latin America	0.242	Europe	0.242	Latin America	0.213
Americas	0.255	Americas	0.242	Americas	0.228
Japan, Korea, Hong Kong+ASEAN	0.281	Japan, Korea, Hong Kong+ASEAN	0.313	Japan, Korea, Hong Kong+ASEAN	0.360
Asia	0.369	Asia	0.364	Asia	0.384
share of commodity exporters					
1970-79		1980-89		1990-2003	
All Countries	0.194	All Countries	0.142	All Countries	0.033
Emerging Markets	0.436	Emerging Markets	0.342	Emerging Markets	0.060
Developed-Emerging Markets	0.100	Developed-Emerging Markets	0.059	Developed-Emerging Markets	0.026
Developed Countries	0.016	Developed Countries	0.005	Developed Countries	0.005
Latin America	1.000	Latin America	0.800	Latin America	0.467
Americas	0.682	Americas	0.545	Americas	0.318
Asia	0.227	Asia	0.227	Asia	0.015
Japan, Korea, Hong Kong+ASEAN	0.214	Japan, Korea, Hong Kong+ASEAN	0.214		
share of net fuel exporters					
1970-79		1980-89		1990-2003	
All Countries	0.054	All Countries	0.084	All Countries	0.082
Emerging Markets	0.105	Emerging Markets	0.128	Emerging Markets	0.100
Developed-Emerging Markets	0.037	Developed-Emerging Markets	0.074	Developed-Emerging Markets	0.081
Developed Countries	0.005	Developed Countries	0.032	Developed Countries	0.053
Americas	0.167	Americas	0.227	Latin America	0.244
Latin America	0.156	Latin America	0.222	Americas	0.242
Asia	0.076	Asia	0.091	Asia	0.076
Japan, Korea, Hong Kong+ASEAN	0.036	G-7	0.048	G-7	0.048
		Japan, Korea, Hong Kong+ASEAN	0.036	Japan, Korea, Hong Kong+ASEAN	0.036
		Europe	0.006	Europe	0.018
				European Union	0.013

Notes: This table reports the averages of bilateral differences in economic structure measured by Krugman index and share of pairs of commodity and net fuel exporters calculated for each period using countries in corresponding income and regional groups.

Table 2.8: Summary Statistics of Data Used in GMM-IV Estimation (I-III)

Variables	Obs	Mean	Std. Dev.	Min	Max
bpoutputcorrel	779	0.121	0.264	-0.591	0.807
comlang	779	0.103	0.304	0.000	1.000
trade1	779	-3.195	0.735	-6.392	-0.960
hightrade1	112	-2.101	0.319	-2.483	-0.960
lowtrade1	102	-4.480	0.523	-6.392	-3.953
trade2	779	-2.787	0.740	-5.903	-0.809
hightrade2	113	-1.735	0.310	-3.106	-0.809
lowtrade2	102	-4.100	0.547	-5.903	-3.572
intratrade	778	-2.327	1.324	-9.572	-0.260
highintratrade	102	-0.731	0.252	-2.209	-0.260
lowintratrade	106	-4.808	1.126	-9.572	-3.706
fta	779	0.103	0.256	0.000	1.000
tradepartner	779	-0.903	0.681	-3.193	0.819
structure	779	-1.546	0.571	-3.493	-0.283
commoditydummy	779	0.175	0.380	0.000	1.000
oil	779	0.007	0.536	-3.568	5.195

Notes: This table displays the summary statistics of variables used in GMM-IV estimation in Table 2.11-a. All variables are in logarithms except for bpoutputcorel, comlang, fta, commoditydummy and oil. Hightrade and lowtrade are constructed by multiplying hightradedummy and lowtradedummy with logarithm of trade1, trade2 and intratrade measures. Country pairs with high and low trade integration are determined by identifying the level of trade integration that is one standard deviation above or below the mean trade integration. Belgium, China, Israel, Paraguay, Romania, Switzerland and South Africa are not included due to missing observations.

Table 2.9: Summary Statistics of Data Used in GMM-IV Estimation (IV-VI)

Variables	Obs	Mean	Std. Dev.	Min	Max
bpoutputcorrel	702	0.116	0.263	-0.591	0.807
comlang	702	0.111	0.314	0.000	1.000
trade1	702	-3.220	0.736	-6.392	-0.960
trade2	702	-2.812	0.744	-5.903	-0.809
intratrade	701	-2.357	1.317	-9.572	-0.285
fta	702	0.098	0.246	0.000	1.000
tradepartner	702	-0.871	0.682	-3.193	0.819
finglobalization	702	-1.276	0.613	-2.831	0.803
highfingldummy	702	0.162	0.369	0.000	1.000
highfinglobalization	114	-0.214	0.488	-0.707	0.803
lowfingldummy	702	0.105	0.307	0.000	1.000
lowfinglobalization	74	-2.132	0.199	-2.831	-1.908
govtspending	702	-3.000	0.668	-4.969	-1.631
realexchrate	702	-2.771	0.661	-5.004	-1.161
structure	702	-1.538	0.574	-3.493	-0.283
commoditydummy	702	0.194	0.396	0.000	1.000
oil	702	0.005	0.559	-3.568	5.195

Notes: This table displays the summary statistics of variables used in GMM-IV estimation in Table 2.12-a. All variables are in logarithms except for bpoutputcorel, comlang, fta, commoditydummy and oil. Highfinglobalization and lowfinglobalization are constructed by multiplying highfingldummy and lowfingldummy with logarithm of finglobalization measure. Country pairs with high and low financial openness are determined by identifying the level of combined gross financial flows to GDP ratios that is one standard deviation above or below the mean. Belgium, China, Germany, Israel, Paraguay, Poland, Romania, Switzerland and South Africa are not included due to missing observations.

Table 2.10: Summary Statistics of Data Used in 3SLS Estimation

Variables	Obs	Mean	Std. Dev.	Min	Max
bpoutputcorrel	630	0.110	0.265	-0.591	0.807
comlang	630	0.113	0.316	0.000	1.000
trade1	630	-3.239	0.720	-6.392	-0.960
trade2	630	-2.805	0.739	-5.903	-0.809
intratrade	629	-2.396	1.300	-9.572	-0.285
fta	630	0.110	0.258	0.000	1.000
tradepartner	630	-0.957	0.637	-3.193	0.802
finglobalization	630	-1.395	0.458	-2.831	-0.157
govtspending	630	-3.002	0.656	-4.969	-1.699
realexchrate	630	-2.742	0.666	-5.004	-1.161
structure	630	-1.580	0.577	-3.493	-0.435
commoditydummy	630	0.216	0.412	0.000	1.000
oil	630	-0.003	0.569	-3.568	5.195
ito	630	1.298	1.834	-3.310	5.313
percapitadifference	630	3.701	0.492	0.984	4.349
gdpproduct	630	10.258	0.886	7.634	13.100
population	630	2.783	0.788	0.958	5.289
distance	630	3.831	0.380	2.344	4.297

Notes: This table displays the summary statistics of variables used in 3SLS estimation in Tables 2.14a-b-c. All variables are in logarithms except for bpoutputcorel, comlang, fta, commoditydummy, ito and oil. Belgium, China, Germany, Hong Kong, Hungary, Israel, Paraguay, Poland, Romania, Switzerland and South Africa are not included due to missing observations.

Table 2.11-a: GMM-IV Estimation with Trade Integration Variables

Dependent Variable:		bpoutputcorrel	
Method:	GMM-IV	GMM-IV	GMM-IV
Independent Variables:	I	II	III
Constant	0.823***	0.674***	0.255***
	[0.17]	[0.14]	[0.06]
europedummy	-0.0378	-0.00973	-0.0452
	[0.043]	[0.043]	[0.042]
g7dummy	0.191***	0.196***	0.235***
	[0.044]	[0.044]	[0.039]
latinamericadummy	0.108**	0.115**	0.153***
	[0.049]	[0.049]	[0.048]
asiadummy	0.0742*	0.0916**	0.132***
	[0.043]	[0.043]	[0.04]
comlang	-0.0105	-0.0109	-0.00402
	[0.029]	[0.03]	[0.03]
trade1	0.264***		
	[0.054]		
hightrade1	0.0499**		
	[0.024]		
lowtrade1	-0.0658***		
	[0.016]		
trade2		0.236***	
		[0.046]	
hightrade2		0.0528**	
		[0.026]	
lowtrade2		-0.0655***	
		[0.015]	
intratrade			0.117***
			[0.023]
highintratrade			0.0436
			[0.042]
lowintratrade			-0.0522***
			[0.013]
fta	0.0523	0.088	0.127**
	[0.066]	[0.063]	[0.059]
tradepartner	0.0201	0.0588***	0.0173
	[0.014]	[0.014]	[0.013]
structure	-0.0815***	-0.0751***	-0.0635***
	[0.016]	[0.016]	[0.015]
commoditydummy	-0.0192	-0.0232	-0.0155
	[0.027]	[0.027]	[0.026]
oil	0.0401***	0.0355**	0.0273*
	[0.015]	[0.015]	[0.015]
Observations	779	779	778
OI Test (p value)	0.4152	0.9341	0.4668
R-squared	0.18	0.21	0.28
Correlation	0.4528*	0.4737*	0.5304*

Notes: Figures in [ ] are standard errors. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Table 2.11-b: OLS Estimation with Trade Integration Variables

Dependent Variable:		bpoutputcorrel	
Method:	OLS	OLS	OLS
Independent Variables:	I	II	III
Constant	0.215***	0.240***	0.198***
	[0.081]	[0.076]	[0.041]
europedummy	0.00675	0.0172	-0.0322
	[0.037]	[0.037]	[0.037]
g7dummy	0.269***	0.263***	0.251***
	[0.058]	[0.058]	[0.055]
latinamericadummy	0.154***	0.146***	0.152***
	[0.051]	[0.051]	[0.05]
asiadummy	0.152***	0.156***	0.148***
	[0.039]	[0.037]	[0.035]
comlang	0.0201	0.0154	0.00352
	[0.033]	[0.033]	[0.032]
trade1	0.0731***		
	[0.024]		
hightrade1	-0.0104		
	[0.016]		
lowtrade1	-0.0141		
	[0.0088]		
trade2		0.0877***	
		[0.024]	
hightrade2		-0.00385	
		[0.018]	
lowtrade2		-0.0204**	
		[0.0098]	
intratrade			0.0931***
			[0.014]
highintratrade			0.0213
			[0.037]
lowintratrade			-0.0390***
			[0.0088]
fta	0.122**	0.126**	0.134***
	[0.053]	[0.052]	[0.05]
tradepartner	0.0258*	0.0423***	0.0191
	[0.013]	[0.014]	[0.013]
structure	-0.0774***	-0.0760***	-0.0673***
	[0.016]	[0.016]	[0.016]
commoditydummy	-0.0508**	-0.0477*	-0.0226
	[0.025]	[0.026]	[0.025]
oil	0.0403***	0.0387**	0.0281*
	[0.016]	[0.016]	[0.015]
Observations	779	779	778
R-squared	0.25	0.25	0.28
F-statistics	F(13,765)=19.34	F(13,765)=19.71	F(13,764)=23.27

Notes: Figures in [ ] are standard errors. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Table 2.12-a: GMM-IV Estimation of the Full Model with Financial Integration and Policy Variables

Dependent Variable:		bpoutputcorrel	
Method	GMM-IV	GMM-IV	GMM-IV
Independent Variables:	IV	V	VI
Constant	0.373***	0.270***	0.102
	[0.12]	[0.1]	[0.076]
europedummy	-0.0121	-0.00572	-0.0349
	[0.054]	[0.053]	[0.052]
g7dummy	0.220***	0.234***	0.266***
	[0.045]	[0.044]	[0.039]
latinamericadummy	0.102*	0.116**	0.131***
	[0.053]	[0.052]	[0.05]
asiadummy	0.0649	0.0925**	0.130***
	[0.046]	[0.043]	[0.041]
comlang	-0.0132	-0.0175	-0.0144
	[0.029]	[0.029]	[0.03]
trade1	0.148***		
	[0.03]		
trade2		0.123***	
		[0.024]	
intratrade			0.0686***
			[0.013]
fta	0.0266	0.064	0.0973
	[0.078]	[0.076]	[0.073]
tradepartner	0.0158	0.0369*	0.00532
	[0.02]	[0.021]	[0.019]
finglobalization	0.0224	0.0404*	0.0382*
	[0.025]	[0.023]	[0.022]
highfinglobalization	0.0868**	0.0844**	0.0970**
	[0.04]	[0.04]	[0.04]
lowfinglobalization	-0.00329	-0.00194	-0.00215
	[0.015]	[0.015]	[0.015]
govtspending	-0.0314**	-0.0286*	-0.0174
	[0.015]	[0.015]	[0.015]
realexchrate	-0.0114	-0.0189	-0.014
	[0.018]	[0.018]	[0.017]
structure	-0.0790***	-0.0762***	-0.0720***
	[0.017]	[0.016]	[0.016]
commoditydummy	0.0101	0.0124	0.0216
	[0.029]	[0.029]	[0.028]
oil	0.0332**	0.0314**	0.0259*
	[0.015]	[0.014]	[0.014]
Observations	702	702	701
OI Test (p value)	0.7309	0.9589	0.8176
R-squared	0.21	0.23	0.27
Correlation	0.4703 *	0.4864*	0.5212*

Notes: Figures in [ ] are standard errors. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Table 2.12-b: OLS Estimation of the Full Model with Financial Integration and Policy Variables

Dependent Variable		bpoutputcorrel	
Method	OLS	OLS	OLS
Independent Variables:	IV	V	VI
Constant	-0.00336	0.00374	0.0141
	[0.086]	[0.083]	[0.071]
europedummy	-0.0116	-0.00866	-0.0263
	[0.046]	[0.046]	[0.046]
g7dummy	0.297***	0.294***	0.287***
	[0.064]	[0.064]	[0.063]
latinamericadummy	0.185***	0.181***	0.161***
	[0.053]	[0.053]	[0.052]
asiadummy	0.171***	0.170***	0.159***
	[0.039]	[0.039]	[0.037]
comlang	-0.00399	-0.00616	-0.00899
	[0.034]	[0.034]	[0.033]
trade1	0.0359**		
	[0.016]		
trade2		0.0395**	
		[0.016]	
intratrade			0.0420***
			[0.0085]
fta	0.0965	0.1	0.106*
	[0.063]	[0.062]	[0.061]
tradepartner	-0.00824	0.00124	-0.00355
	[0.02]	[0.021]	[0.02]
finglobalization	0.0625***	0.0638***	0.0524**
	[0.024]	[0.024]	[0.023]
highfinglobalization	0.0861**	0.0855**	0.0915**
	[0.043]	[0.043]	[0.042]
lowfinglobalization	-0.00257	-0.00221	-0.00106
	[0.016]	[0.015]	[0.015]
govtspending	-0.0385**	-0.0378**	-0.027
	[0.018]	[0.018]	[0.018]
realexchrate	-0.0142	-0.0148	-0.014
	[0.014]	[0.014]	[0.014]
structure	-0.0837***	-0.0823***	-0.0769***
	[0.017]	[0.017]	[0.017]
commoditydummy	-0.0252	-0.0211	-0.00132
	[0.026]	[0.027]	[0.027]
oil	0.0327**	0.0321**	0.0278*
	[0.016]	[0.016]	[0.016]
Observations	702	702	701
R-squared	0.26	0.26	0.28
Fstatistics	F(16,685)=14.98	F(16,685)=15.09	F(16,684)=16.61

Notes: Figures in [ ] are standard errors. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Table 2.13-a: GMM-IV Diagnostic Tests of the Estimation with Trade Integration Variables

	I	II	III
Method	GMM-IV	GMM-IV	GMM-IV
Endogenous Variables	trade1	trade2	intratrade
Excluded Instruments	gdpproduct	gdpproduct	gdpproduct
	population	population	population
	distance	distance	distance
Endogeneity Tests:			
Durbin-Wu-Hausman F Test	15.99320 F(1,764) P-value = 0.00007	14.23127 F(1,764) P-value = 0.00017	1.40689 F(1,763) P-value = 0.23594
Durbin-Wu-Hausman Chi Square Test	15.97283 Chi-sq(1) P-value = 0.00006	14.24533 Chi-sq(1) P-value = 0.00016	1.43191 Chi-sq(1) P-value = 0.23145
Heteroscedasticity Tests:			
Pagan-Hall General Statistics	111.237 Chi-sq(118) P-value = 0.6574	121.144 Chi-sq(118) P-value = 0.4028	127.993 Chi-sq(119) P-value = 0.2703
Overidentification Test:			
Sargan Overidentification Test			
Hansen-J Overidentification Test	1.758 Chi-sq(2) P-val = 0.4152	0.136 Chi-sq(2) P-val = 0.9341	1.524 Chi-sq(2) P-val = 0.4668
First Stage Regression Results:			
Shea's Partial R2	0.209	0.2702	0.2701
F-Test	52.42	63.67	80.89
P-value	0.00	0.00	0.00
Identification/IV relevance Test:			
Anderson canon. corr. LR statistic	182.616 Chi-sq(3) P-val = 0.00	245.36 Chi-sq(3) P-val = 0.00	244.951 Chi-sq(3) P-val = 0.00
Underidentification Tests:			
Cragg-Donald N*minEval stat.	Chi-sq(3) 205.80 P-value 0.00	Chi-sq(3) 288.40 P-value 0.00	Chi-sq(3) 287.90 P-value 0.00
Weak identification Tests:			
Anderson-Rubin Test	F(3,763)= 10.40 P-val=0.00	F(3,763)= 10.06 P-val=0.00	F(3,762)= 8.47 P-val=0.00

Table 2.13-b: GMM-IV Diagnostic Tests of the Estimation of the Full Model with Financial Integration and Policy Variables

	IV	V	VI
Method	GMM-IV	GMM-IV	GMM-IV
Endogenous Variables	trade1	trade2	intratrade
Excluded Instruments	gdpproduct	gdpproduct	gdpproduct
	population	population	population
	distance	distance	distance
Endogeneity Tests:			
Durbin-Wu-Hausman F Test	19.79318 F(1,684) P-value = 0.00001	19.49651 F(1,684) P-value = 0.00001	6.31531 F(1,683) P-value = 0.01220
Durbin-Wu-Hausman Chi Square Test	19.74275 Chi-sq(1) P-value = 0.00001	19.45504 Chi-sq(1) P-value = 0.00001	6.42236 Chi-sq(1) P-value = 0.01127
Heteroscedasticity Tests:			
Pagan-Hall General Statistics	177.486 Chi-sq(170) P-value = 0.3313	189.743 Chi-sq(170) P-value = 0.1428	193.809 Chi-sq(170) P-value = 0.1018
Overidentification Test:			
Sargan Overidentification Test			
Hansen-J Overidentification Test	0.627 Chi-sq(2) P-val = 0.7309	0.084 Chi-sq(2) P-val = 0.9589	0.403 Chi-sq(2) P-val = 0.8176
(Orthogonality of Specific Instruments)	finglobalization, govtspending, realexchrate	finglobalization, govtspending, realexchrate	finglobalization, govtspending, realexchrate
C-Statistics	0.091 Chi-sq(1) P-val = 0.7628	0.079 Chi-sq(1) P-val = 0.7782	0.349 Chi-sq(1) P-val = 0.5550
C-Statistics	0.013 Chi-sq(1) P-val = 0.9098	0.084 Chi-sq(1) P-val = 0.7725	0.308 Chi-sq(1) P-val = 0.5792
C-Statistics	0.367 Chi-sq(1) P-val = 0.5446	0.044 Chi-sq(1) P-val = 0.8339	0.398 Chi-sq(1) P-val = 0.5280
First Stage Regression Results:			
Shea's Partial R2	0.3023	0.4057	0.3822
F-Test	74.35	101.51	107.2
P-value	0.00	0.00	0.00
Identification/IV relevance Test:			
Anderson canon. corr. LR statistic	252.649 Chi-sq(3) P-val = 0.00	365.301 Chi-sq(3) P-val = 0.00	337.555 Chi-sq(3) P-val = 0.00
Underidentification Tests:			
Cragg-Donald N*minEval stat.	Chi-sq(3) 304.10 P-value 0.00	Chi-sq(3) 479.22 P-value 0.00	Chi-sq(3) 433.61 P-value 0.00
Weak identification Tests:			
Anderson-Rubin Test	F(3,683)= 10.04 P-val=0.00	F(3,683)= 10.04 P-val=0.00	F(3,682)= 10.22 P-val=0.00

Table 2.14-a: Three Stage Least Squares Estimation: Model I

Model: I	1	2	3	4
	bpoutputcorrel	trade1	finglobalization	structure
Constant	0.239*	-1.852***	-0.212	-4.875***
	[0.14]	[0.34]	[0.18]	[0.18]
europedummy	-0.0661			
	[0.061]			
g7dummy	0.198***			
	[0.066]			
latinamericadummy	0.141**			
	[0.057]			
asiadummy	0.134***			
	[0.05]			
comlang	0.00363			
	0.037			
trade1	0.138***		0.558***	-0.136***
	[0.031]		[0.035]	[0.035]
fta	0.0378			
	[0.079]			
tradepartner	-0.000327			
	[0.036]			
finglobalization	0.0123	0.914***		-0.500***
	[0.078]	[0.073]		[0.056]
govtspending	-0.0213			
	[0.019]			
realexchrate	-0.0297			
	[0.02]			
structure	-0.105***	-0.126**	0.0932**	
	[0.035]	[0.059]	[0.037]	
commoditydummy	0.0182			
	[0.031]			
oil	0.0288*			
	[0.016]			
ito			0.0282***	
			[0.0071]	
percapitadifference				0.583***
				[0.039]
gdpproduct		0.213***		
		[0.033]		
population		0.281***	-0.382***	
		[0.05]	[0.021]	
distance		-0.857***	0.469***	
		[0.051]	[0.05]	
Observations	630	630	630	630
R-squared	0.22	0.51	0.35	0.29
Correlation	0.4688*			

Notes: Figures in [ ] are standard errors. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Table 2.14-b: Three Stage Least Squares Estimation: Model II

Model: II	1	2	3	4
	bpoutputcorrel	trade2	finglobalization	structure
Constant	0.236*	-4.651***	-0.343*	-5.039***
	[0.13]	[0.37]	[0.18]	[0.18]
europedummy	-0.0623			
	[0.061]			
g7dummy	0.209***			
	[0.065]			
latinamericadummy	0.154***			
	[0.056]			
asiadummy	0.146***			
	[0.047]			
comlang	0.0101			
	[0.037]			
trade2	0.126***		0.288***	-0.203***
	[0.027]		[0.038]	[0.031]
fta	0.0758			
	[0.079]			
tradepartner	0.0214			
	[0.038]			
finglobalization	0.0429	0.101		-0.572***
	[0.077]	[0.085]		[0.053]
govtspending	-0.0214			
	[0.019]			
realexchrate	-0.0261			
	[0.02]			
structure	-0.0885**	-0.123**	0.0515	
	[0.035]	[0.062]	[0.04]	
commoditydummy	0.0216			
	[0.032]			
oil	0.0284*			
	[0.016]			
ito			0.0691***	
			[0.0082]	
percapitadifference				0.565***
				[0.038]
gdpproduct		0.484***		
		[0.039]		
population		-0.0227	-0.353***	
		[0.058]	[0.025]	
distance		-0.811***	0.190***	
		[0.05]	[0.051]	
Observations	630	630	630	630
R-squared	0.23	0.58	0.44	0.27
Correlation	0.4791*			

Notes: Figures in [ ] are standard errors. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Table 2.14-c: Three Stage Least Squares Estimation: Model III

Model: III	1	2	3	4
	bpoutputcorrel	intratrade	finglobalization	structure
Constant	0.042	-1.836***	-0.482***	-4.585***
	[0.11]	[0.6]	[0.18]	[0.16]
europedummy	-0.0594			
	[0.061]			
g7dummy	0.225***			
	[0.064]			
latinamericadummy	0.138**			
	[0.055]			
asiadummy	0.137***			
	[0.043]			
comlang	-0.00465			
	[0.037]			
intratrade	0.0698***		0.314***	-0.0845***
	[0.015]		[0.017]	[0.02]
fta	0.0755			
	[0.078]			
tradepartner	-0.0126			
	[0.035]			
finglobalization	0.0483	1.979***		-0.475***
	[0.076]	[0.12]		[0.056]
govtspending	-0.0193			
	[0.019]			
realexchrate	-0.0229			
	[0.02]			
structure	-0.0886**	-0.455***	0.177***	
	[0.035]	[0.11]	[0.038]	
commoditydummy	0.0294			
	[0.033]			
oil	0.0238			
	[0.016]			
ito			0.0182***	
			[0.0066]	
percapitadifference				0.578***
				[0.039]
gdpproduct		0.351***		
		[0.056]		
population		0.764***	-0.436***	
		[0.087]	[0.022]	
distance		-1.110***	0.342***	
		[0.094]	[0.043]	
Observations	629	629	629	629
R-squared	0.27	0.46	0.34	0.31
Correlation	0.5152*			

Notes: Figures in [ ] are standard errors. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Table 2.15: Marginal Effects of One Standard Deviation Increase in Variables on Average Band-Pass Filtered Output Correlations

Model I (average bpoutputcorrel = 0.11)	trade1	finglobalization	structure
total effect	0.099*	0.006	0.061*
effects through			
trade1		0.058*	0.010*
trade via structure		0.004*	
trade via finglobalization			-0.0068*
finglobalization	0.005		-0.0007
finglobalization via structure	-0.0001		
finglobalization via trade1			0.0005
structure	0.010*	0.024*	
structure via finglobalization	0.021*		
structure via trade1		0.006*	

Model II (average bpoutputcorrel = 0.11)	trade2	finglobalization	structure
total effect	0.093*	0.020	0.051*
effects through			
trade2		0.006	0.009*
trade2 via structure		0.004*	
trade2 via finglobalization			-0.0004
finglobalization	0.009		-0.001
finglobalization via structure	-0.0003		
finglobalization via trade2			0.001
structure	0.013*	0.023*	
structure via finglobalization	0.011*		
structure via trade2		0.001	

Model III (average bpoutputcorrel = 0.11)	intratrade	finglobalization	structure
total effect	0.091*	0.022	0.051*
effects through			
intra-industry trade		0.063*	0.018*
intratrade via structure		0.007*	
intratrade via finglobalization			-0.014*
finglobalization	0.020		-0.005
finglobalization via structure	-0.001		
finglobalization via intratrade			0.004
structure	0.010*	0.019*	
structure via finglobalization	0.017*		
structure via intratrade		0.007*	

Notes: * denotes statistically significant effects.

Figure 2.1: Evolution of Band-Pass Filtered Output Correlations

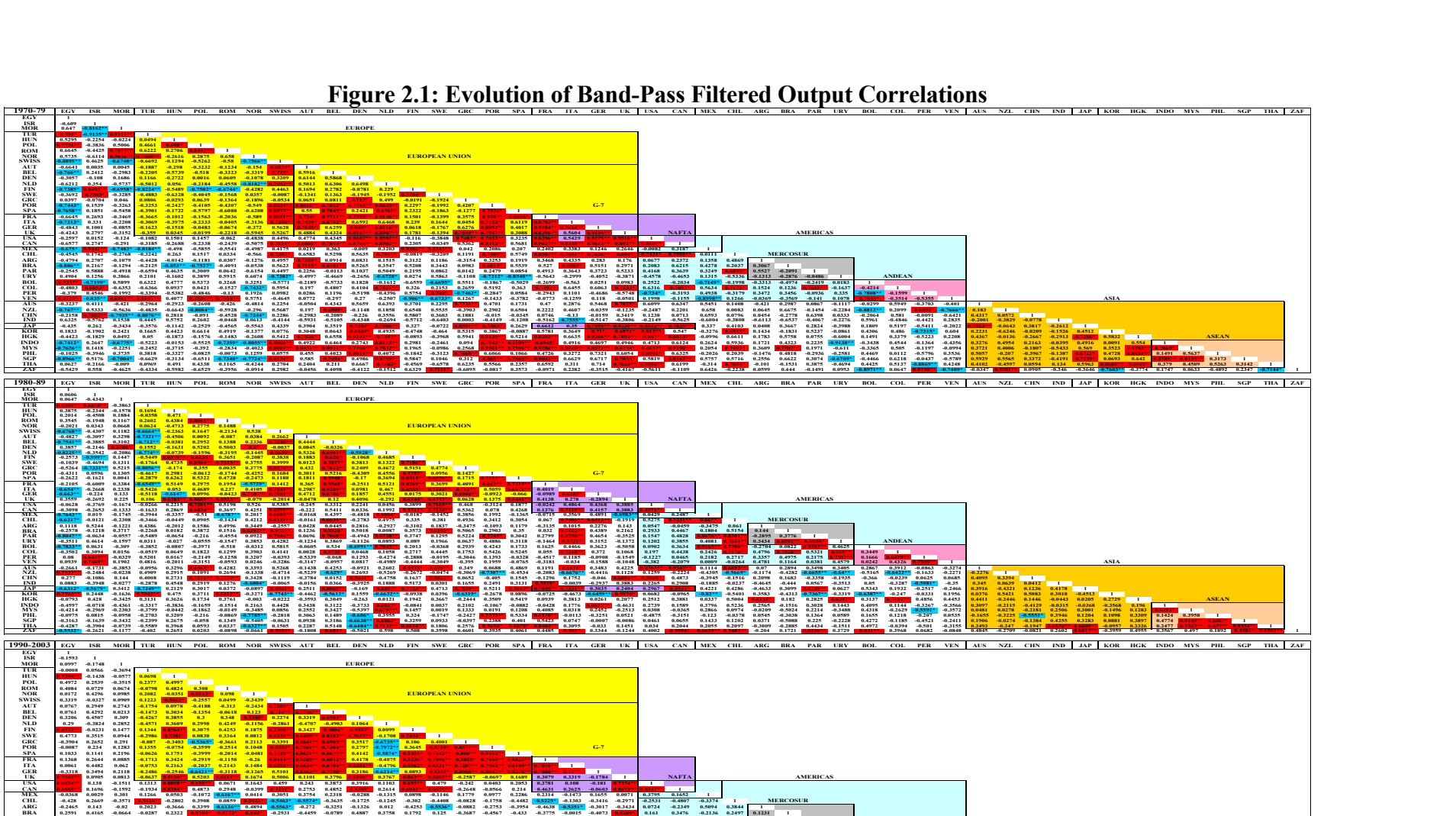
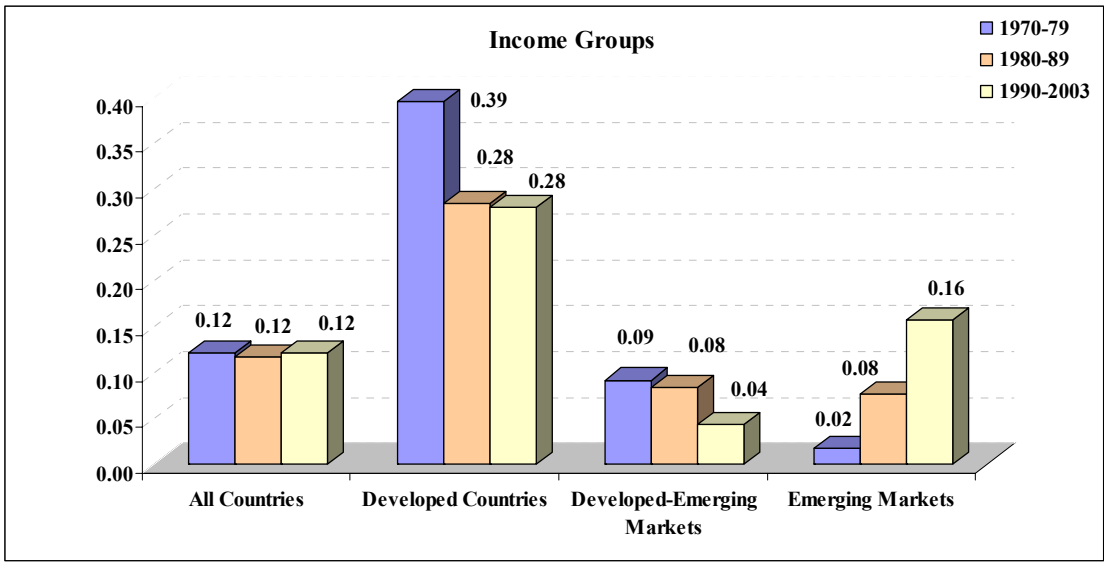
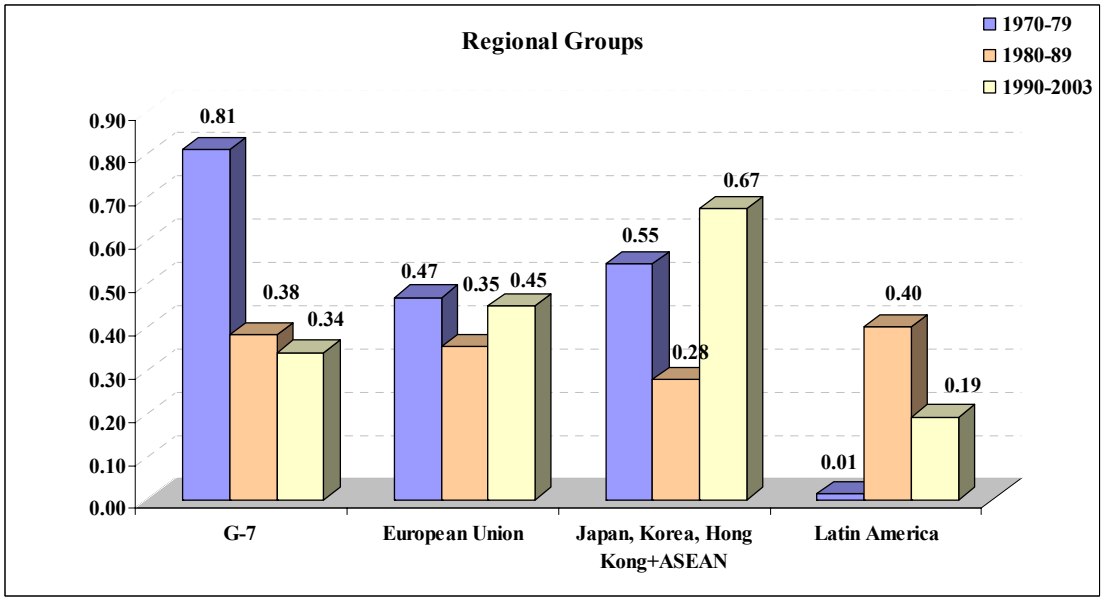


Figure 2.2: Average Band-Pass Filtered Output Correlations





Chapter 3: Changing Nature of North-South Linkages:

Stylized Facts and Explanations

> *"Emerging economies are driving global growth and having a big impact on developed countries...As these newcomers become more integrated into the global economy and their incomes catch up with the rich countries, they will provide the biggest boost to the world economy since the industrial revolution."*
> *The Economist, September 16, 2006*

3.1 Introduction

Profound changes have been taking place in the global economy over the past two decades. First, trade and financial linkages between developed countries, the North, and developing countries, the South, have become much stronger. Second, a number of developing countries have differentiated themselves from the others in the South by growing at an extraordinary pace while rapidly integrating themselves into the global economy. Moreover, some of these developing economies have become increasingly important players in the global economy as they have begun to account for a substantial share of the world output.[29]

Understanding the implications of these changes is important for the design of macroeconomic policies and theoretical models. Deeper trade and financial integration between the North and South can generate faster cross-border transmission of macroeconomic fluctuations, and therefore, can have implications for international

[29] These changes have been the subject of several articles in the media, as the quote at the top of this page and following examples show: *"The new prominence of emerging markets represent a sharp departure from the flurry of financial crises that tore through Mexico, Asia, and Russia in the 1990s…"* (USA Today, February 8, 2007); and *"the idea that the world economy was being pushed along in an American supermarket trolley was always an exaggeration… The difference now is that the rest of the world is doing more of the carrying…"* (The Economist, February 24, 2007). In addition, these changes have recently been at the center of an

coordination of economic policies. In regards to the theory, a better understanding of international economic linkages could be helpful in the design of dynamic models that can replicate the changing nature of linkages between the North and South.

In light of these considerations, the objective of this paper is to provide a comprehensive analysis of the changing nature of growth spillovers between the developed economies of the North and the developing countries of the South. In particular, we address the following questions: First, how have the economic linkages between the North and South changed over time? Second, what are the implications of these changes for the transmission of macroeconomic fluctuations across these groups? Third, how have the dynamics of growth spillovers between the North and South been affected by the changes in international linkages?

As we review in Section 2, there has been a growing empirical research program analyzing the linkages between the developed economies of the North and the developing countries of the South. Our study contributes to this research program along several dimensions. First, to have a better understanding of the changing nature of linkages between these two groups, we examine sectoral interactions in addition to the conventional macroeconomic channels of interdependence. The earlier literature on the North-South linkages has mostly focused on the channels of transmission considering fluctuations in the standard macroeconomic aggregates, such as output, consumption, and investment. The sectoral analysis allows us to study the implications of dramatic shifts across industry, service, and agriculture sectors that have taken place over the past two decades.

---

intensive debate about whether emerging market economies can decouple from the slowing of the U.S. economy (see Helbling and others, 2007, and Dées and Vansteenkiste, 2007).

Second, we employ a comprehensive dataset of 106 countries covering the 1960–2005 period. Considering the changes that have taken place over this period, we analyze the North-South linkages in three distinct sub-periods. The first period of 1960–72 corresponds to the Bretton Woods fixed exchange rate regime. The second period of 1973–85 is associated with a number of common shocks, including sharp fluctuations in the price of oil in the 1970s and contractionary (and highly synchronous) monetary policies in major industrial economies in the early 1980s. Finally, the third period, 1986–2005, represents the globalization era where there has been a substantial increase in the volume of trade and financial flows. By opening their trade and capital accounts during the globalization period, a number of emerging market economies have differentiated themselves from other developing countries in the South.[30] This observation is directly related to our third contribution, as discussed below.

Unlike the traditional North-South literature, we consider the South to be composed of two groups of countries, labeled as the Emerging South and the Developing South, based on the extent of their integration into the global economy. In particular, we divide the world (106 countries) into three groups of countries. The North is composed of 23 "core" OECD countries, the Emerging South includes 23 emerging markets, and the Developing South contains 60 developing countries.

[30] The globalization period also coincides with a prolonged decline in the volatility of output in a number of countries in the North (see Kose, Otrok and Whiteman, 2008). In addition, the beginning of the globalization period marks the start of the Uruguay Round negotiations which substantially accelerated the process of unilateral trade liberalizations in many developing countries.

In Section 3, we examine how the size distribution of these groups, and the dynamics of sectoral output, trade and financial linkages have evolved over time. Our results suggest that the Emerging South economies have increasingly become major players in the global economy because of their rapid economic growth fueled by the dramatic changes in their sectoral structure and international trade and financial linkages. As a result of these changes, the nature of interactions between the Emerging South and North has evolved from one of dependence to multifaceted interdependence.

We turn our attention to the dynamics of growth linkages across these groups in Section 4. The results indicate that there has been a noticeable pattern of convergence within each group of the North and Emerging South countries during the globalization period. In particular, growth fluctuations in aggregate output and production of industry and service sectors across the North countries have become more correlated. Similarly, the growth rates of output and industrial production of the Emerging South economies have become more strongly associated with those of their Emerging Southern trading partners. Surprisingly, cross-group correlations of growth fluctuations suggest that the Emerging South economic activity has appeared to diverge (or decouple) from that of the North in the globalization period. While these are useful stylized facts about the transmission of fluctuations across these three groups, understanding the changing nature of growth spillovers requires a formal framework controlling numerous other factors. We tackle these issues in Section 5.

In particular, Section 5 analyzes the evolving nature of growth spillovers across these three groups using a panel regression model that allows us to control for other growth determinants as well as common shocks. Our results suggest that the North economies have

continued to play a dominant role in explaining the growth dynamics in the rest of the world during the globalization period. However, consistent with the stylized facts about the transmission of growth fluctuations documented above, the impact of the North on the growth dynamics of the Emerging South has declined in the globalization period relative to the earlier periods. Moreover, both the North and Emerging South economies have started to exhibit more intensive intra-group growth spillovers. This result is particularly pronounced in the case of the former group while there is only some suggestive evidence for the latter one. In contrast to the Emerging South economies, the Developing South countries have continued to be significantly affected by the growth dynamics in the North throughout the entire sample.

We also analyze how the North and Emerging South groups affect economic growth in the Asia and Pacific and the Latin America and the Caribbean regions in Section 5. The results suggest that while the impact of the North on the former region has declined over time, it has not changed much on the latter one. Moreover, the Emerging South countries' effect on Asia and Pacific has appeared to be strengthening during the globalization period. These are intuitively appealing findings since countries in the Asia and Pacific region have played a particularly important role in the transformation of the Emerging South group. In section 5, we also briefly discuss the implications of our results for the recent debate about global decoupling considering that this debate heavily focuses on the ability of the Asia and Pacific region to decouple from a potential slowdown in the United States. Section 6 concludes with a summary of our findings and a discussion of their implications for the design of macroeconomic policies and theoretical models.

3.2 What Do We Know About the North-South Linkages?

There have been three streams of empirical research studying the implications of increasing trade and financial flows for the nature of cyclical and growth linkages between the developed countries of the North and the developing economies of the South. The first stream has merely focused on the changes in the time-series patterns of the interdependency across the North and South. The second stream of the literature has attempted to measure the magnitude of spillovers between the North and South. The third one has analyzed the determinants of the business cycle co-movement among countries and groups.

3.2.1 Characterizing the North-South Economic Linkages Over Time

Kose, Otrok, and Prasad (2007) examine the sources of macroeconomic fluctuations in the developed economies of the North and the developing countries of the South using dynamic factor models and the series of output, consumption, and investment for the 1960–2005 period.[31] They explicitly separate the group of emerging markets from other developing economies in the South. They find that while the global factor accounts for a smaller share of business cycle variation in the globalization period, the factors capturing the common fluctuations in each group have become more important in the groups of developed and emerging market countries over time. In other words, intra-group business cycles have become more potent over time in these groups of countries.[32]

[31] Their methodology closely follows the one in Kose, Otrok, and Whiteman (2003) who decompose the volatility in output, consumption, and investment into the world, region, country, and idiosyncratic components using a sixty-country sample over the 1960–90 period.

[32] Several other researchers find relatively stronger business cycle co-movement among developed economies using factor models (see Kose, Otrok, and Whiteman, 2007 and Canova, Ciccarelli, and Ortega, 2007) or simple correlations (see Kose, Prasad, and Terrones, 2003).

Hoffmaister, Pradhan, and Samiei (1998) analyze the long-run growth linkages between the North and South using annual data for the 1967–93 period by constructing group specific output aggregates. They show that despite the long term co-integrating relationship between the growth dynamics of the two groups, the influence of the North countries on the output growth of the South countries has declined over time. They also document a potential structural break in the North-South relationship around the late 1980s. In addition, they report that the South, especially Asia, has become more resilient to cyclical movements in the North possibly because of structural changes that have taken place among the emerging Asian economies over the last decades.

There are three papers focusing on the degree of business cycle co-movement across developed and developing countries using sectoral data. Kouparitsas (2001) documents various stylized facts about the linkages between cyclical growth fluctuations of the Northern and Southern sectoral activity for the 1970–95 period using annual growth rates. He documents strong contemporaneous correlations between the Northern industrial activity and the overall Southern economic activity. He interprets these results on the basis of the classical model of asymmetric trade between the industrialized North and the commodity exporting developing South. He concludes that the relationship between the North and South is unidirectional and terms of trade movements are equilibrium responses to the transmission of business cycles from the manufacturing sector in the North to the export sector of the South. In a related paper, using a dynamic general equilibrium model, Kouparitsas (1998) shows that productivity shocks in the North account for about 20 percent of the variation of aggregate output, roughly 70 percent of the variation of consumption, and 60 percent of the investment variation in the South.

Loayza, Lopez, and Ubide (2001) analyze the common economic patterns across countries in Latin America, East Asia, and Europe for the period of 1970–94 by means of an error components model. Their model decomposes annual real value added growth of GDP, industry, services and agriculture in each country into international, sectoral, and country specific effects. They find that growth fluctuations in the European and East Asian countries exhibit a significantly high degree of co-movement. For Latin America, however, they document that the country specific components to be more dominant owing to the fact that the Latin American countries have more heterogeneous economic structures and are relatively more closed to international trade and financial flows.

3.2.2 Quantifying the Extent of Linkages between the North and South

Some recent papers examine the role of trade partners' economic performance in driving the dynamics of growth. For example, Arora and Vamvakidis (2004) study the role of trade partners in driving the medium term economic growth using a fixed effects panel regression model for 101 countries for the period of 1960–1999. They find that the industrial countries of the North benefit from trading with the rapidly growing developing countries in the South while developing countries benefit from trading with the relatively high-income industrial economies in the North. Their results indicate that a one percentage point increase in the average growth of a country's trading partners increases domestic growth 0.8 percentage points over a 5-year period even after controlling for the global and group-wide trends.[33]

[33] Similarly, Calderon, Loayza, and Schmidt-Hebbel (2005) show the importance of the growth rate of trade partners in explaining domestic growth using a sample of 76 countries during 1970–2000. Ahmed and Loungani (2000) employ a vector-error correction model for the period of 1973–96 to estimate the impact of export weighted aggregate GDP of the largest trading partners on domestic output of several emerging market

In a companion paper, Arora and Vamvakidis (2006) estimate the impact of the U.S. economy on the growth performance of a large sample of industrial and developing countries using a fixed-effects panel regression model for the period of 1980–98. Their results suggest that a one percentage point increase in the U.S. growth is associated with an average of one percentage point increase in the growth in other countries even when the non-U.S. world growth or growth in Japan and Europe is included in the regression.

Helbling and others (2007) examine the implications of a possible economic slowdown in the U.S. economy for other countries using a variety of empirical methods. They find that while the potential size of spillovers from the United States to other countries has increased with greater trade and financial integration, the importance of these links should not be overestimated. Spillovers are most important for countries with close trade and financial ties with the United States, particularly Latin America and some industrial countries, and they tend to be larger during recessions, when import growth turns sharply negative, than during mid-cycle slowdowns.

3.2.3 Determining the Underlying Forces of Business Cycle Co-movement

There is a complementary strand of literature examining the importance of various channels underlying the co-movement of business cycles. For example, Frankel and Rose (1998), Kose and Yi (2006) and Baxter and Kouparitsas (2005) find that trade integration plays an important role in driving business cycle co-movement. Imbs (2004 and 2006) emphasizes the importance of sectoral similarity in addition to trade flows. Darvas, Rose, and Szapáry (2005) and Clark and van Wincoop (2001) provide some support for the role

---

economies in Asia and Latin America. They report that the impact of foreign output shocks is roughly one-for-one after controlling for other shocks. Hsiao, Hsiao and Yamashita (2003) analyze the extent of

of policy coordination in explaining business cycle co-movement. In a recent paper, Akın (2006) provides a detailed analysis of a number of channels in driving business cycle co-movement. Using the data of a large group of industrialized and developing economies, she shows that trade linkages, especially in the form of intra-industry trade, are the main determinants of cyclical co-movement. Her results also indicate that financial integration, the similarity of economic structures and the similarity of fiscal policies can lead to a higher degree of synchronization.

In addition, there are numerous studies analyzing the dynamics of business cycle co-movement in certain regions. Rana (2006 and 2007) argues that increased intra-industry trade flows and financial integration along with monetary policy coordination in East Asia have resulted in stronger cross-correlations of business cycles for some countries in the region. Shin and Wang (2004) also find that the relationship between trade and business cycle co-movement in Asia is mainly driven by the extent of intra-industry trade flows. Kumakura (2006) emphasizes the importance of electronics industry in driving cross-country business cycle correlations in Asia.

3.3 Evolution of International Economic Linkages

This section starts with a detailed analysis of the size distribution of countries in the three groups and their growth dynamics. Next, it examines how international trade and financial linkages have evolved over time. It then provides a brief discussion of the implications of these changes for the traditional models of North-South growth linkages.

---

interdependence between the United States and the Asia-Pacific region using VAR models.

3.3.1 Changes in the Size of Distribution of Countries

The world economy has witnessed a dramatic shift in the size distribution of countries in the globalization period. To analyze these changes, we first divide the world (106 countries) into three groups of countries. The North is composed of 23 "core" OECD countries, the Emerging South includes 23 emerging markets, and the Developing South contains 60 developing countries. The group of Emerging South countries constitutes relatively more mature emerging markets in the sense that they attract the lion's share of international financial flows to developing countries.[34]

Table 3.1 shows that, during the period of 1960–85, the North economies on average constituted more than 70 percent of the world GDP (in PPP terms) while the share of the Emerging South was roughly 25 percent.[35] During the globalization period, the share of the Emerging South has increased to 34 percent while the Northern share has decreased to 62 percent. The share of the Developing South has registered a slight decline over time. These changes have mainly been the result of vibrant growth in the Emerging South in recent decades. Table 3.2 shows that the average growth in this group of countries has been more than two times faster than that in the North during the globalization period.[36]

The increase in the share of the Emerging South in the world GDP has been primarily driven by China and India. For example, China's share of world GDP has

[34] The countries in this group roughly correspond to those included in the MSCI Emerging Markets Index. The main differences are that we drop the transition economies because of limited data availability and add Hong Kong SAR, Singapore and Venezuela.

[35] Using PPP exchange rates is generally thought to provide a more balanced estimate of the relative importance of the rich and the poor countries since they adjust for the price distortions between traded and non-traded goods (see Callen, 2007). Developing countries constitute a much smaller share of the world economy when measured with weights in constant 2000 U.S. dollars (see Helbling and others, 2007).

[36] Implications of increased trade and financial flows for economic growth in the Emerging and Developing South economies have been the subject of numerous papers (see Kose and others, 2006; and Winters, 2004).

increased dramatically from 3.17 percent during the Bretton Woods period to 9.79 percent in the globalization period. Similarly, the share of India has risen from 4.36 percent to 5.61 percent over these periods.[37]

3.3.2 Changes in the Dynamics of Trade and Sectoral Output

Trade Openness

There have been significant changes in the volume and nature of trade flows during the globalization period. These changes have been fueled by the liberalization of trade policies around the world and rapid declines in the costs of transportation and communication. Figure 3.1 shows that the fraction of countries with a fully liberalized trade regime has precipitously increased in the globalization period.[38]

Figure 3.2 shows the evolution of trade openness, measured by the ratio of total trade to GDP, for the world and three groups. The measure of trade openness for the world has been relatively stable until 1985, but then has gained momentum during the globalization period. In particular, the ratio for the Emerging South has risen from 28 percent to 78 percent over this period. Similarly, for the North, the openness measure has increased from 26 percent to 46 percent during the globalization period. In contrast, the openness ratio for the Developing South has been rather stable over time. Relatively high level of trade openness of this group is the result of its heavy dependence on the exports of primary commodities and fuels.

---

[37] The rapid growth of Emerging South economies and their future growth potential have been a central theme in recent research. In particular, the growth potential of Brazil, Russia, India, and China (the BRIC economies) has been widely studied (see Coleman, 2007; Prasad, 2004; Tseng and Cowen, 2005; Aziz, Dunaway and Prasad, 2006; and Wilson and Purushothaman, 2003).

[38] Developing countries undertook the majority of unilateral trade liberalizations reported to the GATT following the beginning of the Uruguay Round negotiations in 1986 (see Qureshi, 1996).

Sectoral Changes

One particular reason for the dramatic increase in the degree of openness of the Emerging South is that many economies in this group have pursued aggressive industrialization policies based on export driven growth strategies over the last two decades (see Weiss, 2005). In the 1960–72 period, the average growth of exports of this group was lower than that of the North, but during the globalization period, it has been more than two times higher (Table 3.2).

These developments have been accompanied by a substantial reallocation of resources from agriculture to industry and services. Table 3.3 shows that the North has been rapidly increasing the relative share of services sector while the Emerging South has been allocating more resources towards industry and services. These two sectors have been the driving forces of the growth in the Emerging South (Table 3.2). The Developing South, on the other hand, has continued to retain a relatively large agricultural sector during the globalization period.

Nature of Trade

There has also been a concurrent shift in the comparative advantage of the Emerging South from primary commodities to a diversified range of manufacturing products. Table 3.4 documents that during the Bretton Woods period, the groups of the Emerging South and Developing South have been similar in terms of the composition of their exports and imports. In particular, both groups have mainly been the exporters of primary commodities with the export share of 60 percent for the Emerging South and 81 percent for the Developing South while the manufacturing products have constituted the

bulk of their imports. However, in the Emerging South, the share of commodities has declined to 17 percent while the share of manufacturing exports has rapidly increased to 74 percent of the total exports during the globalization period.

Table 3.4 also reveals that the share of manufacturing imports has expanded simultaneously with the growth of the manufacturing exports in the Emerging South. One of the underlying factors behind this trend has been the rising intra-industry trade between the North and Emerging South groups during the globalization period. Table 3.5 shows that the extent of intra-industry trade, measured by the average bilateral Grubel-Lloyd index, has been progressively increasing among the G-7 and between the Emerging South and G-7 countries since 1970.[39] The intra-industry trade intensity with the G-7 countries has been higher for the Emerging Asia in comparison to other Emerging South countries. The surge in intra-industry trade linkages between the North and Emerging South has been partly driven by the relocation of some Northern industrial facilities to the Emerging South. In particular, production processes among these two groups have been closely integrated and transformed into vertical trading chains with different countries specializing in different stages of production sequence (see Hummels, Ishii, and Yi, 2001).

Increased intra-industry trade with the North has also led to a significant change in the direction of trade flows around the world. As shown in Figure 3.3, the North has remained to be the dominant destination of global trade flows during the 1960–2005 period. The share of total world trade directed towards the Emerging South has

[39] Due to data limitations, the Grubel-Lloyd indices are available only bilaterally. In order to compute the intra-industry trade intensity, the index values of different countries in the Emerging South group are averaged. Similarly, the average index values of the G-7 countries are used as a proxy for the North.

significantly increased from 14 percent in 1985 to 25 percent in 2005. In testimony to the overall trade integration, the Emerging South has also become an important market for the North by increasing its share from 13 percent of the total Northern trade in 1985 to 21 percent in 2005. In contrast, the Developing South has continued to play a minor role in world trade during this period.

South-South Trade Linkages

Figure 3.3 also shows that the intensity of intra- and cross-group trade linkages has increased in the South. For example, the share of intra-group trade in the total trade of the Emerging South trade has increased by fourfold from 9 percent in 1960 to 36 percent in 2005. During this period, the share of the Emerging Southern trade with the North has declined from 83 percent to 50 percent. Similarly, in the total trade of Developing South, the share of trade with the Emerging South has jumped from 6 percent in 1960 to 25 percent in 2005. China has been an engine of the growth of intraregional trade in Asia. For example, China related intra-regional trade flows grew by 12 times accounting for roughly 60 percent of intraregional trade within emerging Asia over the period 1990-2006 (see Hori, 2007). A significant fraction of intra-group trade flows in the Emerging South has been driven by intra-industry trade. Table 3.5 shows that intra-industry trade intensity of the Asian countries with the Emerging Asia has increased over time and it has in some cases exceeded the levels of Asian intra-industry trade with the G-7 in the 1990s**.** For example, within emerging Asia, China has been a major player in the growth of intra-industry trade as the index of intra-industry trade intensity between China and emerging Asia has increased from 0.06 to 0.32.

3.3.3 Changes in Financial Linkages

Financial Openness

The growth of international financial flows has overshadowed that of trade flows in the globalization period. This unprecedented change has been mainly associated with the rapid liberalization of capital account regimes since 1986. Figure 3.1 shows that the fraction of countries with liberalized financial systems has sharply increased in the globalization period. In addition, several "pull" and "push" factors have changed the composition of financial linkages between the North and South during the globalization period.[40] As a consequence, the composition of capital flows, in particular to the Emerging South, has rapidly changed, and portfolio-equity and foreign direct investment inflows have become more prominent.

Figure 3.4-a displays the absolute level of integration of different country groups into global financial markets, calculated as the sum of gross international financial assets and liabilities. While the level of integration is clearly highest for the North economies, the Emerging South countries have accounted for the bulk of the integration experienced by the South. The gross stocks of assets and liabilities of the Emerging South has risen by more than fivefold and has been on average an order of magnitude larger than that of the Developing South during the globalization period.

[40] Most of these structural changes that can be classified as "pull factors" have taken place in the Emerging South economies. Privatization of state-owned enterprises, removal of restrictions on the acquisition of assets by foreigners, liberalization of domestic banking systems and stock markets, as well as gradual establishment of liberal capital account regimes have attracted the international capital flows towards the developing countries. As for the "push factors", demographic changes in the North countries have resulted in a search for higher returns (see Prasad and others, 2003 for details). For a detailed discussion of the evolution of foreign assets and liabilities around the world, see Lane and Milesi-Ferretti (2006).

Figure 3.4-b presents the evolution of the composition of total foreign assets and liabilities for different groups of countries. Among the North economies, the biggest increase has been in the share of portfolio equity during the globalization period. The share of debt in gross stocks of foreign assets and liabilities of the Emerging South has declined from 80 percent to 50 percent during the same period while the share of FDI and portfolio equity has risen from a total of 13 percent to 40 percent. The share of portfolio equity has been rather small in the total stocks of the Developing South. Accumulation of official international reserves has recently accounted for a significant portion of the increase in gross foreign assets of the Emerging and Developing South economies (see Kose and others, 2006).

South-South Financial Linkages

Finally, there are also signs of increasing financial linkages between the Emerging South and Developing South groups commensurate with the rising importance of Emerging South in the global economy. For example, intra-South FDI flows increased by threefold over the period 1995–2003 (see World Bank, 2006; and Aykut and Goldstein, 2007). The share of flows from the Emerging South rose from 16 percent in 1995 to 36 percent in 2003 in the total FDI flows of the Developing South. These flows have mainly concentrated in the services and extractive industries backed by various government incentives for the Emerging Southern multinationals. The Emerging South banks have also started penetrating into the markets of the Developing South countries.

3.3.4 How to Characterize the North-South Linkages? Theory and Evidence

The dynamics of linkages between the North and South have been traditionally described as a form of "unidirectional dependence" with cyclical fluctuations and growth in the South being determined primarily by the developments in the North. According to the standard North-South model (see Findlay, 1980), the North wields greater economic influence on the South because of the Southern structural dependence on the Northern capital goods, finance, technology, and export markets. The asymmetric interaction between the two groups stems from the fact that the South is composed of poor developing countries specialized in the production and export of a narrow range of primary commodities while the North is composed of rich industrialized economies specialized in the production and export of manufacturing goods. In this traditional framework, the growth in the South is driven by the Northern demand for the Southern exports which are used as inputs in the Northern manufacturing sector. The growth spillovers across these groups are transmitted primarily through terms of trade fluctuations.[41]

However, the structural changes we have documented above suggest that the traditional framework of asymmetric North-South interaction might not be relevant anymore. In particular, the world economy has gone through several structural changes during the globalization period transforming the nature of interactions between the North

[41] See Burgstaller and Saavedra-Rivano (1984) for an extension of the Findlay model with mobile capital flows. The model implies an inverse relationship between changes in the world capital stock and the South terms of trade. Beenstock (1988) shows that demand spillovers for the South exports through trade and a subsequent increase in the real commodity prices and terms of trade provide the main mechanism for the cyclical fluctuations and growth in the South economies. Chui and others (2002) provide a survey of the theoretical North-South models that combine the theory of trade with growth theory. For an excellent exposition of the insights from the earlier development literature analyzing the North-South linkages, see Lewis (1979).

and South from one of unidirectional dependence to multifaceted interdependence. For example, increasing economic weight of the Emerging South countries means that this group has started to play a more important role in explaining the dynamics of global economic growth.[42] Table 3.6 shows that, during the Bretton Woods period, the North and Emerging South groups accounted for 74 percent and 22 percent of the world GDP growth, respectively. In the globalization period, the average contribution of the Emerging South group to the global GDP growth has risen to 52 percent exceeding the Northern contribution of 45 percent.

In addition, the Emerging South group has begun to influence the dynamics of demand and supply in global commodity markets. For example, China, India and other rapidly growing Emerging South economies have become critical consumers of raw materials, food and energy and their demand has affected the dynamics of global commodity prices during the globalization period.[43]

The rapid diversification of the export base and industrial structure of the Emerging South towards the manufacturing activity has wide-ranging implications. For example, it indicates that the pattern of international division of labor described by the traditional framework has been changing. In particular, the Emerging South trade with the North has evolved from trade of raw materials to intra-industry trade where imported manufacturing

[42] Zebregs (2004b) shows that trade flows in Asia have become more China-centric overtime as the Chinese market accounted for 17 percent of the Asian exports in 2002. Gaulier, Lemonie and Unal-Kesenci (2007) document the increase in the volume of vertical trade flows within Asia. For a detailed discussion of the changing nature of China's trade structure, see Cui and Syed (2007). IMF (2007) provides a brief discussion of the contribution of individual countries to global growth in recent years.

[43] For example, China absorbed more than 8 percent of total raw material exports of the Developing South group making it the third largest market after the E.U. with 34 percent and the United States with 23 percent in 2002 (see Yang, 2003).

goods from the Emerging South economies are used as intermediate products in the North. As a consequence of this, economic spillovers between the North and Emerging South have become more interdependent.[44] Moreover, there has been a concurrent increase in trade flows among the Emerging South countries leading to stronger intra-group spillovers (see Zebregs, 2004a).

The changes in the volume and composition of financial flows have also affected the nature of financial interactions between the North and Emerging South groups. The South experience with financial flows from the North in the traditional framework was characterized by the dominance of debt flows and official lending and the sensitivity of these flows to interest rates in the North economies before the globalization period (see Eichengreen and Mody, 1998; and Reinhart and Reinhart, 2001). With the rapid growth of portfolio-equity flows, fluctuations in financial markets in the North and Emerging South have become more interlinked as financial flows have become sensitive not just to the risk and return conditions of the recipient economies but also to macroeconomic conditions in the North. In addition, cross-country international equity holdings have made asset prices in the Emerging South more responsive to financial conditions not only in the North but also in other Emerging South economies, as evidenced by the contagious nature of the 1997–98 Asian crisis.

In conclusion, the changes that have taken place in the globalization period imply that the venues of interaction between the North and Emerging South have become diversified and the relationship between these two groups has become more symmetric and

[44] See Burstein, Kurz, and Tesar (2008) and Kose and Yi (2001, 2006) for models explaining the impact of vertical trade integration on the synchronization of business cycles.

interdependent in comparison to that between the North and Developing South groups. We now turn our focus to the implications of these changes for the growth linkages across these three groups of countries.

3.4 Understanding Growth Linkages

We study the transmission of growth fluctuations in GDP and sectoral output within and across groups of countries using simple correlations in this section. We first describe the methodology used to construct the measures of aggregate economic activity of each group. Then, we document the stylized facts about the cross- and intra-group correlations of growth fluctuations.

3.4.1 How to Measure Aggregate Economic Activity?

We construct two group-wide measures for each macroeconomic variable of interest, including GDP and value added of industry, services, and agriculture sectors.[45] Our first measure is a widely used one based on the output-weighted sum of the growth rates of each variable. The second measure is a country-specific aggregate based on the trade-weighted sum of the growth rates of each variable. These two measures help us examine how the changes in the size distribution of countries and intensity of trade flows in each group affect the dynamics of group-wide economic activity.

[45] We use the annual growth rates of constant local currency values of GDP, industry, services and agriculture value added. Detailed information about the list of countries and data series is provided in Appendices 3.6 and 3.7.

Output-Weighted Index

To construct an output-weighted aggregate for each group, we first compute the time varying output weights, $yw_{i,t}^{R}$, for each country, *i,* by using the ratio of the respective country's GDP measured in PPP terms, $Y_{i,t}$, to the total GDP of its group. In particular, we compute the following ratio:

$$yw_{i,t}^{R} = \frac{Y_{i,t}}{\sum_{i=1}^{N^R} Y_{i,t}} \tag{3.1}$$

where N^R denotes the number of countries in group *R* (North, Emerging South and Developing South).

We multiply the annual growth rate of each macroeconomic aggregate, $\Delta y_{i,t}^{S}$, with each country's lagged output weight and sum this multiplication over the sample of countries in each group to compute the output-weighted aggregate of each group, ΔYR_t^S

$$\Delta YR_t^S = \sum_{i=1}^{N^R} yw_{i,t-1}^{R} \times \Delta y_{i,t}^{S} \tag{3.2}$$

where S denotes the macroeconomic variable of interest (GDP or sectoral output).[46]

[46] When the annual growth rate of GDP or sectoral aggregate is multiplied with the lagged weight for each country, the nominator of the weight term and the denominator of the growth term will cancel out each other and the sum of the product over the sample will be equal to the aggregate growth of each group. Output weights are used both in the calculations of GDP and sectoral output indices.

Trade-Weighted Index

Our second measure corresponds to country specific trade-weighted Northern and Emerging Southern indices for each country in our sample.[47] To construct the trade-weighted index for each country, we first compute the time varying bilateral trade weights for country i with country j in the North and Emerging South groups. In particular, we calculate the ratio of trade (exports and imports) of country i with country j to the total trade of country i with all the countries in the group that the country j belongs to. This ratio is denoted by $tw_{i,t}^{jR}$ and computed as follows:

$$tw_{i,t}^{jR} = \frac{X_{i,t}^{j} + M_{i,t}^{j}}{\sum_{j=1}^{N^R} X_{i,t}^{j} + M_{i,t}^{j}} \tag{3.3}$$

where N^R denotes the number of countries in group R (North and Emerging South).

The trade-weighted index of country i, $\Delta TR_{i,t}^{S}$, is then derived by multiplying the annual growth rate of each macroeconomic aggregate of country j, $\Delta y_{j,t}^{SR}$, with the respective trade-weight of country i with country j and summing this multiplication over the sample of countries in the group the country j belongs to:

$$\Delta TR_{i,t}^{S} = \sum_{j=1}^{N^R} tw_{i,t}^{jR} \times \Delta y_{j,t}^{SR} \tag{3.4}$$

[47] Since the quality of bilateral trade data for the Developing South countries is quite low, the trade weighted indices for this group are not constructed.

For example, in order to calculate the trade-weighted Emerging South index for China, trade volume of China with the Emerging South group is first calculated.[48] Next, the trade-weights for each trading partner of China in the Emerging South group are calculated by using the ratio of its trade with its respective trading partner to the total trade volume of China with the group. Then, these trade-weights are multiplied with the growth rates of macroeconomic aggregates of the respective trading partners. The trade-weighted index for China is the sum of these products over all the countries in the Emerging South group.

Why Two Distinct Indices? Similarities and Differences

The two indices of aggregate economic activity on average exhibit similar growth fluctuations. Figure 3.5-a presents the Northern and Emerging Southern output- and trade-weighted indices of GDP. In the upper panel, the averages of trade-weighted Northern GDP growth are calculated using all of the countries in our sample. The trade- and output-weighted Northern indices exhibit similar dynamics and capture several features of the global growth, including the trough associated with the oil shock in the mid-1970s, the recessions in the early 1980s and 1990s, and the recent global slowdown in 2001.

The lower panel shows the consistent behavior across the trade- and output-weighted measures of GDP growth in the Emerging South. Both measures reflect the major events in this group of countries, such as the debt crisis in the mid-1980s and the 1997 Asian financial crisis. The trade-based index registers a sharper decline following the Asian crisis because of the relatively high trade intensity among the emerging Asian economies.

[48] Since China belongs to the Emerging South group, the rest of Emerging South group is used to calculate the total trade of China with this group. The major trading hubs, including Hong Kong and Singapore, are excluded from the Emerging South group due to their disproportionately large shares of trade.

While the two indices on average display similar behavior, they serve different purposes in measuring economic activity of each group of countries. The output-based index generates a single, aggregated measure of economic activity driven by the size distribution of countries. This implies that large economies like the United States and China exert more influence on their respective group-wide indices. For example, since the United States on average constitutes about 38 percent of the total GDP of the North economies (in PPP terms) over the period 1960–2005, it has a significant impact on fluctuations in the output-weighted Northern index. The Chinese economy exerts a particularly large impact on the Emerging Southern index during the globalization period as the Chinese share in the total GDP of the Emerging South group has doubled from 14 percent during the pre-globalization period to 28 percent over the globalization period. During the 1960–2005 period, the correlation of the U.S. output growth with the output-weighted Northern index is 0.71 and the Chinese growth with the output-weighted Emerging Southern index is 0.59.

There are, however, some advantages in using the trade-based indices over the output-based ones. In particular, each country has a unique trade-weighted index where the weights for its growth fluctuations are proportional to its bilateral trade intensity with its trading partners in the same group. This provides a better characterization of the impact of group-wide economic activity for the respective country than the simple output-weighted index since the latter primarily captures the influence of large economies. As we discuss in Section 2, trade linkages play a particularly prominent role in the transmission of economic fluctuations.[49]

[49] According to the trade-weighted index, for example, the African economies that trade heavily with France will have larger weights for France in the calculation of the North group-wide index in comparison to the

In addition, since shocks to a particular economy often exert more influence on its neighboring trading partners, the trade-weighted index captures valuable information about the regional boom-bust episodes. Figure 3.5-b presents the averages of the trade-weighted Emerging Southern GDP growth across different regions. The Emerging South index for Latin America displays sharper fluctuations during some important events for this region, such as the debt crisis in the early 1980s and the 2001 crisis in Argentina. Similarly, better growth performance of Asian economies during the 1980s and 1990s is reflected more clearly on the average growth of the Emerging Southern indices of the Asian economies as a result of deeper trade integration within Asia.

3.4.2 Stylized Facts about Growth Linkages

Cross-Group Correlations: Divergence Across Groups

We first examine the correlations across the growth rates of GDP and sectoral production based on the output- and trade-weighted indices for the North, Emerging South and Developing South groups. Table 3.7-a presents the cross-group correlations based on the output-weighted indices. While the correlations between the Emerging Southern and Northern indices have increased during the common shock period relative to the Bretton Woods period, they have declined in the period of globalization.[50] In particular, the correlation between the Northern GDP and Emerging Southern GDP has decreased from 0.42 in the common shock period to 0.07 in the globalization period. Similarly, there has

---

Latin American economies that trade relatively less with France. Similarly, the Asian economies will have greater weights for the Japanese growth in their North indices because of their stronger trade linkages with Japan.

[50] We focus on the differences between the Bretton Woods and globalization periods since we would like to isolate the impact of common shocks from that of globalization on the evolution of international growth spillovers over time (see Kose, Otrok and Whiteman, 2008).

been a decrease from 0.63 to 0.22 in the correlation of group-wide indices of industrial output over these two periods. While the correlation between the Northern and Developing Southern GDP indices has been relatively more stable, the one between the Emerging and Developing Southern indices has decreased over time.[51] Our results suggest that the Emerging South has over time differentiated itself from the Developing South as growth fluctuations in the former group have diverged from the North in the globalization period.

There are of course other ways of studying cross-group correlations. Table 3.7-b shows that the average correlations of GDP and sectoral growth of North countries with the output-weighted Emerging South indices produce similar results. The results from the average bilateral correlations of the Developing South countries with the trade-weighted and output-weighted Northern and Emerging Southern indices are not reported because they are close to zero. GDP and industrial output growth rates in the North countries have diverged from those of their trading partners in the Emerging South group in the globalization period (Table 3.7-c). The average of GDP (industrial output) correlations declined from 0.17 (0.31) in 1960–72 to -0.09 (-0.02) during the globalization period.

Intra-Group Correlations: Convergence Within Groups

We analyze the changes in the extent of intra-group growth linkages in Table 3.8 which presents the averages of bilateral correlations of GDP and sectoral growth rates of the North and Emerging South countries with their respective trade-weighted indices. The North countries on average have become more correlated with their Northern trading partners in the globalization period in comparison to the Bretton Woods period. For

[51] We also compute the 10-year rolling window correlations of output and sectoral aggregates in Figure 6 and find broadly consistent results with those reported in these tables.

example, the average correlation between GDP growth of the Northern countries with that of their Northern trade partners has increased from 0.26 in 1960–72 to 0.53 in the globalization period. In a similar fashion, growth fluctuations in the Emerging South countries have become more correlated with their trading partners in the same group. The average intra-group correlation of GDP growth has steadily increased from 0.01 in 1960–72 to 0.35 in the globalization period.

With respect to the correlations of industrial output, the patterns are quite similar to those in GDP correlations. For example, industrial growth of the North countries is on average highly correlated with the growth rates of their Northern trading partners. The average correlation has increased from 0.48 in the 1960–72 period to 0.53 in the globalization period. Growth fluctuations in industrial output in the Emerging South countries have become more correlated with those in their trading partners in the same group as they have progressively increased from -0.09 in 1960–72 to 0.31 in the globalization period. Similar results are obtained in Table 3.9 using the average correlations across output-weighted Northern and Emerging Southern indices.

In sum, the extent of co-movement of growth fluctuations in the Emerging South with those in the North has become weaker over time. On the other hand, there has been an increase in the degree of co-movement of growth fluctuations across the North countries. In addition, growth fluctuations in the Emerging South economies have become more strongly associated with their trading partners in the same group.

These findings are consistent with some of the earlier results we surveyed in section 2, but also provide some new insights. First, we argue that, rather than as a homogeneous

entity, it is necessary to consider the South as the combination of two different groups of countries, the Emerging and Developing South, because of the dramatic changes documented in the previous section. Based on this new partition, we show that the growth dynamics of the Emerging South group have diverged from those of the North group. Second, we document that there has been a convergence in growth fluctuations within the North and Emerging South groups. Earlier studies have documented only one of these two results using standard macroeconomic aggregates, such as output, consumption and investment. Third, unlike the earlier studies, ours also examines to what extent the stylized facts associated with the GDP growth fluctuations are applicable to the dynamics of sectoral output using a comprehensive dataset.

3.5 Quantifying Growth Spillovers

While we provide a set of useful stylized facts about the growth linkages in the previous section, understanding the changes in the nature of growth spillovers within and across the three groups of countries requires a more formal framework controlling numerous other factors. In this section, we analyze these spillovers employing a regression model that accounts for such other factors, including several growth determinants. In particular, we use a set of panel OLS regressions with the following benchmark specification:

$$y_{i,t} = \alpha + \gamma' X_{i,t} + \beta N_{i,t} + \delta D_{pre-globalization} \times N_{i,t} + \varphi ES_{i,t} + \theta D_{pre-globalization} \times ES_{i,t} + \varepsilon_{i,t} \quad (3.5)$$

The dependent variable, $y_{i,t}$, is the 5-year average of the growth rate of the respective measure of economic activity, such as GDP, industry, services, and agriculture value-added of country *i*. Over the period 1960-2005, there are nine 5-year panels implying

that each country has nine observations in these regressions.[52] The variables $N_{i,t}$ and $ES_{i,t}$ represent the 5-year averages of growth rates of each country's trade-weighted Northern and Emerging Southern indices, respectively. We prefer using the trade-weighted indices over the output-weighted ones in our regressions since they are unique to each country included in the estimation. Moreover, they account for the country specific levels of trade integration with the North and Emerging South economies.[53]

In this section, we simplify our earlier time demarcation by splitting the 1960–2005 period into two sub-periods: the globalization and pre-globalization periods. In order to identify the time variation associated with the Northern and Emerging Southern growth, we interact the group-wide indices of economic activity with a dummy variable, $D_{pre\text{-}globalization}$, representing the pre-globalization period (1960-1985) which combines the Bretton Woods period (1960-1972) and the common shock era (1973-1985).[54] In particular, the dummy variable takes the value of 1 before 1986 and is equal to 0 after. This implies that the β coefficient measures the average impact of the Northern growth during the globalization period while $(\beta + \delta)$ captures its average effect during the pre-globalization period. In other words, the δ coefficient indicates whether there is a change in the impact of the North

[52] The use of 5-year panels allows us to analyze the growth spillovers in the medium-term dampening the potential impact of transitory and volatile idiosyncratic shocks in shorter horizons. The panel regressions could also help explain some medium-term trends rather than year-to-year changes which are more apparent in the cross-correlations reported in the previous section. We tested the poolability of our specifications against the fixed or the random effects estimations but the existence of individual effects is rejected for the majority of the specifications.

[53] The results with the output-weighted indices are broadly consistent with the results using trade-weighted indices (see Appendix 3.2a). Results with 1991 as the starting year of the globalization period are also similar.

[54] As we discuss earlier, there are no significant changes in the nature of North-South trade and financial linkages in the pre-globalization period. In the previous section, we separate the common shock period to account for the impact of oil shocks in the 1970s and the contractionary monetary policies in the early 1980s. When we combine the two periods and compare the contemporaneous correlations of GDP and sectoral growth of the groups, we still observe the divergence of the cross-group activity in the globalization period.

growth over the two periods. Similarly, the φ coefficient corresponds to the average impact of the Emerging South growth in the globalization period and $(\varphi + \theta)$ measures its effect during the pre-globalization period.

$X_{i,t}$ represents a set of additional control variables widely used in the standard growth regressions (see Levine and Renelt, 1992). In particular, we use the log level of initial per capita GDP in PPP terms to measure the degree of convergence; the average population growth to account for the labor force growth; the share of investment in GDP as a proxy for fixed capital accumulation; the size of government spending relative to GDP; human capital endowment measured by the fraction of population over 15 years of age with secondary school attainment; and the log level of average inflation as a proxy for macroeconomic stability.

3.5.1 Results from the Benchmark Regressions

Output Growth Spillovers

We present the results of our benchmark GDP growth regressions in Table 3.10 for the world (whole sample) and the North, Emerging South and Developing South groups. The standard growth controls are significant with their expected signs in most cases.[55] The results indicate that the North economies play a major role in explaining GDP growth in the rest of the world. For example, a one percentage point increase in the growth of the North index is on average associated with approximately 0.6 percentage points increase in the GDP growth of the whole sample during the globalization period. On the other hand, a one

[55] Investment is significant in all specifications; the convergence variable is significant for the North and Emerging South groups ; human capital development is significant for the GDP growth of the Emerging South group; population growth is significant for all the groups except the Emerging South; and inflation is significant for all the groups except the North.

percentage point increase in the growth of the Emerging South corresponds to roughly 0.2 percentage points growth spillover to the rest of the world during the globalization period. The pre-globalization coefficients associated with the Northern and Emerging Southern indices are not significant suggesting that the effects of these two groups on global growth have been stable over time.[56]

How do aggregate growth dynamics affect the average growth of countries in each group? The results suggest some interesting similarities with the stylized facts reported in the previous section. For example, the impact of Northern GDP growth on the North economies has increased over the two periods. A one percentage point increase in the Northern GDP growth corresponds to 0.75 percentage points increase in the average GDP growth of a typical North economy and this impact is about 0.54 percentage points higher than that in the pre-globalization period. This pattern is also observed in the growth dynamics of the Emerging South group as a one percentage point increase in the Emerging South growth tends to 0.35 percentage points increase in the GDP growth of the Emerging South economies during the globalization period. While this impact is larger than that in the pre-globalization period, the increase is not statistically significant.[57] In other words, consistent with the findings about the convergence of growth correlations within groups, we find that the group-wide growth has become more important for countries in the same group over time.

[56] The results by Arora and Vamvakidis (2006) partially support our findings about the importance of the North GDP growth for the rest of the world. Their study looks at the growth spillovers from the United States during the period of 1980–98 for a large sample of developed and developing countries and finds that a one percentage point increase in the growth of the U.S. GDP generates a one percentage point increase in the growth of rest of the world.

[57] However, as we discuss later, this change is significant in the case of Asia Pacific countries.

In addition, there have been important changes in the cross-group growth spillovers over time consistent with our findings in the previous section. Specifically, the Northern impact on the Emerging South has decreased over time while its impact has been rather stable on the Developing South. For example, a one percentage point increase in the Northern GDP growth is associated with 0.34 percentage points increase in the GDP growth of the Emerging South economies during the globalization period but this is 0.41 percentage points lower than that in the pre-globalization period. In contrast, a one percentage point increase in the growth of the North activity corresponds to 0.45 percentage points rise in the Developing Southern GDP growth and this impact has been rather stable over time.

While these findings are consistent with some of the earlier results in the literature, they provide some new perspectives about the changing nature of linkages between the North and South. For example, the finding that the Northern activity has a larger and stable impact on growth in the Developing South confirms the results by Kouparitsas (2001). In his paper, a typical expansion in the North creates an expansion in the South as a result of the structural dependence of the South economies on the Northern export demand for primary commodities. Our results show that the asymmetric and unidirectional interaction modeled in the traditional North-South framework emphasized in Kouparitsas (2001) is applicable only in the context of North-Developing South growth spillovers. Moreover, our findings also suggest that the Emerging South economic activity has become less influenced by the Northern growth spillovers during the globalization period implying that the Emerging South has started differentiating itself from the Developing South in terms of its nature of growth linkages with the North.

Sectoral Growth Spillovers

The results associated with sectoral spillovers paint a broadly similar picture to that of output about the cross- and intra-group growth spillovers. To simplify the exposition, we present a summary of these findings in Figures 7 and 8.[58] For the whole sample (world), a one percentage point increase in the growth of industrial output in the North economies corresponds to approximately 0.6 percentage points rise in the average growth of the industrial value-added in the rest of the world. A one percentage point increase in the Emerging Southern industry growth is associated with 0.16 percentage points expansion in the growth of industrial output in the rest of the world during the globalization period. There has been no significant temporal change in the extent of industrial growth spillovers from these two groups. Service output in the North appears to have a significant impact on the rest of the world as well.

With respect to the group-wide growth dynamics, the sectoral results are again similar to those of output. Specifically, there has been an increase in the extent of intra-group growth spillovers. For example, a one percentage point increase in the growth of industrial output in the North corresponds to slightly more than 0.6 percentage points increase in the growth of industrial output in the North economies. This impact is about 0.35 percentage points higher during the globalization period although the change over the two periods is not significant. A one percentage point increase in the industrial output of the Emerging South group is associated with 0.20 percentage points increase in the industrial output growth of the Emerging South economies, but this impact has not changed

[58] Detailed results of the regressions associated with the sectoral growth spillovers are presented in Appendix 3.2b.

over time. Intra-group growth dynamics in the services sector exhibit a similar pattern with a statistically significant increase in the magnitude of growth spillovers from the Northern services to individual countries in the North across the two periods. However, there is no noticeable temporal pattern in the extent of growth spillovers in agricultural output.

The behavior of sectoral growth spillovers across groups is also consistent with that of GDP. A one percentage point increase in the growth of the Northern industrial output is associated with a growth of 0.40 percentage points in the Emerging South economies and this impact is two times higher in the pre-globalization period. Similarly, a one percentage point increase in the growth of the Northern services affects the Emerging South services growth by an additional 0.6 percentage points in the pre-globalization period in comparison to the insignificant impact during the globalization. On the other hand, the Developing Southern sectoral growth appears to be heavily affected by the Northern growth over both periods.

In summary, we have three major results in this section. First, intra-group growth spillovers have become stronger as countries in the North and Emerging South have become more interdependent. Second, there has been a decline in the cross-group growth spillovers as the impact of the North on the Emerging South has decreased over time. In other words, during the globalization period, the Emerging South countries have become more independent from the growth dynamics in the North in contrast to the Developing South countries. Third, the North still plays an important role in explaining the global economic growth.

3.5.2 Robustness Exercises

We conduct several exercises to check the robustness of our benchmark results. First, we check the impact of outliers. Then, we control for several additional variables, including export structure, trade and financial openness, and common shocks. Finally, we examine how the growth spillovers manifest themselves in specific regions such as Asia and Latin America. These exercises show that our main findings are quite robust.

Controlling for Outliers

We control for outliers employing two methods. First, we run our robust regressions using the iteratively re-weighted least squares. Second, we apply an alternative methodology by excluding the observations that are two standard deviations above or below the mean growth rate of the samples. We present the details of the robust regression results in Appendix 3.3. Both methods lead to broadly similar coefficient estimates with those of the benchmark regressions. For example, a one percentage point increase in the GDP growth of the North results in more than 0.6 percentage points increase in the GDP and sectoral growth of the whole sample. The sectoral effects appear to be slightly larger than those in the benchmark. Similarly, a one percentage point increase in the Emerging Southern GDP (or sectoral growth) corresponds to more than 0.2 percentage points increase in the growth of other countries in the whole sample, which is a slightly larger impact than that in the benchmark regressions.

Controlling for Export Structure, Openness, and Common Shocks

We extend our benchmark model by including the following variables: the share of manufacturing exports as a proxy for the high value-added component of the export

structure; the extent of trade openness, measured by the fraction of years the country has an open trading regime using Sachs and Warner (1995) de-jure trade liberalization dummy; the degree of financial openness, measured by the share of the stock of FDI and portfolio-equity liabilities in GDP; and common shocks proxied by the changes in oil prices. Appendices 3.4a-b present the details of these regression results. The results show that inclusion of these variables does not affect our qualitative findings, but they lead to some minor changes in the magnitudes of some coefficients of interest.[59]

Consistent with our benchmark results, the impact of the Northern GDP and sectoral growth on the average growth of the North economies has increased in the globalization period while the Emerging South has become less dependent on the growth spillovers from the Northern activity in the globalization period. The sectoral results point to the same conclusions. Finally, the impact of the Emerging Southern GDP and sectoral growth on the growth of countries in this group is significant during the globalization period and the estimates are broadly consistent with the benchmark results.

Growth Spillovers Across Geographical Regions

We also examine how the growth dynamics in the North and Emerging South groups affect economic growth in countries in the Asia and Pacific (AP) and the Latin America and the Caribbean (LAC) regions.[60] Appendix 3.5 provides a summary of the regression coefficients of the Northern and Emerging Southern GDP and sectoral growth.

[59] Manufacturing exports have a significant impact on GDP and sectoral growth of the whole sample and the Emerging South GDP. We find that trade openness has a positive impact on the GDP, industry and services growth of the Developing South group, and the GDP and services growth of the North group. Financial openness has a positive impact on the North. In contrast, the impact on the Emerging South is either statistically insignificant for the growth rates of GDP and services or negative for the industry growth. Finally, oil price changes positively affect the Developing South growth.

The impact of the North GDP, industry and services growth on the respective aggregates of the AP region has clearly declined during the globalization period whereas the Emerging Southern trading partners' effect has been significant and strengthened over time. In particular, while the impact of the Northern GDP (industrial output) growth on the AP region is significant during the pre-globalization period, it has become insignificant over the period of globalization. On the other hand, a one percentage point increase in the Emerging Southern GDP growth is associated with 0.35 points increase on the growth of the AP region during the globalization period and this impact is 0.27 points higher relative to the pre-globalization period.

In contrast, the impact of Northern GDP and sectoral growth on the LAC region is significant during the globalization period but there is no clear indication that the extent of spillovers has strengthened over time. The Emerging Southern industrial output growth has a significant growth impact on the LAC industrial production during the globalization period.

What are the implications of these findings for the recent debate about decoupling? This debate focuses on the ability of emerging market economies, especially emerging countries in the AP region, to decouple from a potential slowdown in the United States (see Helbling and others, 2007).[61] Our findings indicate that the impact of the North on the Emerging South countries has been declining over the past two decades implying that there is some partial support for the decoupling of business cycles of this group from the

[60] Note that these two regions include countries from both the Emerging and Developing South groups.

[61] For additional information about the decoupling debate in the context of Asia, see He, Cheung and Chang (2007) and Asian Development Bank (2007).

advanced countries in the North. As our robustness exercises show, these results are also valid for the AP region.

However, the relevance of our findings for the decoupling debate should not be overstated. First, our results apply to a large group of advanced countries in the North, not just the United States. Second, they are suggestive of some changes in the evolution of annual growth fluctuations in the three groups of countries and how these groups affect each other. While the results are robust to the inclusion of several factors in the panel regressions, these regressions do not account for potential non-linearities and general equilibrium considerations which are particularly important in an analysis of the merits of the decoupling view.

As Helbling and others (2007) discuss adverse developments in the U.S. economy can have a significant impact on emerging markets in the presence of certain non-linearities involving the amplitude of business cycles. To analyze the importance of such non-linearities, they undertake a detailed event study of the implications of U.S. recessions and slowdowns for the rest of the world. They find that spillovers are larger during full blown U.S. recessions than during mid-cycle slowdowns. Moreover, in light of the large volume of global trade and financial flows, they consider the general equilibrium implications of these episodes. They conclude that the U.S. recessions are more worrisome for the rest of the world since U.S. import growth turns sharply negative during recessions, and cross-country asset price correlations increase significantly during financial market downturns.

3.6 Conclusion

This paper examines the changing nature of growth spillovers between the developed economies of the North and the developing countries of the South. We begin with a detailed account of structural changes in these groups that have taken place over the past two decades. Our findings suggest that the South is no longer a homogenous group of developing countries. In particular, the Emerging South countries have diversified their economies, attained high growth rates and increasingly become important players in the global economy. As a result, the nature of economic interactions between the North and Emerging South has evolved from one of dependence to multidimensional interdependence.

We then document a set of basic stylized facts about the evolution of intra- and cross-group correlations of growth fluctuations. The results indicate that cross-country correlations of growth fluctuations in aggregate output within each group of the North and Emerging South countries have increased over time implying that there has been a noticeable pattern of intra-group convergence of growth spillovers. Surprisingly, while cross-group correlations of growth fluctuations suggest that the Emerging South economic activity has appeared to decouple from that of the North over time, there has been no significant change in the nature of growth linkages between the North and Developing South. The dynamics of sectoral production, especially those of industrial production and services, also exhibit similar stylized facts.

Next, we study the extent of growth spillovers from the North and Emerging South groups to GDP and sectoral output of individual countries. In particular, we employ a panel

regression model to analyze the quantitative importance of group-wide indices of GDP and sectoral output in explaining domestic economic activity after controlling for various factors, including the standard growth determinants, export structure, trade and financial openness, and oil price changes. Consistent with the stylized facts summarized above, we find that the impact of the North on the growth dynamics of the Emerging South has declined in the globalization period (1986–2005) relative to the earlier periods. Moreover, both the North and Emerging South economies have started to exhibit more intensive intra-group growth spillovers. In contrast to the Emerging South, the Developing South countries have continued to be significantly affected by the Northern growth throughout the entire sample.

We also study how the Asia and Pacific and the Latin America and the Caribbean regions are affected by the growth dynamics in the North and Emerging South groups. Our findings indicate that while the impact of the North on the former region has declined over time, it has not changed much on the latter one. In addition, the impact of the Emerging South on Asia and Pacific appears to have increased during the globalization period. These findings confirm that the rapid growth in the Asia and Pacific region, which was partly driven by the integration of China and India into the global economy, has played a major role in the transformation of the Emerging South group.

Our findings have important implications for the design of economic policies and theoretical models. The changing nature of international linkages implies that the global macroeconomic environment can have significant effects on domestic conditions that should be taken into account in the formulation of policies (see Reisen, Grandes, and Pinaud, 2005; and Lenain and de Serres, 2002). Furthermore, nationally oriented policies

aimed at economic stabilization would have a limited impact if growth dynamics in small open economies are driven primarily by external factors such as trade partner's growth and capital flows. Under these circumstances, economic policies need to focus on domestic macroeconomic fundamentals, efficient functioning of markets and of institutions to mitigate the potentially adverse effects of external shocks.

Moreover, in a highly integrated world economy with more potent channels of transmission, the desirability and effectiveness of international policy coordination have become increasingly more relevant. For example, according to the traditional models based on trade multiplier mechanisms, our findings would suggest a growing need for international policy coordination (Oudiz and Sachs, 1984). In these models, international policy coordination can result in sizeable welfare gains if the degree of integration of goods and assets markets is high. If international economic linkages are strong, countries can implement policies targeting current account dynamics to stimulate their economies and such policies can have a strong effect on domestic and global economic activity.

Recent research by Obstfeld and Rogoff (2001), on the other hand, provides insights quite different than those in the earlier literature. In particular, they argue that increased integration may in fact diminish the need for monetary policy coordination since international financial markets generate an expanded set of opportunities for cross-country risk sharing. Policymakers should then focus on eliminating the distortions created by various rigidities in domestic markets. They also find that the coordination of national

economic policies serves little purpose in response to global shocks since it is not possible for countries to insure each other against such shocks.[62]

With respect to theory, it is a major challenge for the traditional North-South models to explain some of the stylized facts documented here. For example, the classical North-South model assumes that the growth dynamics in the South are primarily driven by the North. This model considers the South as a homogenous group of poor developing countries specialized in the production and export of a narrow range of primary commodities while the North is composed of industrialized economies specialized in the production and export of manufactured goods. Consequently, the relationship between the two groups is an asymmetric one.[63]

The structural changes we document here suggest that the assumption of the asymmetric North-South interaction might not be relevant anymore. Recent modeling efforts attempt to account for some of the observations we document here, but they fall short of explaining various features associated with the evolving nature of North-South linkages.[64]

---

[62] For recent surveys on international policy coordination, see Meyer and others (2004) and Canzoneri, Cumby, and Diba (2005).

[63] In his Nobel Prize lecture, Lewis (1979) notes that *"...For the past hundred years the rate of growth of output in the developing world has depended on the rate of growth of output in the developed world. When the developed world grow fast the developing world grow fast, when the developed slow down, the developing slow down. Is this linkage inevitable?..."* The results reported in this paper suggest that the nature of linkages between the developed world and the developing world has been changing, and at least for the group of Emerging South countries of the developing world, the linkage Lewis identified appears to be evitable.

[64] For an early discussion of these issues, see Currie and Vines (1988). Chui and others (2002) provide a survey of theoretical North-South models focusing on trade and growth. For some recent modeling efforts analyzing the implications of the changing nature of international trade linkages for the growth of world trade and transmission of business cycles, see Kehoe and Ruhl (2003), Yi (2003), Kose and Yi (2006), and Burstein, Kurz, and Tesar (2008).

Table 3.1: Size Distribution of Groups
(in percent)

	1960-1972	1973-1985	1986-2005
North	73.40	70.25	62.38
Emerging South	22.03	25.41	33.74
Developing South	4.57	4.34	3.88

Notes: The values correspond to the period averages of shares that are calculated for each year based on GDP with constant PPP 2000 International dollars.

Table 3.2: Average Growth Rates of Macroeconomic and Sectoral Aggregates
(in percent)

	1960-1972	1973-1985	1986-2005
North			
GDP	4.89	2.82	2.63
Agriculture	1.26	2.04	1.37
Industry	5.41	1.65	1.97
Services	4.67	3.21	2.91
Exports	7.95	5.47	5.69
Emerging South			
GDP	5.15	5.00	5.63
Agriculture	3.19	3.40	2.57
Industry	6.47	5.54	6.36
Services	4.96	5.94	5.84
Exports	5.17	7.76	11.73
Developing South			
GDP	4.11	3.14	3.24
Agriculture	1.94	2.29	3.15
Industry	6.89	3.81	3.34
Services	2.46	4.49	3.30
Exports	4.67	4.80	6.12

Notes: The values correspond to the period averages of growth for each group calculated using the sum of PPP-based output weighted constant local currency growth rates of GDP, exports and sectoral value added of each country in the corresponding group.

Table 3.3: Changes in the Sectoral Composition (in percent)

	1960-1972	1973-1985	1986-2005
World			
Agriculture	5.67	4.41	3.91
Industry	32.98	31.86	29.59
Services	61.39	63.73	66.51
North			
Agriculture	3.50	2.43	1.92
Industry	33.60	32.11	28.69
Services	62.90	65.46	69.39
Emerging South			
Agriculture	21.59	15.72	12.28
Industry	27.93	29.74	33.38
Services	50.48	54.54	54.34
Developing South			
Agriculture	28.96	20.97	20.09
Industry	29.91	33.90	32.13
Services	44.61	45.13	47.91

Notes: The values correspond to the period averages of sectoral value added as a share of total value added computed using the constant 2000 U.S. dollars sectoral value added series.

Table 3.4: Changes in the Composition of Trade
(in percent)

Exports	1960-1972	1973-1985	1986-2005
North			
Primary Non-fuels	24.92	19.48	14.18
Primary Fuels	3.79	6.37	4.20
Manufacturing	71.37	74.22	81.63
Emerging South			
Primary Non-fuels	60.80	37.76	17.05
Primary Fuels	16.78	23.65	9.00
Manufacturing	23.33	38.59	73.95
Developing South			
Primary Non-fuels	81.53	35.64	33.36
Primary Fuels	14.96	56.80	40.77
Manufacturing	7.33	9.43	28.21

Imports	1960-1972	1973-1985	1986-2005
North			
Primary Non-fuels	35.74	22.21	15.39
Primary Fuels	11.59	22.69	9.51
Manufacturing	52.66	55.11	75.10
Emerging South			
Primary Non-fuels	26.60	19.71	13.94
Primary Fuels	7.38	17.00	9.45
Manufacturing	66.02	63.29	76.61
Developing South			
Primary Non-fuels	20.98	19.61	20.60
Primary Fuels	7.85	13.31	9.75
Manufacturing	71.17	67.12	69.65

Notes: The values correspond to the period averages of sectoral shares of merchandise exports and imports data. Primary non-fuels are defined as the sum of agricultural raw materials, food, ores, and metals.

Table 3.5-a: Intra-Industry Trade Intensity (Grubel-Lloyd Index)

G-7		G-7	Emerging Latin America	Emerging Asia	Other Emerging South
	1970-79	0.285	0.120	0.076	0.078
Canada	1980-89	0.307	0.108	0.096	0.120
	1990-99	0.383	0.138	0.140	0.175
	1970-79	0.535	0.078	0.123	0.118
France	1980-89	0.540	0.101	0.144	0.188
	1990-99	0.608	0.156	0.269	0.275
	1970-79	0.514	0.089	0.114	0.125
Germany	1980-89	0.507	0.122	0.166	0.159
	1990-99	0.594	0.154	0.285	0.230
	1970-79	0.418	0.086	0.101	0.152
Italy	1980-89	0.441	0.106	0.125	0.208
	1990-99	0.482	0.156	0.267	0.269
	1970-79	0.312	0.056	0.123	0.064
Japan	1980-89	0.290	0.083	0.157	0.071
	1990-99	0.362	0.063	0.309	0.084
	1970-79	0.536	0.095	0.142	0.173
United Kingdom	1980-89	0.537	0.104	0.184	0.224
	1990-99	0.631	0.172	0.300	0.331
	1970-79	0.484	0.193	0.196	0.115
USA	1980-89	0.502	0.241	0.289	0.172
	1990-99	0.602	0.318	0.386	0.262

Emerging Latin America		G-7	Emerging Latin America	Emerging Asia	Other Emerging South
Argentina	1970-79	0.118	0.267	0.054	0.018
	1980-89	0.129	0.204	0.034	0.026
	1990-99	0.138	0.301	0.073	0.061
Brazil	1970-79	0.172	0.160	0.023	0.008
	1980-89	0.217	0.182	0.036	0.039
	1990-99	0.275	0.255	0.099	0.118
Chile	1970-79	0.064	0.116	0.019	0.000
	1980-89	0.071	0.115	0.042	0.013
	1990-99	0.094	0.215	0.035	0.069
Colombia	1970-79	0.061	0.144	0.020	0.006
	1980-89	0.071	0.140	0.041	0.003
	1990-99	0.118	0.248	0.054	0.047
Mexico	1970-79	0.213	0.234	0.020	0.000
	1980-89	0.251	0.200	0.045	0.029
	1990-99	0.332	0.260	0.163	0.104
Peru	1970-79	0.059	0.107	0.053	0.002
	1980-89	0.062	0.136	0.035	0.004
	1990-99	0.073	0.175	0.030	0.017
Venezuela	1970-79	0.031	0.139	0.000	0.000
	1980-89	0.065	0.146	0.012	0.026
	1990-99	0.127	0.208	0.044	0.033

Notes: The values correspond to the period averages of intra-industry trade intensity of each country with respective groups. Intra-industry trade intensity of a specific country vis-à-vis the groups is measured by the average of the bilateral Grubel-Lloyd Indices of that country with the other countries included in the group.

Table 3.5-b: Intra-Industry Trade Intensity (Grubel-Lloyd Index)

Emerging Asia		G-7	Emerging Latin America	Emerging Asia	Other Emerging South
China	1970-79	0.099	0.083	0.055	0.000
	1980-89	0.141	0.044	0.131	0.039
	1990-99	0.268	0.067	0.317	0.107
India	1970-79	0.125	0.024	0.089	0.154
	1980-89	0.101	0.018	0.099	0.068
	1990-99	0.201	0.098	0.254	0.239
Indonesia	1970-79	0.065	0.001	0.059	0.003
	1980-89	0.069	0.010	0.134	0.017
	1990-99	0.163	0.064	0.300	0.069
Korea	1970-79	0.192	0.058	0.090	0.064
	1980-89	0.231	0.078	0.173	0.078
	1990-99	0.354	0.066	0.319	0.113
Malaysia	1970-79	0.204	0.006	0.166	0.067
	1980-89	0.250	0.053	0.226	0.005
	1990-99	0.353	0.064	0.395	0.052
Phillipines	1970-79	0.106	0.007	0.114	0.002
	1980-89	0.224	0.028	0.201	0.016
	1990-99	0.324	0.055	0.294	0.065
Thailand	1970-79	0.084	0.048	0.124	0.024
	1980-89	0.143	0.014	0.151	0.067
	1990-99	0.292	0.085	0.343	0.178

Other Emerging South		G-7	Emerging Latin America	Emerging Asia	Other Emerging South
Egypt	1970-79	0.071	0.002	0.086	0.002
	1980-89	0.072	0.006	0.061	0.031
	1990-99	0.114	0.025	0.048	0.137
Israel	1970-79	0.244	0.016	0.156	0.000
	1980-89	0.324	0.023	0.068	0.068
	1990-99	0.379	0.051	0.241	0.233
Morocco	1970-79	0.084	0.002	0.003	0.005
	1980-89	0.134	0.007	0.004	0.011
	1990-99	0.197	0.025	0.047	0.085
Turkey	1970-79	0.047	0.000	0.016	0.005
	1980-89	0.114	0.022	0.055	0.048
	1990-99	0.209	0.082	0.132	0.172
South Africa	1970-79	0.142	0.011	0.013	0.000
	1980-89	0.171	0.040	0.027	0.036
	1990-99	0.263	0.129	0.120	0.160

Notes: See notes in Table 3.5-a.

Table 3.6: Contribution to World GDP Growth
(in percent)

	1960-1972	1973-1985	1986-2005
North	74.00	48.86	44.62
Emerging South	22.34	46.36	51.84
Developing South	3.66	4.77	3.53

Notes: The values correspond to the period averages of the growth contributions of each group to the world growth. The sum of PPP-based output weighted constant local currency growth rates are used to construct the world growth. Growth contribution of each group is measured as the ratio of the sum of the weighted growth of countries included in each group to the world growth.

Table 3.7-a: Cross-Group Correlations
(Output Weighted Indices)

	1960-1972	1973-1985	1986-2005
North-Emerging South			
GDP	0.23	0.42	0.07
Agriculture	0.06	0.46	-0.05
Industry	0.34	0.63	0.22
Services	-0.37	0.54	-0.19
North-Developing South			
GDP	0.32	0.27	0.20
Agriculture	0.28	-0.02	0.12
Industry	0.47	0.80	0.50
Services	-0.30	-0.16	0.03
Emerging South-Developing South			
GDP	0.75	0.31	0.18
Agriculture	0.01	0.23	0.31
Industry	0.72	0.63	0.04
Services	0.28	0.28	0.04

Notes: The values correspond to the correlations between the PPP-based output weighted GDP and sectoral indices of the North, Emerging South, and the Developing South groups.

Table 3.7-b: Correlations between North and Emerging South
(Correlations with Output Weighted Emerging South Index)

	1960-1972	1973-1985	1986-2005
GDP	0.12	0.34	-0.07
Agriculture	0.15	0.07	0.04
Industry	0.25	0.42	0.01
Services	-0.05	0.36	-0.14

Notes: The values correspond to the cross-country averages of bilateral correlations of GDP and sectoral growth rates of North countries with the output weighted Emerging South indices for each period.

Table 3.7-c: Correlations between North and Emerging South
(Correlations with Trade Weighted Emerging South Indices)

	1960-1972	1973-1985	1986-2005
GDP	0.17	0.41	-0.09
Agriculture	0.26	0.10	-0.03
Industry	0.31	0.44	-0.02
Services	0.05	0.38	-0.17

Notes: The values correspond to the cross-country averages of bilateral correlations of GDP and sectoral growth rates of North countries with the trade weighted Emerging South indices for each period.

Table 3.8: Intra-Group Correlations
(Trade Weighted Indices)

North	1960-1972	1973-1985	1986-2005
GDP	0.26	0.58	0.53
Agriculture	0.08	0.29	0.12
Industry	0.48	0.59	0.53
Services	0.24	0.52	0.41
Emerging South			
GDP	0.01	0.27	0.35
Agriculture	0.002	0.02	0.13
Industry	-0.09	0.28	0.31
Services	-0.13	0.06	0.17

Notes: The values correspond to the cross-country averages of bilateral correlations of GDP and sectoral growth rates of countries in the North and Emerging South groups with the respective trade weighted group indices for each period.

Table 3.9: Intra-Group Correlations
(Output Weighted Indices)

North	1960-1972	1973-1985	1986-2005
GDP	0.24	0.53	0.50
Agriculture	0.24	0.22	0.09
Industry	0.43	0.56	0.45
Services	0.28	0.49	0.45
Emerging South			
GDP	0.10	0.22	0.39
Agriculture	0.07	0.06	0.19
Industry	0.15	0.29	0.36
Services	0.11	0.17	0.25

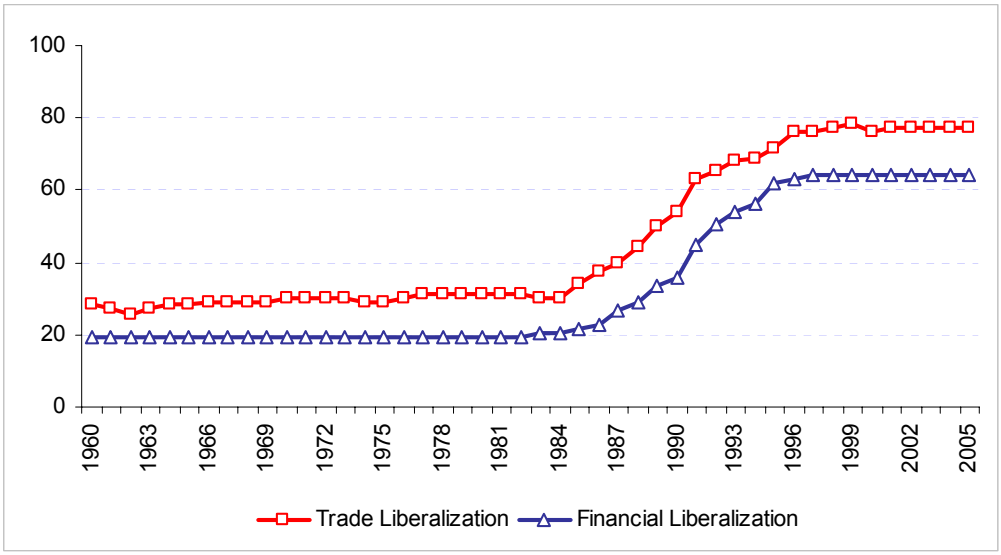
Notes: The values correspond to the cross-country averages of bilateral correlations of GDP and sectoral growth rates of countries in the North and Emerging South groups with the respective output weighted group indices for each period.

Table 3.10: Benchmark GDP Growth Regressions

	GDP			
Variable	Whole Sample (1)	North (2)	Emerging South (3)	Developing South (4)
Northern GDP	0.589***	0.744***	0.344*	0.448***
	[0.1]	[0.19]	[0.18]	[0.16]
Northern GDP * D pre-globalization	0.00448	-0.537**	0.412**	-0.0845
	[0.13]	[0.25]	[0.18]	[0.18]
Emerging South GDP	0.173**	-0.158	0.355***	0.0788
	[0.074]	[0.099]	[0.12]	[0.094]
Emerging South GDP * D pre-globalization	0.0495	0.195	-0.122	0.107
	[0.079]	[0.12]	[0.093]	[0.12]
log (Initial Percapita GDP)	-0.0495	-2.288***	-1.100**	0.182
	[0.21]	[0.59]	[0.43]	[0.22]
Population Growth	0.614***	1.020***	0.0635	0.700***
	[0.15]	[0.23]	[0.21]	[0.2]
Investment / GDP	0.0818***	0.0753**	0.160***	0.0622***
	[0.019]	[0.035]	[0.029]	[0.014]
Government Spending / GDP	-0.0036	-0.0192	0.00794	-0.0196
	[0.016]	[0.023]	[0.021]	[0.034]
log (100 + Inflation)	-1.736***	-3.72	-1.299***	-2.204***
	[0.32]	[4.37]	[0.38]	[0.39]
Secondary Education (15+)	0.018	0.000156	0.0567**	0.0169
	[0.015]	[0.011]	[0.027]	[0.018]
Constant	6.370**	40.06*	11.94**	7.866***
	[2.59]	[22.9]	[4.77]	[2.57]
Observations	803	198	192	413
R-squared	0.25	0.56	0.43	0.21

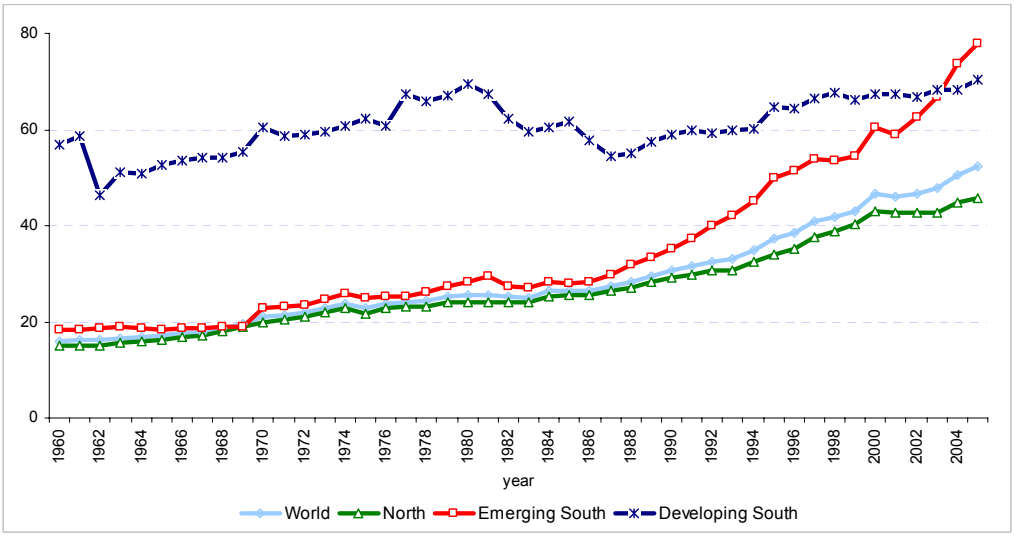
Notes: The dependent variable is the 5-year average of annual real GDP growth. The North and Emerging South GDP refer to the 5-year averages of the country specific trade-weighted GDP growth indices of the respective groups. Detailed descriptions of other explanatory variables are available in Appendix 3.7. Heteroscedasticity consistent robust standard errors from the pooled OLS regression are reported in parenthesis. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Figure 3.1: Evolution of Trade and Financial Liberalization (fraction of liberalized countries, in percent)



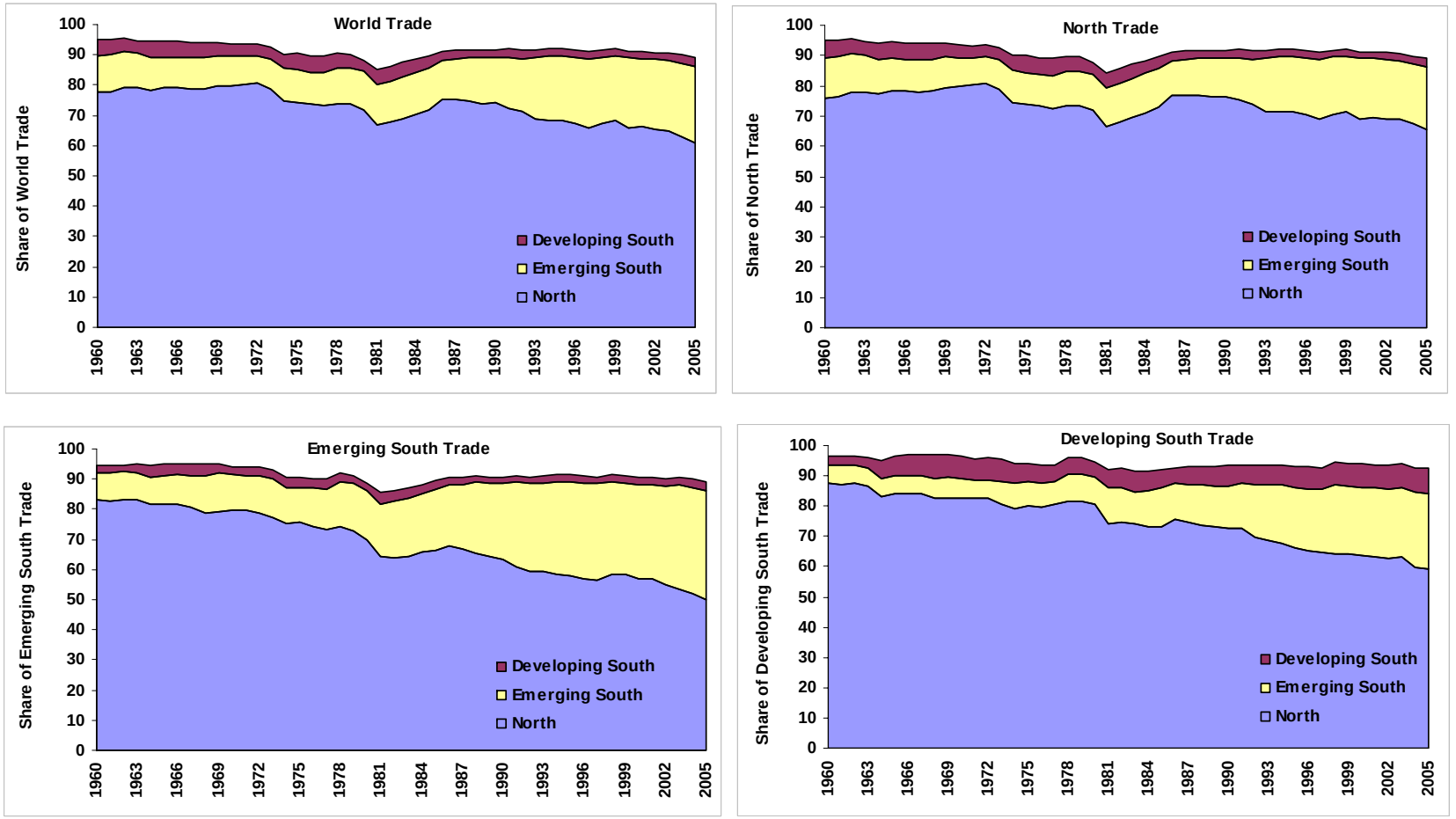
Notes: Trade liberalization measure indicates the fraction of countries with a fully liberalized trade regime. The dates of trade liberalization are determined on the basis of the Sachs and Warner (1995) and Wacziarg and Welch (2003). Financial liberalization measure indicates the fraction of countries with a liberalized financial system. The dates of official liberalization are determined on the basis of stock market liberalization and removal of restrictions on foreign investment based on the Bekaert, Harvey, and Lundblad (2005).

Figure 3.2: Trade Openness (Exports+Imports/GDP, in percent)



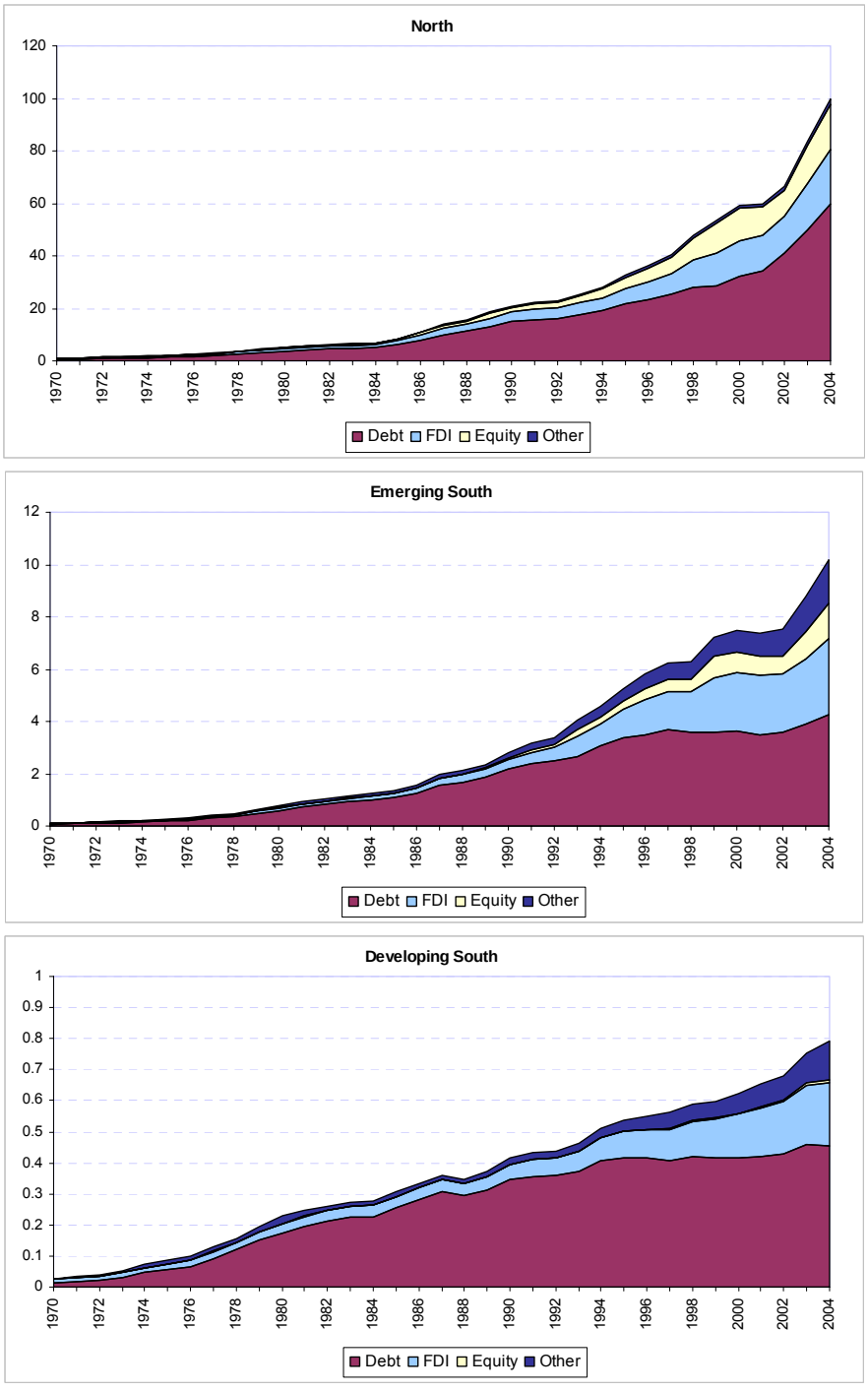
Notes: This figure shows the ratio of constant 2000 U.S. dollar values of the sum of exports and imports of goods and services over combined GDP of the world and each group.

Figure 3.3: Direction of Trade Flows (in percent)



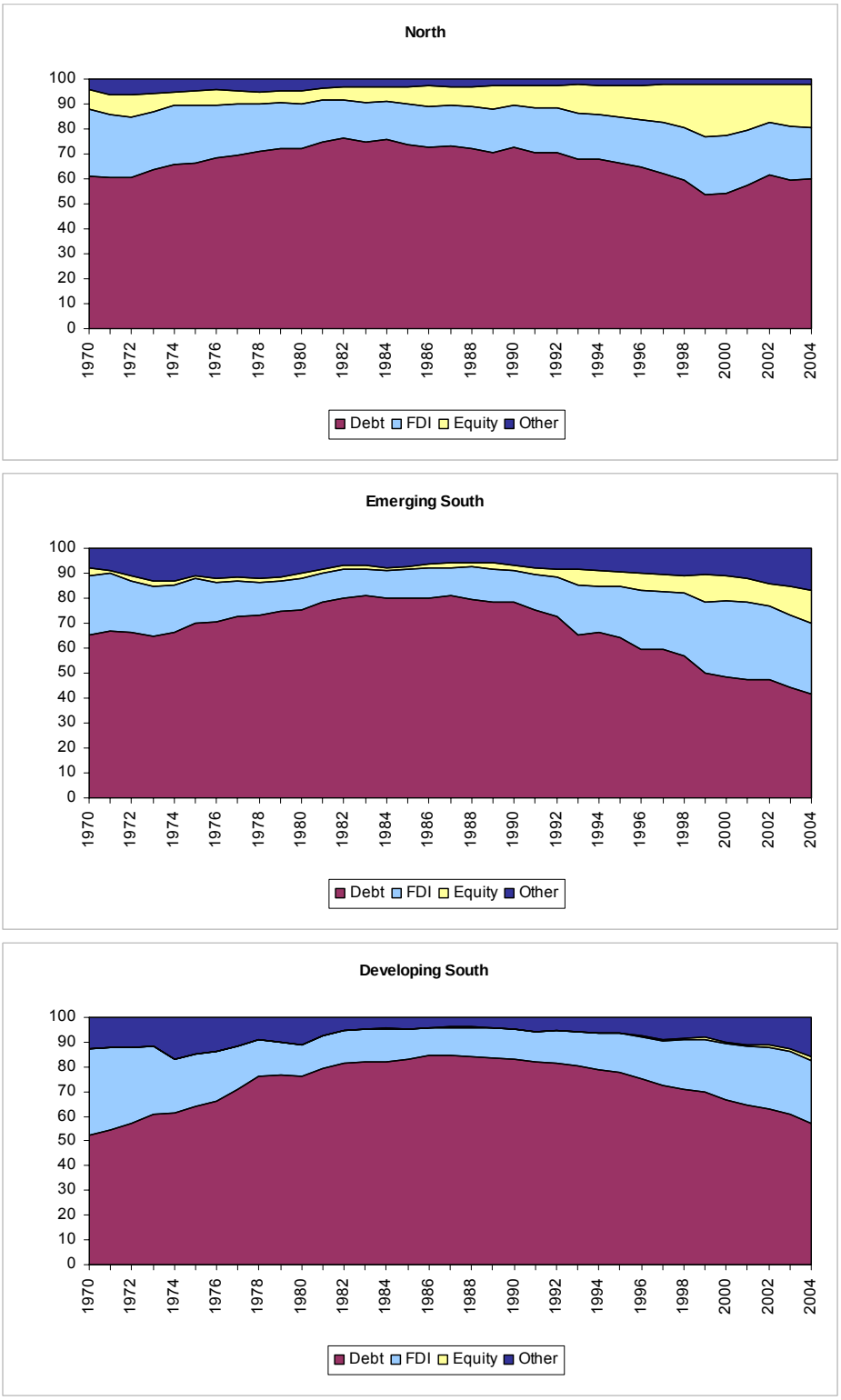
Notes: These figures show the fraction of the total export and import flows directed towards each group. Trade flows are calculated by aggregating the bilateral export and import data of countries in each group. The breakdown of the total world trade is calculated by aggregating the total merchandise exports and imports of each country in the sample and then calculating the fraction of group-wide export and import volumes in the total trade. The sum of the shares for the North, Emerging South, and Developing South does not add up to 100 because of the presence of other countries that are not included in the sample of 106 countries. Trade with those countries, however, is included in the total merchandise trade.

Figure 3.4-a: Financial Integration
(Gross International Financial Assets and Liabilities, trillions of U.S. dollars)



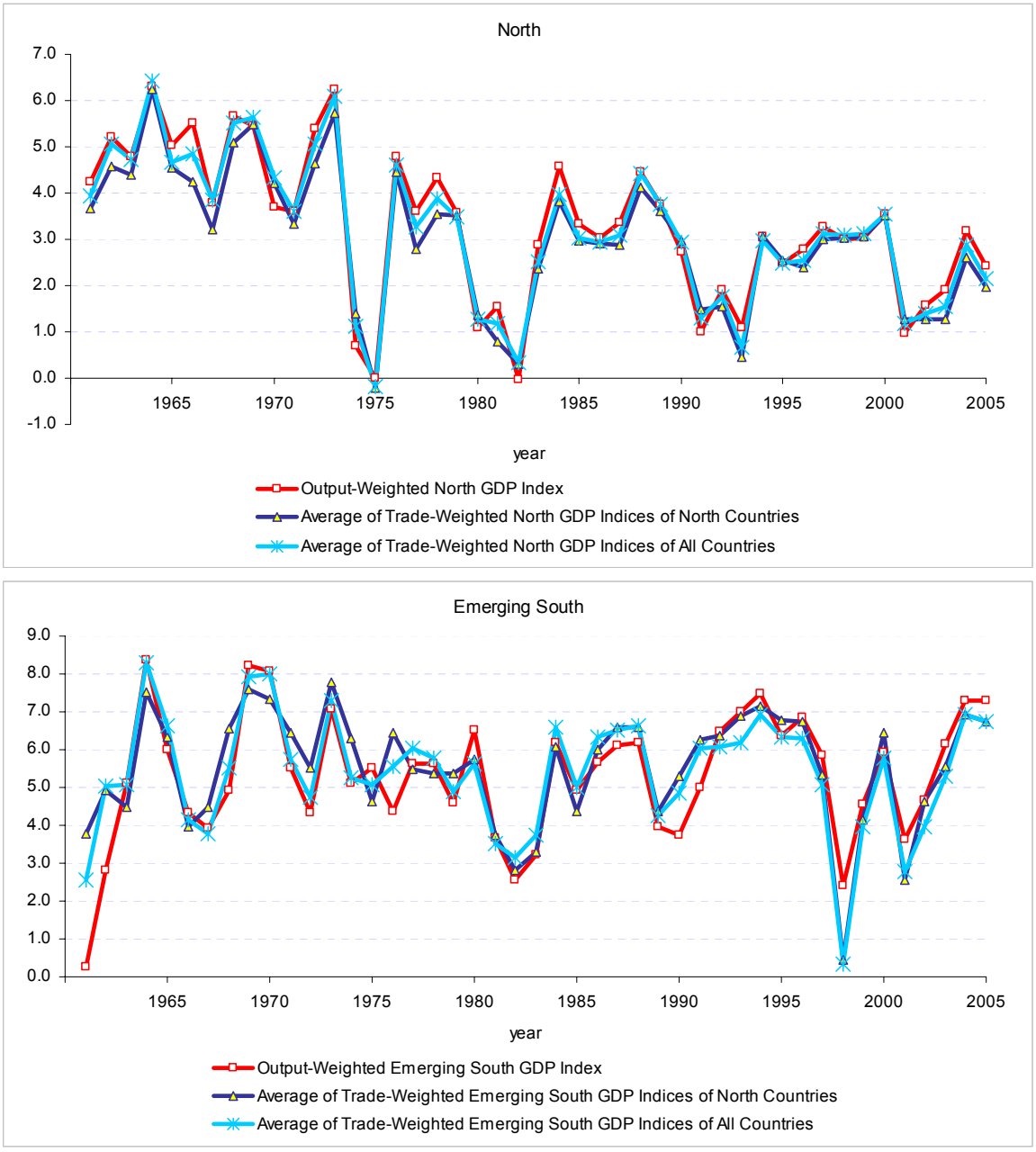
Notes: These figures show how the different components of total financial assets and liabilities evolve over time. Debt includes both official and unofficial debt. The category "Other" includes financial derivatives and total reserves minus gold.

Figure 3.4-b: Composition of Financial Assets and Liabilities (in percent)



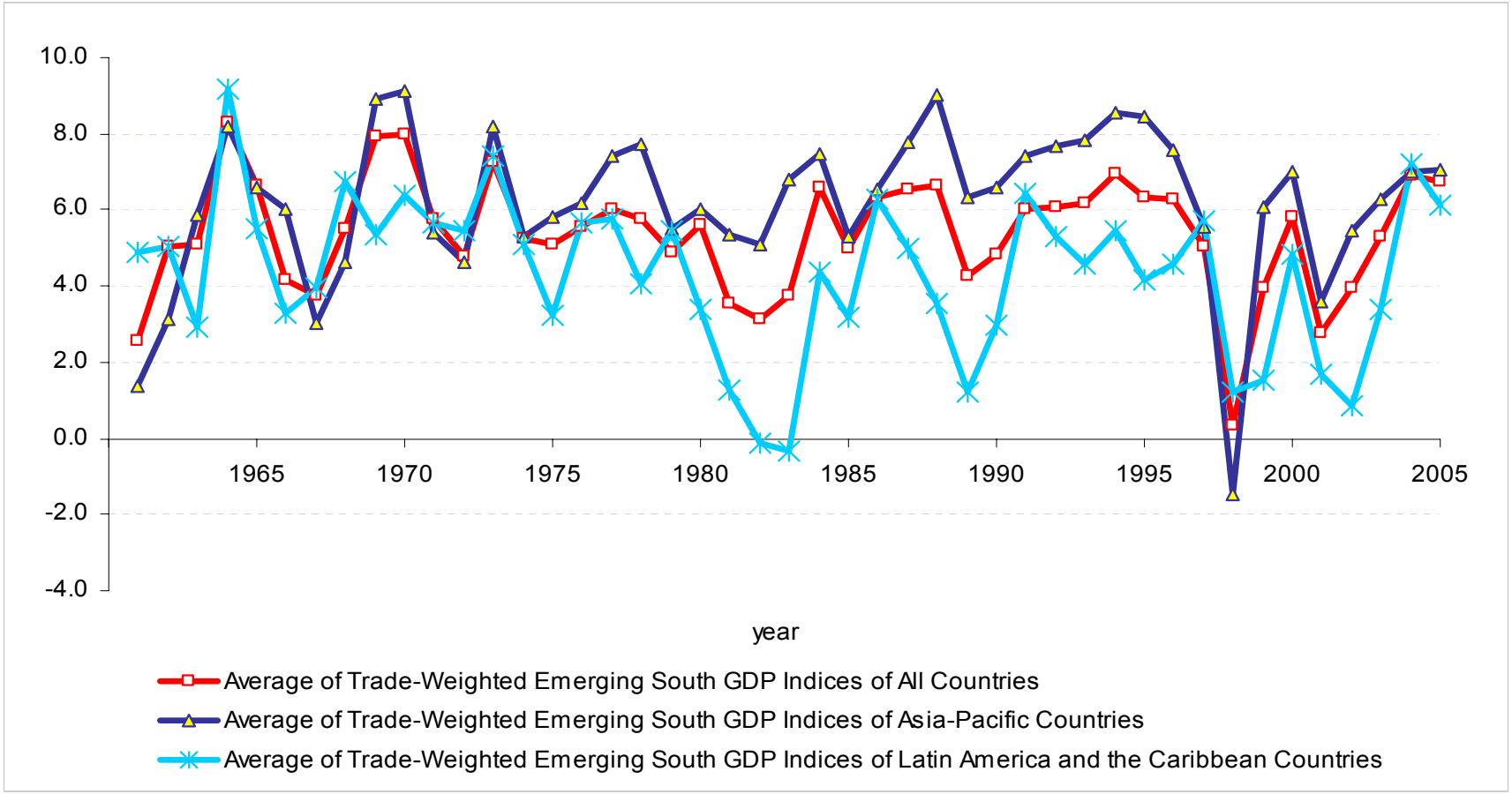
Notes: These figures show the composition of total financial assets and liabilities. Debt includes both official and unofficial debt. The category "Other" includes financial derivatives and total reserves minus gold.

Figure 3.5-a: Comparison of Group-Wide GDP Indices



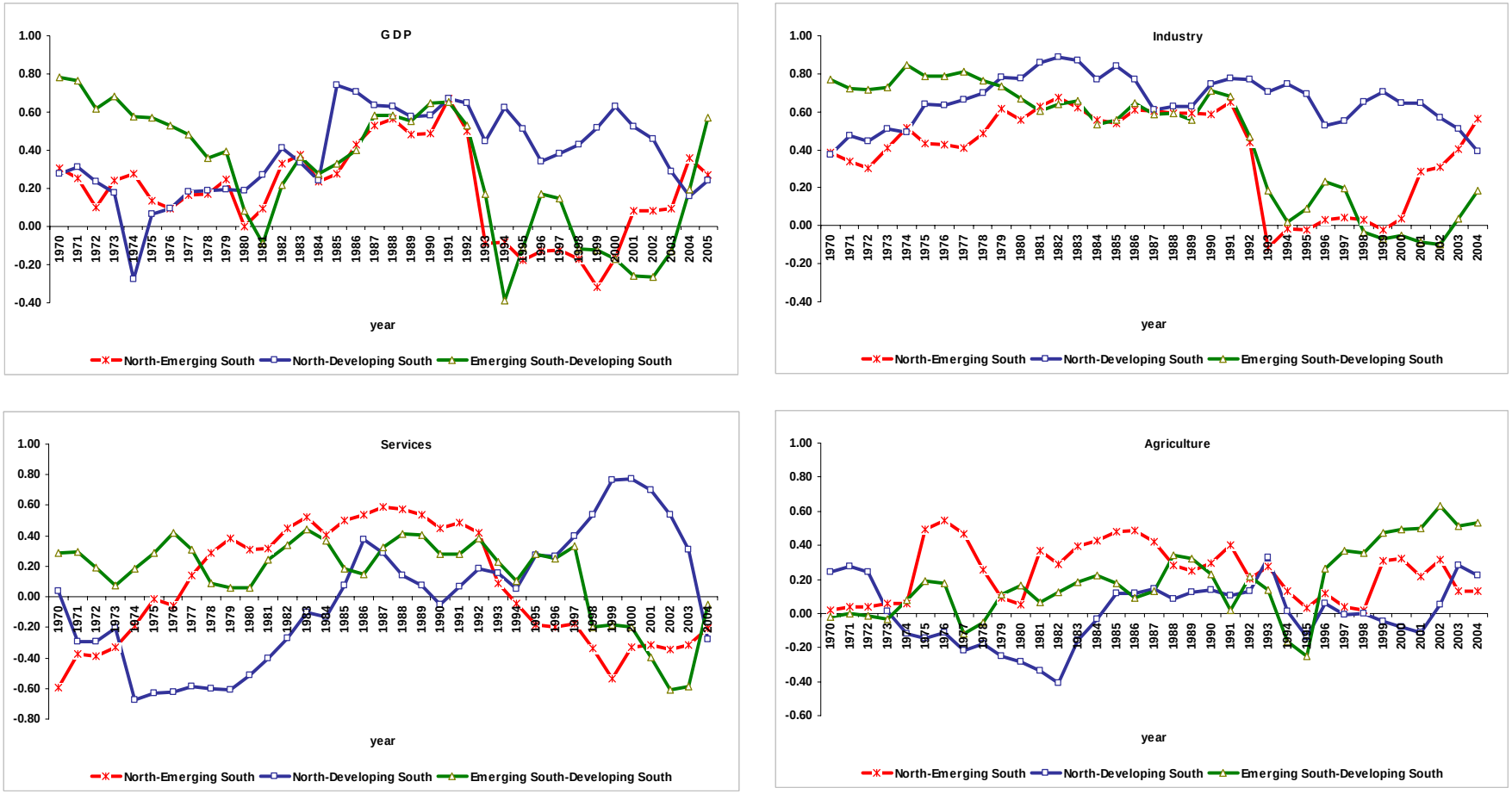
Notes: These figures present the output and trade weighted North and Emerging South GDP growth indices. Red lines with □ refer to the output weighted indices of North and Emerging South GDP growth. Dark blue lines with Δ refer to the averages of the North or Emerging South trade weighted indices of the North countries. Light blue lines with * refer to the average of trade weighted North or Emerging South indices of all the countries in the sample.

Figure 3.5-b: Comparison of Trade Weighted Emerging South GDP Growth across Different Geographical Regions



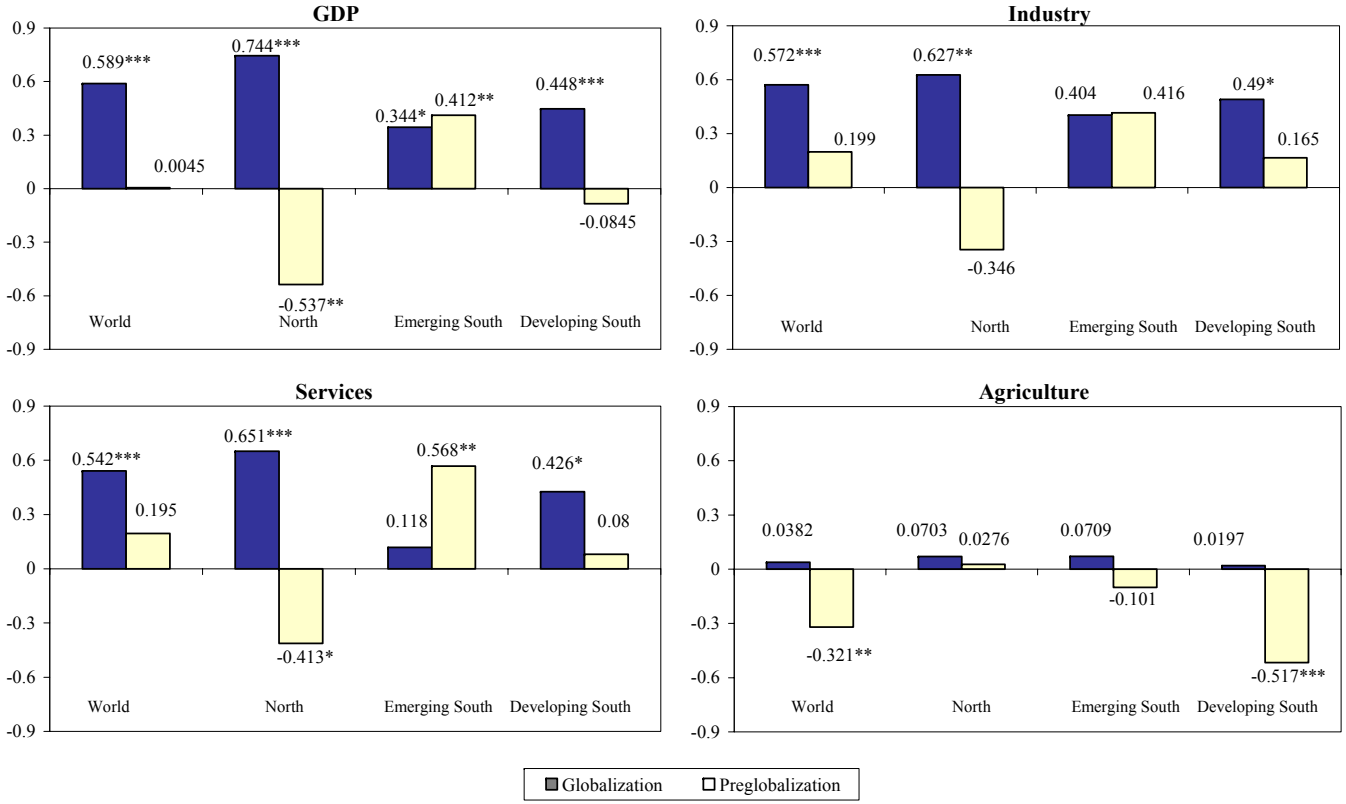
Notes: These figures present the trade weighted Emerging South GDP growth indices for different geographical regions. The averages are derived using the data series of both developed and developing countries if they belong to the same region.

Figure 3.6: Cross-Group Correlations
(10 Year Rolling Window Using Output Weighted Indices)



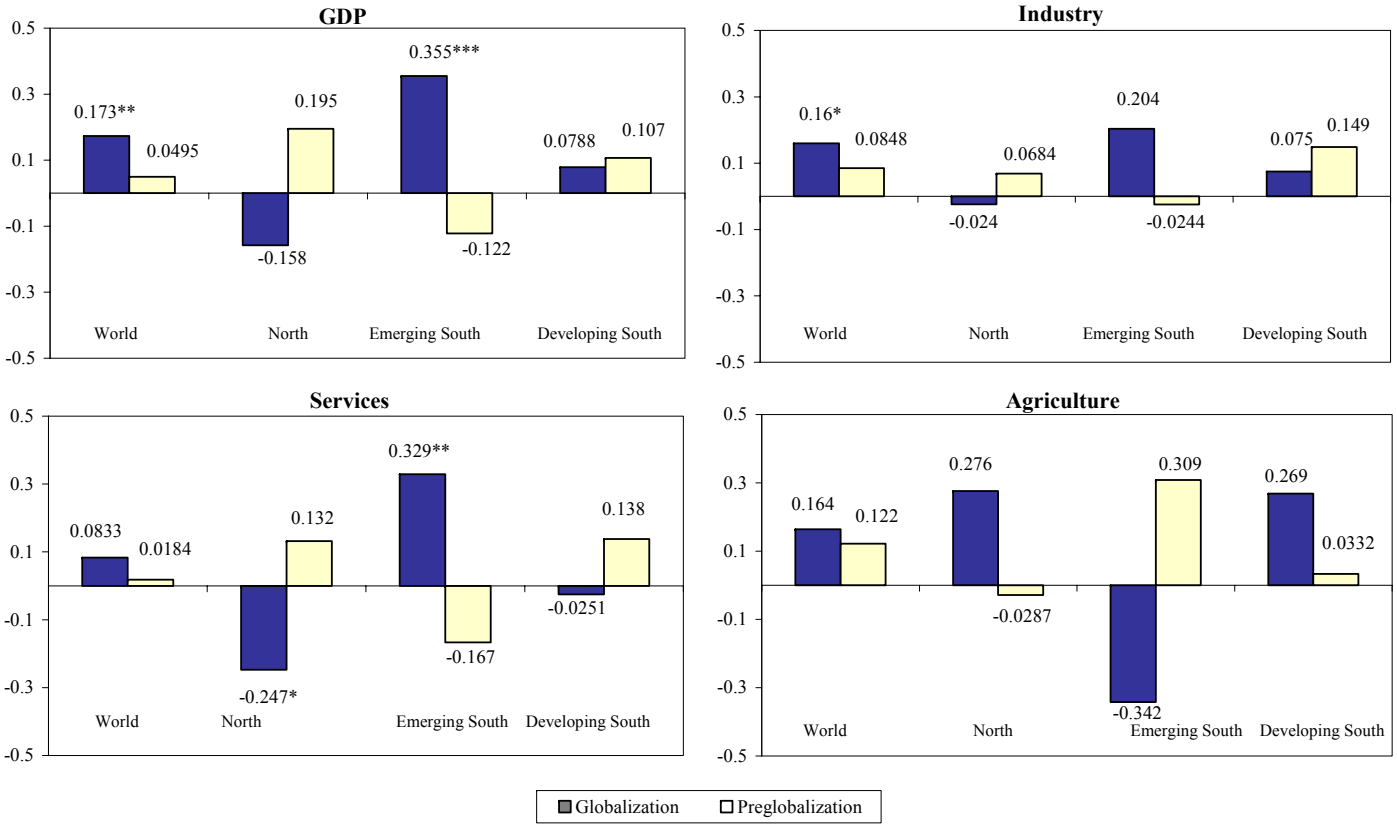
Notes: These figures show the 10 year rolling correlations between the PPP-based output weighted GDP and sectoral indices of the North, Emerging South and Developing South groups. The end year of the rolling window are reported.

Figure 3.7: Growth Impact of the North
(Coefficient Estimates from the Benchmark Regressions)



Notes: These figures show the coefficient estimates from the benchmark growth regressions. The globalization and pre-globalization effects of the North and the Emerging South GDP and sectoral growth are obtained from the coefficient estimates reported in Table 3.10 and Appendix 3.2-b. The top left panel show that a one percentage point increase in the North GDP growth is associated with a significant increase of 0.74 percentage points in the GDP growth of the North countries during the globalization period and this impact was lower by 0.54 percentage points at 5 percent significance level during the pre-globalization period. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Figure 3.8: Growth Impact of the Emerging South
(Coefficient Estimates from the Benchmark Regressions)



Notes: See Figure 3.7.

Chapter 4: Stock Market Fluctuations, Housing Wealth and Consumption Behavior in Turkey

4.1 Introduction

There is an increasing acknowledgment that fluctuations in asset markets and wealth can strongly influence private consumption behaviour in the economy. Over the last decade, as a result of the broadening of equity ownership in the OECD economies, booming stock markets have been credited for the excessive growth in consumer demand, while weaknesses in consumer activity have been, to a certain extent, ascribed to the slump in the stock markets. At the same time, the importance of the residential property markets in determining consumer demand has been strengthened as a consequence of the financial deregulation in mortgage markets and the growing importance of consumer financing through mortgage equity withdrawal.

The combination of these developments as well as the recent volatility in worldwide equity prices and housing markets following the sub-prime mortgage crisis in the United States have naturally stimulated the interest in the potential impact of the movements of major asset prices and wealth on the real economy. Despite the ample empirical evidence on the role of banking sector and credit expansion in fueling consumption booms, studies investigating the effects of fluctuations in stock market and housing wealth on consumption behavior are relatively scarce and essentially focus on the OECD economies.

Despite the fact that emerging market economies have shown substantial financial sector development over the last two decades, there are only a limited number of empirical

studies assessing the link between asset prices and private consumption in the context of the emerging market economies. This paper is the first attempt in the literature to explicitly investigate the role of the stock market, housing, and financial wealth in determining the durables and non-durables consumption behaviour for the Turkish economy by developing a vector error correction model using quarterly time series data for the 1987-2006 period. Unlike previous studies on consumption behaviour in Turkey that employed Engle-Granger single equation estimation with annual data, the model developed in this paper uses longer and higher frequency data, and captures the long-run and short-run interrelationships across variables in system estimation.

Another major contribution of this paper is that the effects of the housing wealth is estimated using an originally constructed quarterly housing wealth series based on primary data on occupancy permits, dwelling stocks from building census and residential floor area prices. Furthermore stock market wealth is estimated using stock market capitalization, while time, savings, and foreign currency deposits in the banking system are used as a proxy for the financial wealth. The separate models developed for the durables and non-durables consumption identify the distinct wealth effects of these asset categories. Consistent with the life-cycle and permanent-income hypotheses, net private disposable income, credit to private sector and consumer price index based real exchange rate fluctuations are also controlled for in the vector error correction model as a proxy for income, liquidity constraints and import demand as well as depreciation of non-indexed assets respectively.

The main finding of the paper is that in the long-run, in contrast to the durables consumption, the non-durables consumption is not significantly affected by the stock

market wealth. On the other hand, a one percent increase in real per capita housing wealth raises the consumption of non-durables by 0.27 percent in the long-run, but has no effect on the consumption of durables.

This result is consistent with the fact that home ownership is spread much more evenly over the population in Turkey while the limited equity ownership is concentrated in high income households. On the other hand, the movements of the stock market capitalization, which is a reflection of foreign capital flows into the economy, functions as a leading indicator of the boom-bust periods, and reflects the consumer confidence about the future economic conditions. Thus, although the coefficient estimates are small, the stock market fluctuations are associated with the durables consumption, which are highly sensitive to the cyclical conditions and income uncertainty in the economy.

The paper also finds a strong impact from the elimination of liquidity constraints on consumption of durables and non-durables. A one percent increase in bank credit raises durables consumption by 0.45 percent, which is more than three times the elasticity of non-durables consumption. Even though the coefficient estimates from the cointegrating vector do not indicate any distinct long-run relationship between the durables consumption and housing wealth, the high coefficient capturing the elasticity of durables consumption with respect to bank credit may incorporate the collateral channel, through which the housing wealth affects the household consumption spending. Housing assets constitute the most important form of collateral available to the households because they are less concentrated among certain segments of the population compared to financial assets. The use of homes as collateral amplifies the impact of cyclical fluctuations of house prices on consumer spending as increases in house prices raise the value of the collateral and loosen the

borrowing constraints of the households. The estimated housing wealth series in this paper using urban dwellings with occupancy permits allows the collateral channel to be effective because the housing asset is legally recognized in formal transactions in financial institutions or can be transferred legally to next generations as bequest.

Another set of interesting findings is that in the long-run, increases in financial wealth proxied by savings move in the opposite direction with both durables and non-durables consumption. One possible interpretation of this result is that consumers might be using accumulated financial wealth in the banking system to finance their consumption in the long-run.

Disposable income has no influence on the consumption of non-durables in the long-run indicating evidence in favor of the permanent-income hypothesis. On the other hand, a one percent increase in disposable income raises the consumption of durables by 0.17 percent, which indicates that the consumption of durable goods in Turkey is strongly determined by the uncertainty about real income and employment expectations.

Finally, real appreciation of the Turkish Lira has a significant and positive effect on the consumption of durables indicating that elimination of the risk of depreciation of non-indexed assets creates a wealth perception and stimulates the import demand and consumption of durables. On the other hand, real depreciation of the Turkish Lira significantly increases the consumption of non-durables. This result is consistent with the fact that in economies that have persistent and chronic inflation, real interest rates will be negative and therefore savings will be low.

The short-run coefficients show positive wealth effects from the stock market capitalization and financial savings for both durables and non-durables consumption. On

the other hand, there are negative effects on non-durables consumption from increases in the housing wealth. This result can be explained by the fact that increases in housing expenses can lower the consumption of households in the short-run.

The remainder of the paper is organized as follows. Section 2 gives a review of the theoretical literature on the effects of stock market and housing wealth on consumption. Section 3 looks at the empirical findings about the wealth effects in the OECD and emerging market economies, and reviews the empirical findings about the consumption behaviour in Turkey. Section 4 looks at the data sources and the description of the variables. Section 5 describes the vector error correction methodology. Section 6 discusses the empirical findings obtained from modeling the wealth effects on durables and non-durables consumption in Turkey. Section 7 of the paper concludes with policy implications from the findings of this research.

4.2 Review of the Theoretical Literature

Theoretically, the relationship between an increase in wealth, whether from stocks, real estate or other financial assets, and consumption can be based on the permanent-income hypothesis by Friedman (1957) and the life-cycle hypothesis developed by Ando and Modigliani (1963). The following model illustrates the role of the household wealth derived from asset ownership (see Wickens, 2008).

The representative household seeks to maximize the present value of utility

$$\max_{\{c_{t+s}, a_{t+s}\}} V_t = \sum_{s=0}^{\infty} \beta^s U(c_{t+s}) \tag{4.1}$$

subject to its budget constraint

$$A_{t+1} + c_t = y_t + (1 + r_t) A_t \tag{4.2}$$

where c_t is consumption, $U(c_t)$ is the utility function with $U_t' > 0$ and $U_t'' \leq 0$. The discount factor is $0 < \beta = 1/(1+\theta) < 1$. A_t is the net stock of household assets derived from ownership of stocks, bonds, savings and property at the beginning of period t. If $A_t > 0$ households are lenders and if $A_t < 0$ they are net borrowers. r_t is the interest rate on assets during period t. y_t is the household income from labor. All of the variables are in real terms.

The solution to the household's problem can be obtained by the following Lagrangian function:

$$\Im = \sum_{s=0}^{\infty} \{\beta^s U(c_{t+s}) + \lambda_{t+s}[y_{t+s} + (1+r_{t+s})A_{t+s} - c_{t+s} - A_{t+s+1}]\} \tag{4.3}$$

The first order conditions are:

$$\frac{\partial \Im}{\partial c_{t+s}} = \beta^s U'(c_{t+s}) - \lambda_{t+s} = 0 \qquad s \geq 0$$

$$\frac{\partial \Im}{\partial A_{t+s}} = \lambda_{t+s}(1+r_{t+s}) - \lambda_{t+s-1} = 0 \quad s > 0$$

Solving the first order conditions for $s = 1$ eliminates λ_{t+s} and gives the Euler equation:

$$\frac{\beta U'(c_{t+1})}{U'(c_t)}(1+r_{t+1}) = 1 \tag{4.4}$$

The budget constraints in periods t and $t+1$ can be combined into one equation by eliminating A_{t+1} and can be expressed as the two-period intertemporal budget constraint.

$$A_{t+2} + c_{t+1} + (1+r_{t+1})c_t = y_{t+1} + (1+r_{t+1})y_t + (1+r_{t+1})(1+r_t)A_t \tag{4.5}$$

This can be also be written as

$$\frac{A_{t+2}}{1+r_{t+1}} + \frac{c_{t+1}}{1+r_{t+1}} + c_t = \frac{y_{t+1}}{1+r_{t+1}} + y_t + (1+r_t)A_t \tag{4.6}$$

Further substitutions of A_{t+2}, A_{t+3},... give the wealth of the household as:

$$W_t = \frac{A_{t+n}}{\prod_{s=1}^{n-1}(1+r_{t+s})} + \sum_{s=0}^{n-1} \frac{c_{t+s}}{\prod_{s=1}^{n-1}(1+r_{t+s})} \tag{4.7}$$

$$W_t = \sum_{s=0}^{n-1} \frac{y_{t+s}}{\prod_{s=1}^{n-1}(1+r_{t+s})} + (1+r_t)A_t \tag{4.8}$$

In this model, the wealth can be measured either in terms of its use as the present value of current and future consumption plus the discounted value of terminal assets as in equation (4.7) or in terms of its source as the present value of current and future income plus initial assets as in equation (4.8).

Taking the limit on wealth as $n \to \infty$, two conditions need to hold:

First, the transversality condition, which is $\lim_{n\to\infty} \beta^n A_{t+n} U'(c_{t+n}) = 0$, implies that assets in period $t+n$ if consumed would give a discounted utility of $\beta^n A_{t+n} U'(c_{t+n})$ that goes to zero.

Second, the no-Ponzi game condition of $\lim_{n\to\infty} \frac{A_{t+n}}{\prod_{s=1}^{n-1}(1+r_{t+s})} \geq 0$ if $\beta^n = \frac{1}{\prod_{s=1}^{n-1}(1+r_{t+s})}$ in the steady state implies that households cannot finance consumption indefinitely by borrowing i.e. by having negative assets.

If these conditions are satisfied, when the interest rate is constant or equal to r, the infinite intertemporal budget constraint can be written as:

$$W_t = \sum_0^\infty \frac{c_{t+s}}{(1+r)^s} = \sum_0^\infty \frac{y_{t+s}}{(1+r)^s} + (1+r)A_t \tag{4.9}$$

Using the infinite intertemporal budget constraint, the household's problem can be alternatively solved by maximizing V_t in equation (2.1) subject to the constraint on wealth in equation (4.9).

If interest rate is assumed to be constant and is equal to its steady state value of $r = \theta$, then optimal consumption in the future, c_{t+s} $(s > 0)$ will equal to its period t value, c_t. Then the equation (2.9) for the consumption function becomes

$$W_t = \sum_0^\infty \frac{c_{t+s}}{(1+r)^s} = \frac{1+r}{r} c_t = \sum_0^\infty \frac{y_{t+s}}{(1+r)^s} + (1+r)A_t \tag{4.10}$$

Hence $$c_t = \frac{r}{1+r} W_t = r \sum_0^\infty \frac{y_{t+s}}{(1+r)^{s+1}} + rA_t \tag{4.11}$$

According to the permanent-income hypothesis developed by Friedman (1957), Equation (4.11) implies that the key determinant of consumption is the household's real wealth, not the current real disposable income. In this model, level of household consumption is a function of permanent income, which is composed of the present value of the current and expected future labor income stream, and the annuity value of the assets.

The life-cycle hypothesis developed by Ando and Modigliani (1963) argues that consumers are assumed to smooth their consumption over the life cycle based on the estimates of permanent income. Therefore, an increase in wealth derived from assets will lead to higher current and future consumption as the consumers tend to spread the wealth gain over the rest of their lives.

Ownership of equities in stock market and investment in housing are considered to be the major components of the household asset portfolio. The following sections examine the theoretical channels, through which fluctuations in stock market and housing wealth can influence the consumer spending.

4.2.1 The Effects of Stock Market Wealth on Consumption

For households holding stocks, the impact of a permanent increase in stock prices implies an increase in financial wealth, which consequently stimulates the consumer spending. In this regard, the increase in stock market wealth can lead to higher consumption either by households liquidating the appreciated stocks or consuming the dividend stream that these assets generate, or by increasing the borrowing capacity of liquidity constrained households.

Poterba, Samwick, Schleifer and Shiller (1995) argue for the United States that the sensitivity of consumption to the wealth effect coming from stock ownership might in fact have strengthened over time with the broadening of stock ownership. Despite the fact that percentage of households with direct stock ownership has been declining, indirect holdings of stocks through mutual funds, private and public pension plans, personal trusts, and insurance companies have increased the number of individual investors exposed to the fluctuations of stock market. There is in fact evidence to suggest that the link between stock price fluctuations and consumption spending has not changed as a result of this shift from direct to indirect ownership, and the consumption of individuals who hold stocks indirectly is more sensitive to stock price movements in comparison to the consumption of those who do not hold any stock.

Nevertheless, regardless of the direct or indirect stock ownership, Poterba (2000) argues that substantial amount of stocks are still owned by a limited number of high income households. Consumption decisions of this small group may not have detectable effects on aggregate consumer spending. The wealth effects for the majority of households are likely to be small because they have very limited ownership of stocks, which are typically not the largest asset in their portfolio. Therefore concentration of stock ownership might be a reason to assume that the link between changes in stock market wealth and aggregate consumption can be modest relative to the link between changes in other wealth items and consumer spending (see Starr-McCluer, 2002).

Economic theory on the other hand suggests another two channels, through which stock market wealth can affect consumption behaviour. Stock prices can be interpreted as a leading indicator of the cyclical developments in the economic activity because asset prices contain valuable information reflecting expectations about growth in GDP, consumption and investment. Several studies found evidence for both developed and emerging market economies that stock prices can predict the economic performance and the direction of future consumer spending (see Aylward and Glen, 2000; Henry, Olekalns, and Thong, 2004; and Mauro, 2003).

At the same time, stock prices also fluctuate with the news about the outlook of the economy. Thus a decline in stock prices can be interpreted as a signal for increased downward risks and uncertainty for employment prospects. Romer (1990) shows that at the onset of the Great Depression in 1929, the uncertainty following the stock market crash caused the consumers to delay current spending on durable goods. Therefore, given this historical example, it is possible to argue that changes in stock prices may strongly affect

consumer spending even by households that do not own stocks, because consumers regard the stock market fluctuations as a leading indicator for the future course of the economy, and direction of stock market fluctuations indicates the consumer confidence or uncertainty that is perceived about the economic conditions.

In addition to these effects, changes in international economic conditions transmitted through fluctuations in foreign stock prices as well as international capital flows have become more associated with domestic stock markets and consequently affected changes in financial wealth of domestic companies and consumers. With the removal of barriers to cross-border investment opportunities, foreign investors have started to account for an important share of the market capitalization and value traded in the stock markets of both developed and emerging market economies (see Hargis, 2002). Increases in foreign ownership and cross-listings of firms through ADRs and country funds as well as the existence of multinational companies quoted in domestic stock markets has increased the transmission of volatility across the world (see Karolyi, 2004). Furthermore, the emergence of mutual funds and pension plans that invest in foreign equities has increased the exposure of households to fluctuations in foreign stock markets. International equity holdings through increasing cross-border flows have made local financial asset prices more responsive to world or regional financial conditions. As investors herd or capital flows follow similar patterns across countries, financial integration has induced contagion and increasing co-movements of stock markets across the world (see Dornbusch, Park and Claessens, 2000). Therefore, as a result of greater integration of world capital markets, it is possible to argue that international economic conditions reflected through the fluctuations in stock markets have become relevant for consumption behavior.

4.2.2 The Effects of Housing Wealth on Consumption

Despite the fact that the housing wealth is often considered to be the single most important component of the asset side of household's balance sheet, a number of theoretical reasons have been put forward to explain why increases in the housing wealth might have ambiguous effects on consumption in comparison to the stock market wealth.

The stock market and housing wealth may have differences in liquidity. As Dvornak and Kohler (2003) argue, housing is often considered to be a less homogenous asset, which is difficult to trade as well as liquidate due to high transaction costs. This difference may suggest that wealth effects of housing on consumption can be lower than the stock market wealth.

As Mishkin (2007) argues, rising house prices may have no net effect on change in national wealth if they are primarily driven by supply constraints in the housing market or increased scarcity due to higher demand. On the other hand, stock market wealth is more clearly connected to future increases in the productive potential of the economy.

Home owners may not react to changes in property prices in the same way as they react to stock market due to certain psychological factors. Households may have a bequest motive that favor holding appreciated assets until death and may not be interested in reacting to the short-run changes in real estate values. The accumulation of housing wealth may be viewed as an end in itself to have a hedge against life's uncertainties. This type of psychology may imply that households earmark housing asset for long-term savings while using others like stocks for current expenditures (see Case, Quigley, and Shiller, 2005). Therefore consumption effect derived from the housing wealth could be smaller than that derived from other assets.

One objection to the arguments in favor of smaller wealth effects from housing is that in comparison to the stock ownership, the housing wealth is held by consumers in all income classes and spread much more evenly over the population while stock market wealth is concentrated in the high income groups. In addition, because house prices are much less volatile than stock prices, changes in the housing wealth might be viewed as permanent. In these circumstances, the housing wealth might have larger impact on consumption than the stock market wealth (see Mishkin, 2007).

As argued by Catte, Girouard, Price, and André (2004), usually house price increases affect the relative positions of current home-owners vis-à-vis would-be home buyers. While increases in property prices may increase the consumption of home owners due to wealth perception, households planning to purchase their own homes may reduce their consumption as a result of higher house prices as they will have to save more to afford higher down-payments. It is also possible that owners feel less wealthy when the value of their property goes up since the implicit rental costs have also gone up. Increases in value of owner occupied housing may not affect consumption at all if the households keep housing assets for bequest or are not willing to trade down to less expensive houses. Because households both own housing assets and consume the housing services at the same time, the strength of the housing wealth effect on consumption is uncertain since the effect of higher house prices on wealth can be fully or partially offset by the higher cost of present and future housing services consumed (see Boone and Girouard, 2002).

Perhaps the most significant channel, by which the housing wealth may affect household consumption spending, is through the borrowing capacity for liquidity constrained households that may not have access to uncollateralized consumer credit.

Housing assets constitute the most important form of collateral available because they are less concentrated among certain segments of the population compared to financial assets. The increased use of homes as collateral amplifies the impact of cyclical fluctuations of house prices on consumer spending as increases in house prices raise the value of the collateral available to households and loosen their borrowing constraints by reducing the finance premium. As a consequence, a change in the housing wealth may have a stronger effect on consumption than an equivalent change in stock market wealth.[65]

In particular, consumption responses to changes in the housing wealth are higher when financial markets provide easy access to mortgage financing and to financial products that facilitate equity withdrawal (see Cardarelli, Igan and Rebucci, 2008). If residential mortgages or home equity loans are readily available to homeowners, then a rise in housing values potentially leads to more borrowing using the housing asset as collateral and encourage households to increase spending through housing equity withdrawal upon rising property values (see Girouard and Blöndal, 2001).

In summary, all of these arguments suggest that it is ultimately an empirical question to test whether the effect of housing wealth on consumption is significantly different from that of stock market wealth. Moreover, institutional features as well as differences in the economic and financial structures determine the strength of the housing wealth effect.

[65] Empirical estimates for the United Kingdom and the United States suggest that the increase in borrowing by households to finance consumption is closely related to the collateral position. The effect of the housing

4.3 Review of the Empirical Literature

Several studies investigated the importance of the stock market and housing wealth effects on private consumption behaviour for selected OECD and emerging market economies. The results from the empirical analyses depend on the depth of the financial system, the importance of stock markets and mortgage financing, role of banking institutions, and the composition of wealth.

4.3.1 OECD Economies

As Lall, Cardarelli, and Tytell (2006) argue, in more market-based financial systems, households may be more exposed to changes in stock prices as the degree of stock market capitalization relative to GDP is higher, and households invest more heavily in equities. Further, the housing wealth effects may be larger due to developed mortgage financing and instruments for housing equity withdrawal, since collateralization allows more leverage by households. Therefore, dependence of credit availability on housing values can exacerbate the impact of house price developments on consumption in comparison to bank-based financial systems.

Consistent with these hypotheses, using an error correction specification, Edison (2002) and Ludwig and Sløk (2004) find for 16 OECD economies that the long-run responsiveness of consumption to permanent changes in both the stock market and housing wealth tends to be higher for the market-based economies, often observed in Anglo-Saxon countries, than the bank-based economies, found in continental Europe and Japan.[66]

---

collateral on consumption is significant and larger than the stock market wealth effect. (See Muellbauer, 2007)

[66] The evidence by Ludwig and Sløk (2004) regarding the relative importance of house prices compared to stock prices is mixed across specifications although the relationship between changes in consumption and changes in house prices has become positive since the mid-1980s across all specifications and financial systems.

Using the estimates from the 1984-2000 period for the market-based group, Edison (2002) finds that for every dollar increase in the housing wealth, consumption increases by 7 cents, whereas a one dollar increase in the stock market wealth leads to a 4.5 cents increase in consumption. For the bank-based group, a dollar increase in the stock market wealth leads to slightly less than a cent increase in consumption, while the housing wealth increases the consumption by 4 cents. The fact that equity holdings are more prevalent among the rich with lower propensity to consume, and housing ownership is more evenly distributed across the income groups may explain why the wealth effect from the stock market is smaller than that from housing.[67] The estimated long-run elasticities on stock prices have increased over time for both financial systems, which reflects the broadening of direct and indirect stock ownership and deregulation of financial markets since the mid-1980s.

In addition, several studies investigated in detail the wealth effects from housing and stock markets in several G-7 economies. The results are consistent with the expected differences observed between market-based and bank-based financial systems. The estimates by Catte, Girouard, Price, and André (2004) confirm the existence of significant housing wealth effects on consumption in market-based G-7 economies like the United States, the United Kingdom, and Canada with long-run marginal propensity to consume that is in the range of 4 and 8 percent. In this group, the housing wealth effect appears to be larger than the financial wealth effect. Furthermore the marginal propensity to consume out of housing equity withdrawal appears to be significant for these countries similar to the findings of Boone and Girouard (2002). In contrast, in bank-based G-7 economies such as

[67] Case, Quigley and Shiller (2005) also find a statistically significant and rather large effect of housing wealth upon household consumption, while observing at best weak evidence of a stock market wealth effect

Italy and Japan, marginal propensity to consume out of housing wealth is between 1 and 2 percent while the consumption response to changes in the housing wealth remains insignificant in France and Germany. At the same time, no effect for housing equity withdrawal is found for this group.

Furthermore, the results show that the long-run marginal propensity to consume out of financial wealth is lower than that of housing wealth while the estimates are significantly lower for G-7 countries with bank-based financial systems except Japan. For Canada, Japan, the United Kingdom and the United States marginal propensity to consume out of financial wealth varies between 3 and 7 percent while the estimate is between 1 and 2 percent for France, Germany, and Italy. These results for the United States are consistent with the previous literature. Boone, Giorno, and Richardson (1998) find that estimated elasticity of consumption with respect to an increase in the stock market wealth for the United States has risen from about 4.5 percent to 6.5 percent since the mid-1980s. Similarly, Ludvigson and Steindel (1999) find that a dollar increase in the stock market wealth leads to a 3 to 4 cents increase in consumption in the United States.

4.3.2 Emerging Market Economies

Despite the fact that emerging market economies have shown substantial financial sector development over the last two decades, they are still characterized by shallower financial markets, limited dispersion of equity ownership, smaller size of stock markets, and underdeveloped mortgage financing in comparison to the OECD economies. There are only a limited number of empirical studies assessing the link between the stock market wealth and private consumption in the context of the emerging market economies.

---

for 14 OECD countries.

Funke (2002) examines the relationship between stock market returns and private consumption in 16 emerging markets. He finds evidence supporting increased sensitivity of private consumption to changes in stock markets after financial liberalization in the 1990s. In the short-run, the results show that a 10 percent decline in the annual real stock market return is associated with a reduction in real private consumption by 0.1-0.3 percent on average.

Liu and Shu (2004a) empirically investigate the causal link between consumption and stock prices of Hong Kong, Japan, Singapore, South Korea and Taiwan using VAR method and find that there is a long-run relationship between consumption and stock prices in the cases of Hong Kong, Japan, Singapore and Taiwan, but not in South Korea. In terms of the direction of long-run causality, two-way causal link between stock market performance and consumption is found for Hong Kong and Taiwan, indicating that the stock prices act as a leading indicator of consumption while at the same time movements in stock prices are explained by consumption or real economic activities.[68] In the short-run, a uni-directional causal link is found from consumption to stock prices in Singapore, and from stock prices to consumption in the case of Hong Kong, Japan and Korea. In a companion paper, Liu and Shu (2004b) find only one-way causality running from the consumption to stock prices for Mainland China implying that the wealth effect of stock markets on consumption is too small to be visible at the aggregate level. In sum, all of these results indicate that the wealth effect and leading indicator roles of stock markets are observed in economies with more developed stock markets.

[68] This finding is consistent with the consumption-based capital asset pricing model (CAPM), which assumes that the variables determining asset prices also co-vary with inter-temporal marginal rates of substitution, which is a function of consumption growth. Cheung and Ng (1998) find evidence of long-run co-movement between national stock market index and country-specific real consumption expenditures for G-7 economies.

Ahumada and Garegnani (2002) study the wealth effects in Argentina during the 1980-2000 period by looking at the private consumption, national disposable income, and "wealth perception" measures such as liquid assets proxied by M3, inflation, sovereign risk, real exchange rate, and stock market index. The results show that national disposable income is the only long-run determinant of private consumption. Inflation and liquid assets have no significant effects. The real exchange rate has a significant impact indicating that the appreciation of wealth as a consequence of falling rate of inflation could matter for consumer expenditure. The results show that changes in stock market index have no effect on private consumption in Argentina consistent with the limited equity ownership.

Finally, a recent study by the IMF (2008) estimates a non-stationary panel model, which differentiates between the long-run and short-run stock market wealth effects, using real per capita consumption expenditure, broad money, GDP per capita, inflation and real stock market index for 22 emerging market economies covering the 1985–2007 period.[69] The study finds a robust relationship between fluctuations of equity prices and consumption patterns across emerging markets. A 10 percentage increase in the stock market valuation on average leads to 0.12 percent increase in private per capita consumption in the short-run and 0.15 percent in the long-run. The model, however, does not take into account increases in real estate values, structural differences across financial markets, and the relatively low degrees of consumer leverage and stock market participation in emerging markets.

[69] The countries are Argentina, Brazil, Chile, China, Colombia, Czech Republic, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, Russia, South Africa, Thailand, and Turkey. They are selected from the Morgan Stanley Capital International Emerging Markets equity index.

Due to data related difficulties in measurement of the real housing values in emerging markets, studies on estimating the housing wealth effects on consumption behaviour have been limited. Aron and Muellbauer (2006) study the stock market and housing wealth effects on private consumption after the credit market liberalization in South Africa. Their evidence shows that the housing wealth effect does not exceed the stock market wealth effect, but exceed that for illiquid financial wealth.[70] Cheng and Fung (2007) suggest that a rise in housing prices has both a negative price effect that is caused by an increase in the cost of housing services, and a positive wealth effect on consumption in Hong Kong during the 1980-2002 period. They also find that the consumption purpose of the housing market dominates the investment purpose in general, whereas over the period of intense speculative demand for housing, the housing wealth effect is as high as that of the stocks.

4.3.3 Turkey

In the context of the Turkish economy, a limited number of studies looked at the stock market and housing wealth effects on private consumption behaviour. Binay and Salman (2008) estimate the wealth effects on total consumption expenditures, consumption of durables, semi-durables, and services as a proportion of disposable income in Turkey for the 1990-2005 period using quarterly data on the percentage change in rent price index as a proxy for housing wealth, and return on Istanbul Stock Exchange as a proxy for the stock market wealth. They find that a percent increase in real estate wealth increases total consumption by 0.2 percent and semi-durables by 0.13 percent. However they find no real

[70] The estimates indicate that the marginal propensity to consume out of net liquid wealth proxied by share price index is 0.17, whereas marginal propensity to consume out of housing wealth is 0.14. On the other hand, marginal propensities to consume out of directly held illiquid financial wealth and pension wealth are 0.05 and 0.09 respectively.

estate wealth effect on consumption of durables, while a percent change in stock market index increases consumption of durables by 0.03 percent.

A study by Aydede (2007) looks at the effects of unfunded social security system on consumption for Turkey using Engle-Granger methodology. He extends the model to incorporate the wealth effects by using M2/GDP ratio as a proxy for financial wealth and the rental income from dwellings as a proxy for housing wealth alongside other variables, which can influence aggregate consumption, such as net private disposable income, inflation uncertainty, unemployment, demographic changes, interest rate, and credit to private sector. Rental income from housing wealth has a statistically significant effect in all estimations. Consistent with Özcan, Günay, and Ertaç (2003), the sign of the financial wealth variable is negative possibly due to the fact that savings increased in Turkey with the deepening of the financial system.

On the other hand, in a similar aggregate consumption model using annual data during the 1962-1994 period, Akkoyunlu (2002) approximates the housing wealth using total number of households and private investment in the housing sector. Results indicate a significant effect from housing wealth on consumption expenditure. However housing assets have a marginal effect when compared to M2/GNP ratio, which is used as a proxy for liquid financial wealth. This result might be due to the negative effects of real house price increases on consumption expenditures of younger households, which partly offset the positive wealth effect on households with accumulated owner occupied housing capital. Neither of the research by Aydede (2007) and Akkoyunlu (2002) controls the stock market wealth effect in their estimations.

Ceritoğlu (2003), on the other hand, studies the implications of financial wealth accumulation on permanent income and life-cycle hypothesis in Turkish economy using instrumental variables estimation. He concludes that, growth of the household consumption of non-durables becomes less dependent on growth of disposable income during the 1987-2002 period. In contrast, Akçin and Alper (1999) found excessive sensitivity of Turkish consumers on disposable income during the 1987-1995 sub-period. These two papers indicate that permanent-income hypothesis have become valid for the Turkish economy after 1995, with the strengthening of financial wealth channel as a result of the deepening of financial markets and availability of credit by the banking sector through credit cards and consumer credits.[71] However none of these studies explicitly looked at the role of stock market and housing wealth.

There is another stream of literature that analyzes the effects of international capital flows on fluctuations of consumption behaviour in Turkey. As can be seen in Figure 4.1, the cross-border investment activities of foreigners have important effects on the fluctuations of the Turkish stock market. In 1989, regulatory authorities permitted foreign institutional and individual investors to purchase or sell securities, and repatriate the capital and profits without any restrictions. As a consequence, foreign portfolio investment in Istanbul Stock Exchange has continuously increased, and been driving the movements of the IMKB-100 index. There is a strong positive association between foreign net purchases and the monthly returns in Istanbul Stock Exchange. This is due to the fact that the share of foreign investors in total market capitalization reached 65 percent while the share of foreign purchases in total value traded in secondary markets reached to 20 percent in 2006

[71] Özcan, Günay, and Ertaç (2003) find a significantly positive effect of severity of the borrowing constraints and the degree of financial repression on savings for Turkey during 1967-1994 period.

(see Akın, 2008a). Although Turkish individual and institutional investors have limited exposure to Istanbul Stock Exchange, fluctuations in the stock market wealth induced by international capital flows affect the consumption of households in Turkey.

From the beginning of 1990s, real GDP growth rates have been significantly associated with the capital movements to Turkey.[72] A theoretical model developed by Aghion, Bacchetta and Banerjee (2004) shows that in economies with intermediate levels of financial development and credit market imperfections, full capital account liberalization may actually have destabilizing effects by inducing chronic phases of growth associated with capital inflow followed by collapse with capital outflow. İnsel, Soytaş, and Gündüz (2004) find that during the 1987-2002 period, capital flows are strongly pro-cyclical and a leading variable of private consumption and investment growth in Turkey. Ulengin and Yentürk (2001) and Çimenoğlu and Yentürk (2005) also confirm using the VAR models that the growth performance of the Turkish economy, in particular the private consumption, is closely linked to the amount of short-term capital inflows.

Capital flows are intensively used as a source of foreign credit by the banking system. This lending boom generally helps the private sector to finance its consumption and investment expenditures. High levels of capital inflows also lead to the real exchange rate appreciation. A rise in the prices of non-tradable goods relative to tradables increases the consumption of imports, leading to the widening of current account deficit, which

[72] Çulha (2006) finds that persistently high real returns on the Turkish Lira denominated assets have been the most important determinant of the capital flows to Turkey. After the drastic deterioration of the fiscal balances in the 1990s, Turkish government found it much easier to finance its increasing public sector borrowing requirements by issues of the government debt instruments. The Turkish banking system purchased these debt instruments, which in turn they marketed to private households. Financing through treasury bills have led to an overall increase in the real interest rates. As Boratav and Yeldan (2006) argue, in this environment, liberalization of the capital account in 1989 and the full convertibility of the Turkish Lira attracted short-term capital flows that helped banks to borrow from abroad and invest in high yield government securities.

eventually triggers financial crisis if international liquidity conditions also deteriorate (see Başçı, Özel and Sarıkaya, 2007).

Alper and Sağlam (2001) show that after sudden capital outflows following the financial crisis in 1994 and the Russian crisis in 1998, increasing risk premiums and capital scarcity put upward pressure on the real interest rates. The stock market index sharply falls reducing the value of the domestic firms with the withdrawal of foreign portfolio investors. The contraction in the money supply and the decline in new syndicated loans offered by international banks decrease the ability of the banking sector to lend. The shortage in the supply of bank credits reduces the private consumption and investment, leading to a contraction in the economic activity.

In summary, the movements of the stock market index, which is a reflection of capital flows into the economy, functions as a leading indicator of the boom-bust periods, and reflects the consumer confidence about the future economic conditions. Furthermore, international economic conditions are transmitted to the Turkish economy through the portfolio equity investment in the stock market. Therefore, the stock market fluctuations are associated with the consumption spending even if households do not own any stocks.

4.4 Data

On the basis of this theoretical and empirical background, this section of the paper looks at the data sources and the description of the variables that are used in the estimation of the stock market and housing wealth effects on consumption behaviour in Turkey. The explanatory variables for consumption are selected consistent with the empirical literature using the framework of the life-cycle and permanent-income hypotheses.

The quarterly data for the econometric analysis covers 1987:Q1-2006:Q4.[73] Except for the real effective exchange rate, all nominal variables are in New Turkish Lira and converted into real values by deflating with consumer price index using 2000 as the base year. Per capita values are obtained by dividing the real series with quarterly population obtained from the OECD Analytical Database. Since the variables are seasonally unadjusted, centered seasonal dummies are included to account for deterministic seasonality.

Since the financial liberalization in 1989, the Turkish economy has experienced three main financial crises, one of which originated internationally. Dummy variables are introduced to account for these important economic events. [74]

In the last quarter of 1993, the Turkish government modified its domestic borrowing strategy with the aim of reducing the interest rates on treasury bills and curtailing the interest expenditures in response to the increasing public sector borrowing requirement. Consequently, this policy led to a decrease in the demand for treasury bills. In the first quarter of 1994, the Central Bank, while trying to keep the interest rates at their artificially low levels, attempted to defend the exchange rate by selling foreign currency reserves. The first crisis, which took place in January 1994, was triggered after Moody's and Standard & Poors downgraded Turkey's foreign debt rating. As can be seen in Figure 4.2, exchange rate worries triggered a sharp decline in foreign bank loans and a panic sale of portfolio equities and debt securities by domestic and foreign institutional investors. The capital outflow resulted in a decline in the Turkish Lira based Istanbul Stock Exchange index by more than 25 percent in February. In response, austerity program with the IMF

[73] The data sources and the description of the variables are presented in detail in Appendix 4.1.

was announced in April of 1994, and Lira was devalued. The economy went into recession in that year with the GDP per capita declining by 7.6 percent. To control for these events, dummy variables for 1994:Q1 and 1994:Q2 are introduced.

The Southeast Asian crisis in 1997 had only a short-lived impact on Turkey. The loss of confidence in the emerging markets due to the crisis resulted in a modest decline in the reserves of the Central Bank in the last quarter of 1997. However the decrease in international oil prices and slowdown in domestic demand prevented deterioration of the current account balance.

The Russian crisis however had a serious impact on the Turkish economy. In August 1998, the loss of confidence with the Russian default resulted in massive shift of funds to developed markets because portfolio managers carried the Turkish and Russian equities in the same basket. In response, the Istanbul Stock Exchange index sharply declined by 39 percent in August, and continued its downward trend. As Figure 4.2 displays, the outflow in portfolio equities and debt securities reached to more than 10 percent of the third quarter GNP, and total outflow in the second half of 1998 amounted to 7.4 billion U.S. dollars. The crisis affected the fiscal deficit through high real interest rates, and significantly increased the cost of debt financing. Uncertain external demand conditions, rising real interest rates and credit shortages led to a fall in production, especially in the industrial sector. Since Russia was one of Turkey's main export markets, the fall in the Russian demand had a direct impact on Turkish exports. In the following year, the earthquake in İzmit industrial center further deteriorated the recovery prospects in the economy. As Table 4.1 displays, GDP per capita declined by 3 and 12 percent in 1998

[74] See Table 4.2 for the detailed chronology and description of important financial, economic and political events during the globalization period in Turkey.

and 1999 respectively. Therefore to account for the Russian crisis, dummy variable for 1998:Q3 is introduced.

The last economic crisis took place when Turkey was implementing the 1999 IMF-sponsored disinflation program. The program relied exclusively on a nominally anchored exchange rate system for disinflation. However, one year after introducing the program, a financial crisis was triggered by the liquidity problems in the banking sector and rumors of takeover. These developments led to a capital outflow of 5 billion U.S. dollars from financial markets in the last quarter of 2000. The Turkish Lira based Istanbul Stock Exchange index declined by more than 35 percent. The initial crisis was contained by an IMF package of 10 billion U.S. dollars. However public quarrel between the president and the prime minister over corruption investigation followed by cabinet resignations triggered the second liquidity crisis in February 2001. As can be seen in Figure 4.2, additional 4.6 billion U.S. dollars worth of portfolio equities and debt securities investment and foreign bank loans were withdrawn in the first quarter of 2001, amounting to 15 percent of the quarterly GNP. Turkey's stabilization program based on crawling peg regime ended with the devaluation of Lira, and free float regime was introduced. Turkish economy entered into a severe recession in 2001 with the GDP per capita declining by 9.6 percent. The financial crisis in 2001 is controlled by dummies introduced for 2001:Q1 and 2001:Q2.

Having identified the major economic events that shaped the period under investigation, the dependent and the independent variables used in the econometric analysis are shown in Figure 4.5, together with the first difference, quarterly difference, first difference of the quarterly difference as well as season-by-season plots of the logarithm of the series displayed in first panel.

The private final consumption behaviour is examined by looking at the non-durables and durables consumption separately since the sub-components of total consumption expenditure have different responses to wealth effects. Therefore, the dependent variables used in the econometric models are per capita real final consumption expenditures excluding durables and the real per capita consumption of durables.

Theoretically, non-durables consumption is renewed in subsequent time periods and they provide utility to consumers from the flow of consumption. On the other hand, durables consumption can be considered as another form of household saving especially in developing countries when financial markets are not deep (see Ceritoğlu, 2003). Durable goods can not only provide utility from consumption, but also can store wealth and be realized into cash in case of necessity. Moreover, expenditures for durable goods are considered as a replacement or addition to a capital stock, since utilization periods of these products are much longer compared to other consumption goods. Expenditures for durable goods are more volatile compared to non-durables because they are more influenced by cyclical macroeconomic conditions. In particular, the consumption of durables is more sensitive to changes in income and wealth. As Romer (1990) argues stock market crashes are more likely to lead to a postponement of the consumption of durables. Furthermore, durable consumption goods are among the major entities, on which resources raised by mortgage refinancing and increases in housing wealth are spent on. Therefore, there are valid theoretical reasons to build separate econometric models for consumption of non-durables and durables to investigate the wealth effects.

The first dependent variable, *gcfinexldr*, represents the natural logarithm of the real per capita private final consumption expenditure excluding durables. The series represent

the sum of real per capita consumption in food and beverages, semi-durable and non-durable goods, energy, transportation and communication, services as well as ownership of dwellings. The series are computed by subtracting the per capita durables consumption from the total per capita private final consumption expenditure.

As seen in Figure 4.5-a, the series itself exhibit a strong pattern of seasonality. However, non-stationary seasonal pattern is not observed because the mean of the series is significantly higher in the third quarter and the lowest in the first quarter for each year indicating that deterministic seasonality can be adequately controlled by introducing centered seasonal dummies. Seasonal differences of the series are stationary.

One interesting pattern observed in Figure 4.5-a is that per capita non-durables consumption follows an inverted U shape until 2002 and the series started to increase from this date onwards. Following the major economic crises that the Turkish economy experienced during 1994-2002, the annual per capita non-durables consumption growth turned negative. As displayed in Table 4.1, per capita non-durables consumption declined by 3 percent on average starting from 1998 until 2002.

The trend has been reversed and per capita consumption of non-durables has been rising since 2002 after the implementation of the next IMF-sponsored disinflation program. Strong financial support from the IMF, private capital inflows due to low interest rates in the world markets as well as the establishment of strong one-party government since 2002 elections resulted in relative economic stability in Turkish markets. As displayed in Table 4.1, nominal interest rates on 3 months' time deposits declined from 63 percent in 2001 to 24 percent in 2006 following the decline in inflation from 67 percent to 9.83 during the same period.

The other dependent variable, *gcdr*, represents the natural logarithm of the real per capita consumption of durables. The series represent consumption items such as automobiles, electrical or electronic goods, home appliances, and furniture. As Figure 4.5-b displays, the series itself do not exhibit any strong pattern of deterministic seasonality as the means of the series are approximately equal across the quarters for each year. Seasonal differences indicate stationarity.

However one interesting characteristics observed in Figure 4.5-b is that per capita durables consumption is highly volatile and responds very strongly to major economic crises that Turkish economy experienced.[75] As can be seen in Table 4.1, the consumption of durables declined by 27 percent after 1994 crisis, and more than 30 percent after the 2001 crisis. However, since 2002, after the implementation of the disinflation program, per capita durables consumption has been rising similar to the non-durables consumption.

This observation is consistent with the findings of the research by De Gregorio, Guidotti, and Végh (1998), which investigates the behaviour of real consumption of durables goods in five chronic inflation countries like Argentina, Chile, Israel, Mexico, and Uruguay from the late 1970s to the early 1990s. Exchange rate-based stabilizations in chronic-inflation countries have often been characterized by an initial consumption boom, which is most evident in the behaviour of durable goods. They argue that the initial fall in inflation and a reduction in the devaluation rate reduce the level of uncertainty in the economy. The fall in nominal interest rates provide the consumers with more liquidity and results in a wealth effect, which induces many consumers to bring forward their purchases

[75] This observation is consistent with the findings of Duygan (2005), who investigates the relationship between durables purchases and the idiosyncratic employment and income uncertainty during Turkey's 1994 financial crisis. Using micro-level data, her results show that higher the unemployment risk, households are less likely to buy durables, even after controlling for differences in income and tastes.

of durable goods. The reappearance of credit in the aftermath of stabilization programs provides an additional channel, which could trigger the consumption boom.

The first independent variable, *gyd,* represents the natural logarithm of the real per capita net private disposable income, which is introduced in the econometric model as a proxy for the labor income as suggested by the life-cycle and permanent-income hypotheses. There is no official government statistics for net private disposable income. The series are constructed following the methodology used by Aydede (2007) and Yükseler and Türkan (2007).[76]

As can be seen in Figure 4.5-c, the logarithm of the real per capita net private disposable income series exhibits a strong pattern of seasonality. The mean of the first quarter has the lowest and the third quarter has the highest values in each year. Therefore, the deterministic seasonality pattern indicates that seasonality can be controlled by centered seasonal dummies. Seasonal differences are stationarity.

One interesting pattern in *gyd* series is that similar to the consumption series, income follows an inverted U shape, the peak of which is reached in year 1998. As can be seen in Table 4.1, the economic crises suffered by the Turkish economy have had serious negative effects. The per capita disposable income declined annually by 6.3 percent after 1994 crisis, by 2 percent in 1999 and by 4 and 5 percent following 2000 and 2001 crises respectively. However unlike consumption series, net private disposable income series continued to fall after 2002.[77]

---

[76] A detailed explanation for the construction of net private disposable income series is available in the Appendix 4.1.

[77] The comparison of household income to net minimum wage by Yükseler and Türkan (2008) indicates similar pattern of deterioration during 2002-2005 period. While the average household income was 6.6 times the net minimum wage in 1994, in 2005, this ratio declined to 3.47 times. The household income of the lowest 20th percentile was 1.11 times the net minimum wage in 2002 and this declined to 1.05 times in 2005. The

One possible reason behind the decline in per capita net private disposable income since 2002 might be due to the implementation of the new disinflation program. As discussed in detail by Voyvoda and Yeldan (2005), the program relied on three pillars: (1) fiscal austerity that targeted achieving a 6.5 percent surplus for the public sector as a ratio to the gross domestic product; (2) contractionary monetary policy through an independent central bank that exclusively aimed at price stability via inflation targeting; and (3) structural reforms consisting of privatization, large scale layoffs in public enterprises, and abolition of any form of subsidies.

The program assumed that successful implementation of the fiscal and monetary targets would stimulate growth by enhancing the credibility of the Turkish government through reduction in the country risk perception and the interest rates. The program introduced strict fiscal discipline measures where the government had to run budget surpluses in order to meet the interest payment obligations for the government debt. As a consequence, government spending declined and tax collection increased.[78] As can be seen from the Figure 4.3, the increase in the government savings proxied by the fall in fiscal deficit has contributed to a decrease in the net private disposable income. Furthermore the limits on public spending due to primary surplus requirements weakened the role played by fiscal policy in improvement of income distribution.

---

household income of highest 20th percentile was 10.48 times in 2002 and declined to 7.7 times in 2005. In particular, the deterioration in the real income of high income groups contributed to the improvement in income inequality.

[78] Yükseler and Türkan (2008) show that during the 2002-2006 period, the share of tax and social security premiums in GDP increased from 29.7 percent to 33.1 percent while share of education, health care, pension, social transfers, and income support for agriculture in GDP have increased only from 17.1 percent to 18.8 percent. The share of tax and social security premiums increased by 3.4 percentage points while the spending on education declined by 0.3 percentage points, health and social spending increased by 2.1 percentage points. Indirect taxes significantly increased its weight in total taxes after 2001 crisis. The share of indirect taxes as percentage of GDP increased from 15.6 percent in 2002 to 17.7 percent in 2006.

As Figure 4.3 shows, another explanation for the downward movement in net private disposable income series is due to the widening trade deficit as a result of the growing import demand stimulated by the appreciation of the Turkish Lira since 2002. The net imports to GDP ratio increased from 1.5 percent in 2002 to 7.7 percent in 2006.

Graphical examination of the *gyd* and *gcfinexldr* series in Figure 4.6-a shows that there is one-to-one income-consumption relationship during the 1987-2002 period consistent with the findings of Akçin and Alper (1999) that disposable income was the main determinant of private consumption demand for a significant portion of total households during the 1987:Q1-1995:Q4 period. However, this relationship breaks down after the year 2002 as a result of the precipitous increase in banking sector credit to the private sector. A very similar pattern of relationship between disposable income and durables consumption is also observed in the joint plot of *gyd* and *gcdr* in Figure 4.7-a. Similarly, the association is very strong until 2002, but seems to weaken afterwards.

The next dependent variable corresponding to the housing wealth, *who*, represents the natural logarithm of real per capita housing wealth series, that are originally constructed using dwelling stock data obtained from 2000 building census, as well as quarterly construction of dwelling units and housing price data obtained from primary sources of construction and occupancy permit statistics. Unlike the previous literature using total number of households in the population, the housing wealth is estimated using urban dwellings with occupancy permits in order to capture the collateral channel, through which home owners can borrow from the financial institutions using their legally documented homes as collateral. Since there is a substantial undocumented and unauthorized dwelling stock particularly in squatter settlements in Turkey, using this methodology to measure the

housing wealth will avoid the potential problems associated with identifying the extent of illegal housing stock.[79]

The movements of the estimated housing wealth series are consistent with the developments in the construction sector and therefore it can be successfully used in the econometric models analyzing the relationship between the housing wealth and consumption behaviour. The *who* series exhibit no seasonality pattern. As Table 4.1 shows, on average, per capita housing wealth series have declined by more than 4 percent a year from 1994 until 2003. The negative growth rates in housing wealth are clearly evident following the crises years. However since 2003, there is an upward movement in real per capita housing wealth series. In addition, dummy variables for 1993:Q1 and 1993:Q2 are used in the econometric estimation to control for the fluctuation in the housing wealth.

Graphical examination of *who* and *gcfinexldr* series in Figure 4.6-b shows that the movements of the housing wealth and non-durables consumption have a very close association with each other throughout the entire period. However, housing wealth and durables consumption do not exhibit a strong relationship as observed in the joint graph of *who* and *gcdr* in Figure 4.7-b.

The *deptsvfx* series represent the natural logarithm of real per capita total time, savings and foreign currency deposits as a proxy for financial wealth. Due to underdeveloped institutional investors, financial savings in Turkey are predominantly channeled to the banking system. In response to the chronic high inflation in the last 20

[79] Even though commercialization and quasi-legal property ownership exist in squatter settlements, several researchers like Başlevent and Dayıoğlu (2005) argue that ownership of squatter housing hardly gives the dweller complete control over the real estate wealth. For instance, it is argued that extralegal property such as squatter housing is a "dead capital" because it cannot be used as collateral in any formal transaction in financial institutions or transferred legally to next generations as bequest. See Akın (2008b) for a detailed analysis of housing market characteristics and housing wealth estimation in Turkey.

years, households in Turkey have invested part of their savings in foreign currency denominated savings accounts. Therefore financial wealth measure is constructed by including the Turkish Lira as well as foreign currency denominated time deposit and savings accounts.

The logarithm of real per capita total time, savings and foreign currency deposits display a clear upward trend indicating the deepening of the financial system. Despite small declines after 2001 crisis, the overall per capita savings started to increase again. The first and quarterly differences of the series are clearly stationary. As can be seen in Table 4.1 growth rates of per capita time, savings and foreign currency deposits have been mainly positive during the last 20 years. The joint graphs of *deptsvfx* with *gcfinexldr* and *gcdr* series in Figure 4.6-c and Figure 4.7-c also indicate the persistent increase in financial wealth.

The *isemcap* series represent the natural logarithm of real per capita stock market capitalization of the Istanbul Stock Exchange. As Bertaut (2002) argues using equity price index as a proxy for the stock market wealth cannot capture changes over time in the size of the equity market or in its importance in aggregate household wealth. Therefore several studies have instead used the real stock market capitalization (see Catte et. al., 2004; Ludwig and Sløk , 2004).

The *isemcap* series are very volatile but exhibit no clear trend or seasonal pattern. The strong persistent positive growth rates in the stock market capitalization have been followed by market downturns in 1998 and 2001 associated with the financial crisis years that were triggered by the capital outflow by the foreign investors from the stock market. After 2001 crisis, per capita stock market capitalization declined by 47 percent and

continued its downfall in the following two years. During 2004-2006, commensurate with the overall improvement in the Turkish economy, stock market capitalization has started to recover. As can be seen in Table 4.1, the annual average growth rate of per capita stock market capitalization reached 37 percent.

The joint graph of *isemcap* with *gcfinexldr* in Figure 4.6-d shows that there is not a very strong association between the movements of per capita stock market capitalization and per capita non-durables consumption. On the other hand, joint graph of *isemcap* with *gcdr* in Figure 4.7-d shows that both of these series have a similar pattern of fluctuations in particular after 1993. This close association reflects the fact that movements in stock market capitalization are primarily driven by foreign capital inflows in Turkey. As discussed in the previous section, from the beginning of 1990s, growth rates in key macroeconomic variables such as consumption and investment have been significantly associated with capital movements to Turkey. Since durables consumption is highly sensitive to cyclical fluctuations and income uncertainty, it is not surprising that per capita stock market capitalization and durables consumption follow a similar pattern as a result of the leading indicator and confidence effects of the stock market prices.

The *bnkcred* series represent the natural logarithm of real per capita bank credit to private sector as a proxy for liquidity constraints. According to the life-cycle hypothesis of Ando and Modigliani (1963), under the presence of liquidity constraints, households increase their savings as an insurance against the effects of future falls in income. In addition, if consumers are unable to borrow, consumption will fluctuate with the income rather than be smoothed away over time as the life-cycle hypothesis predicts. Therefore

greater access to credit allows households to smooth consumption over periods of high and low income and enables better diversification of household wealth.

As can be seen in Figure 4.5-g, the *bnkcred* series exhibit strong persistent positive growth rates followed by downturns after major economic crises reflecting the credit crunch in the economy. Figure 4.2 clearly shows that decline in foreign bank loans during crisis years is clearly associated with the availability of private sector credit in Turkey. As can be seen in Table 4.1, following the 1994 and 1998 crises, per capita bank credit to private sector declined by 21 percent and 16 percent respectively. Similarly, after 2001 crisis, bank credit declined by 11 percent in 2001 and 34 percent in 2002. As a result of the role of capital inflows, both *bnkcred* and *isemcap* series exhibit very similar fluctuations.

However since 2003, there is a clear upward trend in the availability of the banking sector credit to the private sector following the IMF-sponsored disinflation program.[80] Between 2003 and 2006, as shown in Table 4.1, average annual growth of per capita bank credit to private sector was 34 percent. Since 2002, as Figure 4.4 illustrates, consumer credit loans precipitously increased from 6 percent of the total credit to 26 percent in 2006. Consumer loans and individual credit cards combined increased from less than 20 percent from 1993 until the 2001 crisis to roughly 40 percent of total credit by the end of 2006.

As a result of these improvements, both investment and consumption spending that were deferred following the crises years started picking up. As a consequence of the availability of banking credit, both real per capita consumption of durables and non-

[80] According to Başçı (2005), with the successful implementation of prudent monetary and fiscal policies, yearly change in the consumer price index decreased to single digits after more than 30 years. As displayed in Table 4.1, the average inflation rate in consumer prices has declined from 78 percent in the 1990s to 9.83 percent in 2006. These developments also contributed to credit expansion, due to the fall in inflation and the associated reduction in interest rates. The most important driver of this rapid credit growth was the decline in public sector borrowing requirement and interest rates of government securities. Banks have replaced

durables increased during this period while net private disposable income declined.[81] In particular, the decline of liquidity constraints has enabled households to increase consumption of durable goods parallel to the rise of consumer credit and fall in inflation and interest rates.[82] There is evidence suggesting that the fast growth of credit to households is linked to the deterioration in current account balance as a consequence of the increased imports of durable goods. The close association between the availability of credit and durables consumption throughout the entire sample is clearly visible in Figure 4.7-e.

The final independent variable, *rer* series represent the natural logarithm of CPI based real effective exchange rate, which is obtained by weighted geometric average of the nominal exchange rate of the Turkish Lira in U.S. dollars deflated by the consumer price index of trade partners relative to the nominal exchange rate of the trade partners in U.S. dollars deflated by the consumer price index of Turkey. The weights are calculated by using the trade in manufactures, primary commodities and tourism services with 19 countries. An increase in the index denotes an appreciation of the Turkish Lira whereas a decrease denotes depreciation.[83]

The real effective exchange rate is one of the most commonly used indicators of international competitiveness, which represents the relative purchasing power of the

---

government securities in their balance sheets with predominantly private credit. Availability of global liquidity provided supply of credit to the banking sector.

[81] Yükseler and Türkan (2008) and Van Rijckeghem and Üçer (2008) show that the increased opportunities for borrowing by private sector and lower interest rates decreased the private savings during 2002-2005. The average savings rate in the last 20 percent of the income distribution declined from 36 percent of the household disposable income in 2002 to 24 percent in 2005. Similarly, the fourth 20 percent of the income distribution had a slight decline in the average savings rate from 11 percent to 9.6 percent of the household disposable income. The third 20 percent of the income distribution increased its savings rate from negative 3 percent to 1 percent during this period while the first and the second 20 percent of the income distribution continued to have negative savings rates.

[82] Çimenoğlu and Yentürk (2005) have previously showed using econometric model that the rise of credit volume and credit card utilization has a significant impact on consumption of durable goods.

Turkish Lira vis à vis the trade partners. Therefore an appreciation indicates the increase in demand for imported goods. Furthermore real effective exchange rate can be interpreted as the relative price of non-tradable goods to traded goods. Finally, since relative price inflation is incorporated into the definition by using consumer price indices, it reflects the uncertainty associated with inflation and the degree of wealth perception related with the depreciation of non-indexed financial assets.

Theoretically, there are two hypotheses about how price inflation influences consumer decisions about spending. These two ambiguous effects can only be distinguished empirically.

As Gylfason (1981) argues, an increase in the expected rate of inflation drives down the real value of financial assets and discourages savings. The net effect of an increase in expected inflation is therefore an increase in current consumer expenditures at the expense of financial savings and a shift in the composition of household portfolios from financial to real assets. Thus according to intertemporal substitution effect, rise in inflation will increase consumer spending.

Second alternative view is that consumers will tend to increase savings and reduce spending in response to inflation because consumers may be more concerned that uncertainty associated with price inflation will erode their real income and holdings of wealth. Therefore, according to the income or the so-called Pigou effect of inflation on consumption, the erosion of wealth will lead to decrease in consumption and increase in savings.

[83] See Appendix 4.1 for a detailed formulation of the CPI based real effective exchange rate.

Empirically, Juster and Wachtel (1972) find that high and variable rate of anticipated inflation results in the decline of spending on durables consistent with the Pigou effect, because consumption of durable goods is more sensitive to uncertainty about the real income expectations and wealth. On the other hand, their results suggest that fully anticipated inflation will increase the consumer expenditures on non-durables and services consistent with the substitution effect. [84]

In the context of the Turkish economy, movements of the real effective exchange rate can be used as a proxy for inflation as well as the import demand. It can be hypothesized that the depreciation can reduce durables expenditures because of the uncertainty associated with inflation as well as the high import content of consumption of durable goods. On the other hand, depreciation can increase expenditures on non-durables and services consistent with substitution effect because chronically high and variable inflation during the 1990s has adversely affected the real returns on savings deposits. As Table 4.1 indicates, real interest rates on 3-months' time deposits were predominantly negative until the implementation of the disinflation program in 2002.

The examination of the *rer* series in Figure 4.5-h shows that there is an upward movement or appreciation in the series during the sample period, except for the sharp depreciations of 27 percent occurred after the 1994 and 2001 crises. In particular, after 2002, as Table 4.1 indicates due to positive real returns on Turkish financial instruments, the increase in foreign exchange supplied by the foreign financial investors led to significant pressures for the Turkish Lira to appreciate at the expense of the deepening current account deficit.

[84] However if the inflation is unanticipated, either high or low rates of inflation will increase savings and will sharply reduce the expenditures on both non-durables and services, and durables. The negative effect of

When the Figure 4.6-f is examined, the relationship between the non-durables consumption and the real effective exchange rate using *gcfinexldr* and *rer* series is ambiguous during the 1987-2006 period. It can be observed that between 1994 and 2002, per capita non-durables consumption declined while the real exchange rate continued to appreciate. On the other hand, after 2002, both series moved in the same direction. The early periods from 1987-1993 display a mixed relationship between the two series.

However examination of the Figure 4.7-f clearly gives support to the hypothesis that appreciation of the currency reduces the uncertainty associated with depreciation of the non-indexed financial assets and therefore creates a wealth perception for consumers. Furthermore appreciation increases the import demand, in particular of durables goods, due to increased purchasing power of the currency (see Ahumada and Garegnani, 2002). Therefore, movements in per capita durables using *gcdr* series have a clear positive association with the *rer* series.

4.5 Methodology

On the basis of this detailed description of the data sources and variables, this section of the paper provides a theoretical discussion about the vector autoregression (VAR) methodology and how it can lead to the vector error correction (VEC) methodology that will be employed in the estimation of the wealth effects on consumption within the framework of the life-cycle and permanent-income hypotheses. The main advantage of the VEC model is that the long-run equilibrium relationship between the dependent variable and the selected explanatory variables can be analyzed simultaneously with the short-run interrelationships among them using a system approach.

---

unanticipated inflation on consumption supports the uncertainty hypothesis.

The VAR methodology is commonly used in the econometric analysis in order to find models that approximate the data generating processes of the macroeconomic time series, to understand the interactions between macroeconomic variables, and to describe the dynamic impact of random disturbances on the system of these variables. As Enders (2003) argues, for a set of n endogenous variables $y_t = (y_{1t}, y_{2t}, ..., y_{mt})$, a basic VAR model of order p has the following form:

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + ... + A_p y_{t-p} + \varepsilon_t \tag{4.12}$$

where A_i's are (nxn) coefficient matrices of the endogenous variables to be estimated and $\varepsilon_t = (\varepsilon_{1t}, ..., \varepsilon_{mt})$ is a vector of disturbance terms assumed to be a zero mean and independent white noise process with time invariant, positive definite covariance matrix of $E(\varepsilon_t, \varepsilon_t') = \sum_{\varepsilon}$. The ε_t s are assumed to be contemporaneously correlated, but they are uncorrelated with their own lagged values and uncorrelated with the right-hand side variables. The VAR methodology treats every endogenous variable as a function of the lagged values of all of the endogenous variables in the system. As a result, simultaneity is not an issue and ordinary least squares (OLS) estimation yields consistent results.

A situation of special interest arises if several variables in the given VAR system have unit roots and they are driven by a common stochastic trend. Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. In this case, the non-stationary time series are said to be cointegrated, and the stationary linear combination is called the cointegrating equation, which can be interpreted as a long-run equilibrium relationship among these variables. If cointegrating relations are present, the VAR system can be reparameterized to analyze the cointegration structure. These special models are known as vector error correction (VEC) models. They

incorporate the cointegrating relation into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics. The cointegration term is known as the error correction term because the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

The cointegration analysis takes place in the given unrestricted VAR model as follows:

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + \ldots + A_p y_{t-p} + \varepsilon_t \tag{4.13}$$

where $y_t = (y_{1t}, y_{2t}, \ldots, y_{mt})$ is a $(nx1)$ vector of non-stationary variables in levels that are integrated of order one I (1).

If the polynomial defined by the determinant of the autoregressive operator has a unit root i.e. $\det(I_n - A_1 z - \ldots - A_p z^p) = 0$ for z =1, then some or all of the I (1) variables have a common stochastic trend and they have a cointegrating relationship such that there are linear combinations of these variables that are stationary I (0).

In this case, the above equation can be written into the following VEC form by subtracting y_{t-1} from both sides and rearranging terms in order to obtain a more convenient model setup for cointegration analysis:

$$\Delta y_t = \Phi y_{t-1} + \Gamma_1 \Delta y_{t-1} + \ldots + \Gamma_{p-1} \Delta y_{t-p+1} + \varepsilon_t \tag{4.14}$$

Further generalizations of the above VEC model can be achieved by incorporating deterministic variables Bx_t such as constant term, linear trend, seasonal dummies and impulse dummies or non-stochastic regressors into the system. The most commonly added

deterministic terms are centered seasonal dummy variables that will not affect both the mean and the trend of the level series y_t .

$$\Delta y_t = \Phi y_{t-1} + \Gamma_1 \Delta y_{t-1} + \ldots + \Gamma_{p-1} \Delta y_{t-p+1} + Bx_t + \varepsilon_t \tag{4.15}$$

where $\Phi = \sum_{i=1}^{p} A_i - I$, $\Gamma_i = -\sum_{j=i+1}^{p} A_j$ and $\varepsilon_t \sim (0, \sum_{\varepsilon})$ is a vector of white noise innovations. Δy_t does not contain stochastic trends and is I (0), and the term Φy_{t-1} contains the cointegrating relations among I (1) variables and must be I (0) by definition. Γ_j 's (j = 1,…, p-1) are referred as the short-run parameters.

As the first step in VEC analysis, all endogenous variables $y_t = (y_{1t}, y_{2t}, \ldots, y_{mt})$ in levels that will be used in the VAR model must be tested to assess their order of integration by conducting augmented Dickey Fuller tests. In addition, when seasonally unadjusted data is used in the model, there might be changing seasonal patterns over time, which cannot be adequately captured by the use of deterministic seasonal dummy variables, and this indicates that the seasonal data generating process may contain one or more unit roots. The presence of unit roots at seasonal frequencies as well as at the zero frequency is tested using the methodology developed by Hylleberg, Engle, Granger and Yoo (HEGY, 1990). The graphical analysis of the variables further detects other characteristics in the data generating process such as linear time trend.

The results of the VEC model as well as the cointegrating relationship among variables are quite sensitive to the chosen lag length of the endogenous variables (p) while constructing the VAR model using the undifferenced data. In determining the lag order of the VAR system, one approach is to start from a model with some pre-specified maximum lag length and apply tests sequentially using likelihood ratio test statistics to determine a

suitable model order. For instance, lags of at least one year, i.e. four lags have to be included for quarterly data and twelve lags can be used for monthly model. If the order is chosen to be too small or too large, this problem can be discovered at later stages when the final model is subject to series of misspecification tests. Alternatively, the lag length can be selected using multivariate generalizations of log-likelihood, Akaike information, Schwarz and Hannan-Quinn criteria.

Having determined the lag length of the endogenous variables, the properties of the residuals of the individual equations as well the VAR system are analyzed in order to verify that they are white noise processes. A range of formal diagnostic tests are available for checking the model assumptions and properties such as tests of autocorrelation, normality, ARCH effects and heteroscedasticity.

The recursive estimates of coefficients and residuals with their confidence intervals are also considered for possible structural breaks and parameter constancy in the individual equations and the system. Overall constancy of the model is necessary to accept the system with the specified lags. The graphical examination of parameter constancy using recursive methods can be conducted by one-step residual plots, one-step Chow tests and break-point Chow tests. [85]

Once the lag length of the undifferenced endogenous variables are determined and the stability of the VAR system is verified, the cointegration tests are conducted by using the reduced rank procedure developed by Johansen (1988) and Johansen and Juselius

[85] The recursive estimation technique begins by estimating the model over first s < T number of observations in the sample and the process is repeated by adding one more observation until there are s = T-1 observations. The one-step Chow test looks at the sequence of one-period ahead predictions from the recursive estimation for period s to T. The break-point Chow test looks at the whole sample. The results are normalized over the critical values at each observation. If the value is above unity, this indicates a rejection of the hypothesis of no structural break at any point.

(1990). The Johansen method, which is based on maximum likelihood optimization, can detect multiple cointegrating vectors in non-stationary time series and allow for hypothesis testing on the elements of the cointegrating vectors and adjustment coefficients (see Enders, 2003).

According to the Johansen methodology, the rank of the matrix Φ gives the number of linearly independent cointegrating vectors that exist in the equilibrium system. If rank (Φ) = 0, matrix is null and usual VAR model in differences can be estimated. If rank (Φ) = n, stationary VAR may be specified in terms of the levels of all of the series. On the other hand, if the coefficient matrix Φ has reduced rank $r < n$, then the cointegrating rank, r is the number of cointegrating relations. There exists $r \times n$ matrix of $\Phi = \alpha\beta'$ where β and α contain the cointegrating vector parameters and adjustment coefficients respectively. α is the matrix of weights, with which each cointegrating vector enters the n equations of the VEC model. The α can be viewed as the matrix of speed of adjustment parameters for the endogenous variables towards the equilibrium.

If rank (Φ) = 1, there is a single cointegrating vector and the expression Φy_{t-1} is the error correction term. In intermediate cases where 1< rank (Φ) < n, there are multiple cointegrating vectors and error correction terms.[86]

The determination of the rank of Φ depends on the assumptions made with respect to deterministic trends included in the cointegrating vector. The Johansen methodology considers the following cases:

[86] As Greene (2008) argues, if the cointegrating rank exceeds one, identification of the behavioural relationships as cointegrating vectors may be difficult without out-of-sample exact information and theoretical models.

1. The level data y_t have no deterministic trends and the cointegrating equations do not have intercepts: $H_1(r): \Phi y_{t-1} + Bx_t = \alpha\beta' y_{t-1}$

2. The level data y_t have no deterministic trends and the cointegrating equations have intercepts: $H_2(r): \Phi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_o)$

3. The level data y_t have linear trends and the cointegrating equations have intercepts: $H_3(r): \Phi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_o) + \alpha_\perp \gamma_0$

4. The level data y_t and the cointegrating equations have linear trends: $H_4(r): \Phi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_o + \rho_1 t) + \alpha_\perp \gamma_0$

5. The level data y_t have quadratic trends and the cointegrating equations have linear trends: $H_5(r): \Phi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_o + \rho_1 t) + \alpha_\perp(\gamma_0 + \gamma_1 t)$

The terms associated with $\alpha_\perp$ are the deterministic terms that are outside the cointegrating relations. In practice, cases 1 and 5 are rarely used. Case 1 is used only if all series are known to have zero mean. Case 2 is used if none of the series appear to have a trend. Case 3 is suitable if all trends are stochastic, and case 4 is used if some of the series are trend stationary.

Once the deterministic terms entering inside the error correction term are specified based on the plausible data generating processes of the endogenous variables, the number of distinct cointegrating vectors can be obtained by checking the significance of characteristic roots of Φ. The rank of Φ is estimated using the maximum likelihood method proposed by Johansen (1988). The tests for number of characteristic roots can be conducted using the trace statistic and the maximum eigenvalue statistics.

The trace statistic tests the null hypothesis of r cointegrating relations against the alternative of n cointegrating relations, where n is the number of endogenous variables. The alternative hypothesis corresponds to the case where none of the series has a unit root and a stationary VAR may be specified in terms of the levels of all of the series. The trace statistic for the null hypothesis of r cointegrating relations is computed as:

For $r = 0,1,..., n-1$, $\lambda_{trace}(r) = -T \sum_{i=r+1}^{n} \ln(1-\hat{\lambda}_i)$ where $\hat{\lambda}_i$ is the i-th largest eigenvalue of the Φ matrix and T is the number of usable observations. The trace statistics tests the null hypothesis that the number of distinct cointegrating vectors is less than or equal to r against a general alternative.

The maximum eigenvalue statistic tests the null hypothesis that the number of cointegrating vectors is r against the alternative of r +1 cointegrating vectors. This test statistic is computed as:

For $r = 0,1,..., n-1$, $\lambda_{\max}(r, r+1) = -T \ln(1-\hat{\lambda}_{r+1})$

When r number of cointegrating relationships are determined, initially the matrices α and β are not unique. There are many possible cointegrating relations or linear transformations of them. To estimate the matrices of α and β consistently, it is necessary to impose identifying restrictions. Parameter estimates of β is made unique by the normalization of the eigenvectors and α is adjusted accordingly. For rank (Φ) = 1, this restriction amounts to normalizing the coefficient on one variable to be 1. In the case of a single cointegrating vector, given that rank (Φ) = 1, the rows of Φ are linear multiples of each other. Hence if s_i's are scalars, the equations have the form:[87]

[87] For notational simplicity, the matrices $\Gamma_i \Delta y_{t-i}$ and Bx_t are excluded.

$$\Delta y_{1t} = \Phi_{11} y_{1t-1} + \Phi_{12} y_{2t-1} + \ldots + \Phi_{1n} y_{mt-1} + \ldots + \varepsilon_{1t} \tag{4.16}$$

$$\Delta y_{2t} = s_2(\Phi_{11} y_{1t-1} + \Phi_{12} y_{2t-1} + \ldots + \Phi_{1n} y_{mt-1}) + \ldots + \varepsilon_{2t}$$

…

$$\Delta y_{nt} = s_n(\Phi_{11} y_{1t-1} + \Phi_{12} y_{2t-1} + \ldots + \Phi_{1n} y_{mt-1}) + \ldots + \varepsilon_{mt}$$

If we define $\alpha_i = s_i \Phi_{1j}$ and $\beta_i = \Phi_{1j} / \Phi_{11}$, for i=1,…,n each equation can be written as

$$\Delta y_{it} = \alpha_i(y_{1t-1} + \beta_2 y_{2t-1} + \ldots + \beta_n y_{mt-1}) + \ldots + \varepsilon_{it} \tag{4.17}$$

or in a general matrix form

$$\Delta y_t = \alpha\beta' y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + Bx_t + \varepsilon_t \tag{4.18}$$

where the single cointegrating vector is $\beta = (1, \beta_2, \beta_3, \ldots, \beta_n)$ and the speed of adjustment parameters are given by $\alpha = (\alpha_1, \alpha_2, \ldots, \alpha_n)$ (see Enders, 2003).

Once the cointegrating vector is determined, the unconditional VEC model as displayed in equation (4.18) needs to be tested using several criteria in order to verify that the model provides an adequate representation of the data generating process underlying the time series variables. The tests for the overall significance of variables in the system for each regression are given by F tests on regressors. The statistical insignificance of the variables and lags indicate the regressors to be eliminated in order to achieve a more parsimonious representation of the VEC model.

The properties of the residuals of the individual equations as well the VEC model are also analyzed in order to verify that they continue to be a white noise process. The recursive estimates of coefficients and residuals with their confidence intervals are considered for possible structural breaks in the individual equations and the system. The parameter constancy tests can be conducted by one-step residual plots, one-step Chow tests

and break-point Chow tests. Overall constancy of the model is necessary to accept the system with the specified lags.

Once the stable unconditional VEC model is verified, further hypothesis testing on coefficients of the cointegrating vectors and feedback coefficients can be possible. In a cointegrated system, each speed of adjustment coefficient α measures the degree to which the variable responds to the deviation from the long-run equilibrium relationship. If the speed of adjustment parameter α_i is zero, the variable is considered weakly exogenous. The weakly exogenous variables do not experience the feedback that necessitates using VAR and need not be modeled within the system.

Conditional VEC model can be constructed after incorporating the coefficient restrictions on the cointegrating vectors and adjustment coefficients and eliminating the equations corresponding to weakly exogenous variables from the system. If insignificant variables in the conditional VEC model are present, the overparameterized VEC model can be reduced to a more parsimonious representation. The variables at or below 10 percent significance level can be retained after comparing the fit of the restricted model against the unrestricted model and the previous reductions. The χ^2 test for overidentifying restrictions as well as model comparison results using Akaike information, Schwarz and Hannan-Quinn criteria establish whether or not reduction of the conditional VEC model to a more parsimonious representation provides the same explanatory power. The usual misspecification tests on residuals of the individual equations and the system as well as diagnostic tests regarding parameter constancy verify whether or not the parsimonious model is a stable representation of the data generating process.

With this detailed discussion on the theoretical formulation of the VEC models and the steps involved in general-to-specific modeling, the next section of the paper discusses the empirical results obtained from estimating the wealth effects in Turkey.

4.6 Empirical Results

Two separate empirical models estimating the stock market and housing wealth effects on the private consumption of non-durables and durables will be presented in this section of the paper. The explanatory variables are the logarithm of the per capita stock market, housing and financial wealth, disposable income, banking credit to private sector and the logarithm of the real effective exchange rate index. In addition, the dummy variables controlling for 1994:Q1 and 1994:Q2; 1998:Q3, and 2001:Q1 and 2001:Q2 are introduced as unrestricted variables to account for the crisis episodes during the sample period. The dummy variables for 1993:Q1 and 1993:Q2 are used as well to control for the fluctuation in the housing wealth. Intercept and centered seasonal dummy variables account for the possible deterministic seasonality patterns of the seasonally unadjusted data, particularly in non-durables consumption, *gcfinexldr* and disposable income, *gyd* series. Trend term will be restricted to the cointegrating space.

A precondition for cointegration testing and formulation of VEC model is that all variables must be non-stationary and integrated of order one I (1). The augmented Dickey-Fuller results are presented in Table 4.3 to show that the null hypothesis of a unit root cannot be rejected for all of the variables at the 5 percent significance level under three alternative specifications regarding trend, intercept and deterministic seasonality, and the order of integration for all variables are found to be I (1).

Standard testing for unit roots is usually performed on the assumption that there are no unit roots other than the one, which corresponds to a zero frequency peak in the spectrum. When seasonally unadjusted data is used, and if there are changing seasonal patterns over time, this indicates that the seasonal data generating process may contain one or more unit roots. When stochastic seasonal patterns exist, the use of seasonal dummy variables is not a suitable approach, which assumes the seasonal process is driven by constant intra-year movement in the mean of the series. Deterministic seasonal models and inferences drawn from these models may not be statistically valid when the seasonal patterns change.

The literature has devoted considerable attention to detecting the presence of unit roots at some seasonal frequencies as well as at the zero frequency. In this paper, the unit roots at all the seasonal frequencies as well as the zero frequency are tested using the methodology developed by Hylleberg, Engle, Granger and Yoo (1990).[88] The results presented in Table 4 show that all of the variables except for logarithm of per capita durables consumption, *gcdr* and logarithm of per capita net private disposable income, *gyd* indicate unit roots at non-seasonal frequency, and therefore first differences of these series can achieve stationarity. For *gcdr* and *gyd*, HEGY test found that they have unit roots at non-seasonal, semi-annual and seasonal frequencies. However using an alternative methodology to check for seasonal unit roots, quarterly plots of both series as displayed in Figure 4.5-b and Figure 4.5-c indicate that there is no obvious crossing pattern or irregularity in the seasonal data. Therefore stationarity can still be achieved using first differences, and centered seasonal dummies can adequately capture the possible seasonal patterns.

[88] A detailed description of the HEGY seasonal unit root testing is provided as explanatory notes under the Table 4.4.

4.6.1 Modeling the Wealth Effects on Non-Durables Consumption in Turkey

As discussed previously, the approach used in this study to model non-durables consumption, *gcfinexldr* is based on the life-cycle and permanent-income hypotheses, with non-durables consumption depending on per capita disposable income and wealth in addition to the liquidity constraints and real exchange rate movements. The first step in the cointegration testing and formulation of a VEC model is to determine the appropriate lag length to be used in the VAR system in levels. The previously mentioned exogenous variables are included in the system as unrestricted variables that will not enter the cointegrating vector except for the trend term.

To determine the appropriate lag structure, the models are compared using log-likelihood, Akaike information, Schwarz and Hannan-Quinn criteria adjusted for the sample size in Table 4.5-a. The Akaike information criterion suggests using four lags in the estimation corresponding to a year in quarterly data. Table 4.6 displays the coefficient estimates from the VAR system in levels using four lags of the endogenous variables, *gcfinexldr, gyd, who, deptsvfx, isemcap, bnkcred*, and *rer* together with the unrestricted and restricted exogenous variables. The estimation period covers 1988:Q1-2006:Q4 using 76 observations.

Table 4.7 looks at the explanatory power of each variable and each lag in the VAR system. F-statistics shows that all of the variables are significant. The lag tests also support the fact that 4 lags provide explanatory powers although the third lag is not significant. Table 4.8 looks at the residual diagnostics of the individual equations of the VAR and the system as a whole. On the basis of the diagnostic and misspecification tests related to autocorrelation, normality, ARCH effects and heteroscedasticity of residuals, the VAR

model in levels has the desired properties and successfully captures the data generating process.

Figure 4.8 displays that the scaled residuals from the individual equations are clearly white noise. Residual density and histogram confirms that the residuals are normal. Although residual portmanteau tests and AR 1-5 tests indicates no autocorrelation for individual equations, there is some indication of autocorrelation in the system. Autocorrelation and partial autocorrelation functions displayed in Figure 4.8 confirm the results for no autocorrelation for individual equations. Heteroscedasticity tests indicate that residuals of the individual equations and the system have constant variance.

Recursive graphs in Figure 4.8 indicate that one-step residuals lie within the two standard error confidence interval, therefore there are no large outliers that may violate the parameter stability. The sequentially estimated one-step ahead Chow statistics shows that there are no points that are above the one percent significance level for the system and the individual equations except for *gyd* and *isemcap*. The breakpoint Chow test for all equations and the system verify the parameter constancy condition at one percent significance level.

Having determined the appropriate lag length, the next step requires testing for cointegration among the endogenous variables using the multivariate Johansen methodology. The trend term is restricted to the cointegrating space by assumption due to the existence of trend stationary variable such *deptsvfx,* which is a proxy for time, savings and foreign currency deposits. Table 4.9 displays the trace (λ_{trace}) and maximum eigenvalue ($\lambda_{\max}$) statistics. The first statistics tests the null hypothesis that the number of distinct cointegrating vectors is less than or equal to *r* against a general alternative. The

second statistic tests the null that the number of cointegrating vectors is *r* against the alternative of *r +1* co-integrating vectors. Both tests proceed sequentially until they fail to reject the null hypothesis. The results indicate that there is one cointegrating relationship at the 5 percent significance level among the endogenous variables included in the VAR system.

Table 4.10 shows the unconditional VEC model using three lags of the first differences of the endogenous variables and the error correction term. In addition, the cointegrating vector is normalized on *gcfinexldr* to identify as the long-run equation for non-durables consumption. The speed of adjustment coefficient for the error correction term for the change in non-durables equation, Δ*gcfinexldr,* is negative and significant in this unconditional VEC model. This indicates that deviations from the long-run equilibrium are corrected by reductions in the non-durables consumption in the next period. However α coefficients in the other equations are statistically insignificant indicating potential weak exogeneity in the system except for change in financial wealth, Δ*deptsvfx* and change in stock market capitalization, Δ*isemcap.* The significant α coefficients in these two equations indicate that cointegrating vector provides explanatory power. The formal weak exogeneity tests that will be conducted on the α coefficients determine the feedback from the cointegrating vector to changes in endogenous variables.

Table 4.11 shows that each variable and lag included in the unconditional VEC model are significant and have explanatory power in the system. Table 4.12 displays the residual diagnostics of the individual equations of the VEC model and the system as a whole. Figure 4.9 indicates that residuals satisfy the conditions for white noise and the model satisfies the parameter constancy condition at one percent significance level.

Table 4.13-a shows the individual restrictions that are placed on the coefficients of the cointegrating vector and adjustment coefficients. The results indicate that the β coefficients on net private disposable income, *gyd* and stock market capitalization, *isemcap* are statistically insignificant. Furthermore the weak exogeneity tests show that all of the adjustment coefficients except for Δ*gcfinexldr,* Δ*deptsvfx* and Δ*isemcap* equations are not significantly different from zero. The joint restrictions placed on insignificant β and α coefficients give a χ^2 (6) statistics that is equal to 6.35 with a p-value of 0.38. This result indicates that these restrictions cannot be rejected. The system can be estimated using only three equations because the weakly exogenous variables do not experience the feedback from the error correction term that necessitates using system estimation. The stationarity tests in Table 4.13-b also indicate that all of the variables are non-stationary.

The incorporation of the coefficient restrictions of the cointegrating vector and the adjustment coefficients into the unconditional VEC model transforms the system into the conditional VEC model, which is displayed in Table 4.14. However the model in Table 4.14 can be transformed further into a final version by excluding all of the weakly exogenous equations except for Δ*gcfinexldr,* Δ*deptsvfx* and Δ*isemcap*. The final conditional VEC model is displayed in Table 4.16. The F tests regarding the explanatory power of residuals and the model residual diagnostic tests are displayed in Table 4.17 and Table 4.18. The model successfully satisfies all of the diagnostic tests regarding the normality, autocorrelation and heteroscedasticity of the residuals and the stability conditions displayed by recursive coefficient estimates in Figure 4.11.

The model in Table 4.16 is still overparameterized due to the existence of insignificant variables. The final step of the general-to-specific methodology is to reduce

the system in Table 4.16 into a more parsimonious representation in Table 4.19 after examining the explanatory power of different lag lengths and set of variables. Using the results displayed in Table 4.17, the variables that are significant at or below 10 percent significance level are retained after comparing the fit against the conditional model and the previous reductions.[89] The test for overidentifying restrictions regarding the reduced model as well as the model comparison results using Akaike information, Schwarz and Hannan-Quinn criteria indicate that reduction of the final conditional VEC model to a parsimonious version is accepted. The χ^2 (46) statistics is equal to 30.141 with a p-value of 0.96 indicating that the explanatory power of the reduced model is the same as the general model from which it is derived.

$$\text{gcfinexldr} = 0.27216\times\text{who} - 0.59423\times\text{deptsvfx} + 0.1275\times\text{bnkcred} - 0.15953\times\text{rer} + 0.011928\times\text{trend} \quad (4.19)$$

The long-run cointegrating vector for the private final consumption excluding durables is displayed in equation (4.19). The housing wealth has a statistically significant positive long-run effect on non-durables consumption. The coefficients of the error correction equation show that a one percent increase in housing wealth raises the real per capita non-durables consumption by 0.27 percent, which is consistent with the strong co-movement of the two series displayed in Figure 4.6-b. There is a significant and positive long-run cointegrating relationship between bank credit and non-durables consumption. A one percent increase in the availability of bank credit to private sector increases the non-durables consumption by 0.13 percent. At the same time, one percent real exchange rate depreciation increases the non-durables consumption by 0.16 percent. On the other hand,

[89] PCGive Autometrics is used to determine the significant variables retained in the system.

there is a negative relationship between non-durables consumption and time, savings and foreign currency deposits in the banking system. A one percent increase in savings reduces the consumption by 0.59 percent in the long-run. The trend term regarding the per capita non-durables consumption is positive and significant.

Consistent with the coefficient restrictions in Table 4.13-a, the fluctuations in stock market capitalization do not have any significant wealth effect on the consumption of non-durables due to the fact that equity ownership is limited and concentrated in the high income households of the Turkish economy.[90] This result is consistent with the findings of Case, Quigley and Shiller (2005) that indicate at best a weak evidence of the stock market wealth effect for 14 OECD countries. On the other hand, housing wealth has a significant and strong positive impact on the consumption of non-durables similar to the findings of Binay and Salman (2008) because home ownership is spread much more evenly over the population and the housing wealth is held by consumers in all income classes in Turkey. According to the study by Undersecretariat of Housing (2003) home ownership rate has reached 60 percent of urban households in 2000 (see Akın, 2008b).

At the same time, lack of a statistically significant relationship between consumption and disposable income is consistent with the permanent-income hypothesis and the findings of the previous literature that the relationship between disposable income and consumption has weakened in the last 15 years due to the availability of bank credit as well as earnings coming from accumulation of financial wealth (see Ceritoğlu 2003).

[90] Akın (2008a) shows that individual stock investors correspond to less than 4 percent of civilian labor force. Due to high volatility in returns, investing in equity market has been an unattractive option for domestic investors in comparison to the Turkish Lira and foreign currency deposits, government debt, and overnight repos. Roughly 12 percent of the total portfolio of Istanbul Stock Exchange is held by domestic institutional investors and 21 percent by domestic individual investors. More than 80 percent of domestic individual investors are small investors holding portfolio size of less than 10.000 New Turkish Lira. However share of their portfolio constitutes only 6 percent of the total investment by domestic individuals.

There is a significant positive effect from the bank credit to the private sector. This indicates that elimination of financial constraints on households stimulates the consumption in the economy.

The coefficient estimates show that the financial wealth proxied by the per capita time, savings and foreign currency deposits has a negative and statistically significant effect on the non-durables consumption in the long-run. The negative coefficient estimate is consistent with the findings of Aydede (2007) and Özcan, Günay and Ertaç (2003). One possible interpretation of this result is that higher consumption leads to a decline of savings in the banking system. The consumers might be using the accumulated financial wealth to finance their consumption in the long-run.

Real depreciation of the Turkish Lira significantly affects final consumption expenditure on non-durables that mainly represent necessities like food, energy, transportation, semi-durables, etc. As mentioned before, there is no consensus on the impact of inflation on consumption and saving behavior in the literature. Gylfason (1981) shows that several studies found inflation to drive down the real value of assets and therefore encourage consumption at the expense of savings. The negative interest rates experienced on savings deposits due to chronically high and variable inflation during the 1990s and depreciation of the Turkish Lira denominated assets would have encouraged consumption rather than savings in Turkey. Similarly depreciation of the domestic currency creates a negative wealth perception reducing the demand for cash holdings and stimulating the consumption on necessities consistent with the findings of Juster and Wachtel (1972).[91]

[91] Akkoyunlu (2002) also finds a positive effect of inflation on consumption under high chronic inflation in Turkey.

Δgcfinexldr = - 0.3867×CointEq.(-1) - 0.06631× Δgyd(-2) - 0.1209× Δwho(-1) - (4.20)
0.1223× Δwho(-3) + 0.1891× Δdeptsvfx(-1) +0.1915× Δdeptsvfx(-3) + 0.04658×
Δisemcap(-1) + 0.01912× Δisemcap(-2) - 0.09878× Δbnkcred(-3) + 0.07549×
Δrer(-1) + 0.08049× Δrer(-3) + 2.6685 + 0.1054×CSeasonal_1 +
0.2825×CSeasonal_2 - 0.09472×DUM1994Q1 - 0.0427×DUM1998Q3 +
0.03878×DUM2001Q1

Δdeptsvfx = -0.8092×CointEq.(-1) + 0.1933× Δgyd(-1) + 0.4688× Δdeptsvfx(-2) (4.21)
+ 0.0768×Δisemcap(-2) - 0.3107× Δbnkcred(-2) + 0.2472× Δrer(-1) + 0.2926×
Δrer(-2) + 0.1565× Δrer(-3) + 5.595 - 0.1204×CSeasonal - 0.1297×CSeasonal_1
- 0.1572×CSeasonal_2 - 0.1113×DUM1993Q2 + 0.1267×DUM1994Q1 -
0.06812×DUM1994Q2 + 0.1484×DUM1998Q3 + 0.2285×DUM2001Q1 +
0.1104×DUM2001Q2

Δisemcap = -1.663×CointEq.(-1) + 2.763× Δgcfinexldr(-1) + 1.329× (4.22)
Δgcfinexldr(-3) + 0.7832× Δgyd(-2) - 1.382× Δwho(-1) - 1.162× Δwho(-2) +
1.259× Δdeptsvfx(-2) + 2.385×Δdeptsvfx(-3) + 0.2723×Δisemcap(-3) -
0.7492×Δbnkcred(-3) + 1.095×Δrer(-2) + 1.004×Δrer(-3) + 11.44 +
0.5861×CSeasonal + 0.5831×CSeasonal_2 + 0.6842×DUM1993Q2-
0.4329×DUM1998Q3 + 0.4667×DUM2001Q2

where

CointEq.(-1) = gcfinexldr(-1) - 0.27216×who(-1) + 0.59423×deptsvfx(-1) -
0.1275×bnkcred(-1) + 0.15953×rer(-1) - 0.11928×trend

As displayed in the system equations of the parsimonious model above, the α adjustment coefficient for the error correction term of Δ*gcfinexldr* equation is -0.3867, which is significant and negative indicating that deviations from the long-run consumption equilibrium is adjusted partially by short term changes as the theory suggests. The short-run coefficients of the parsimonious VEC model displayed in Equation (4.20) show that quarterly change in the non-durables consumption is positively affected by lagged quarterly changes in the financial wealth proxied by savings and foreign currency deposits. On the other hand, despite the absence of a long-run effect, the lagged changes in the stock market wealth have a positive effect on the growth of non-durables consumption, although the magnitude of the short-term effect is significantly smaller that the effect of changes in savings.

The changes in disposable income surprisingly have a negative effect on the changes in the consumption of non-durables. One possible explanation is that consumption booms in Turkey often coincide with the widening of the current account deficit, which enters negatively into the equation for net private disposable income (see Başçı, Özel and Sarıkaya, 2007). Furthermore, economic crises during the 1990s have already led to a substantial erosion in the disposable income of households. Particularly after 2002, the fiscal discipline imposed by the IMF disinflation program increased the government savings through lower social spending and higher collected taxes, which led to a further decline in the net private disposable income while consumption surged during this period with the availability of private sector lending.

The changes in the housing wealth reduce the non-durables consumption growth in the short-run. This effect might be due to the fact that housing represents an asset, which

yields residential services, and the increase in the cost of acquiring these services reduces the consumption for households in the short-run.

The increase in per capita bank credit also has a negative effect on non-durables consumption in the short-run indicating that increase in debt reduces the consumption of the necessities. However unlike the long-run coefficient estimates, the exchange rate appreciation raises the non-durables consumption growth in the short-run, which is consistent with the increase in the perceived purchasing power of the currency by the households.

When the Δ*deptsvfx* equation is examined, changes in savings and foreign currency deposits, which is a proxy for financial wealth, is positively influenced by the changes in disposable income, the stock market capitalization, and the real exchange rate appreciation. However changes in the bank credit in previous periods reduce the savings growth. The magnitude of the speed of adjustment of savings to the deviations from the long-run equilibrium of the non-durables consumption is -0.8092, which is rapid and highly significant.

Finally, as displayed in equation (4.22) changes in stock market capitalization, Δ*isemcap,* responds very rapidly to deviations from the long-run equilibrium of non-durables consumption in the short-run. The magnitude of the speed of adjustment of stock market capitalization is -1.663 indicating a strong feedback effect from overall consumption in the economy to stock market performance. Furthermore changes in the non-durables consumption growth in previous periods also significantly increase the change in stock market capitalization. These findings are in line with the consumption based capital asset pricing model (CAPM), which assumes that the variables determining

the asset prices co-vary with the consumption growth. The one-way causality running from consumption to stock market capitalization growth is consistent with the findings of Liu and Shu (2004b), which indicate that the wealth effect and leading indicator roles of stock markets are mainly observed in economies with more developed stock markets that play a central role in the allocation of capital resources in the economy.

The results show that changes in income and savings increase the stock market capitalization growth in the short-run. The real exchange rate appreciation has a strong positive effect on stock market capitalization growth, which might reflect the effects of foreign capital investments in the stock market and other domestic assets, which leads to the appreciation of the currency. On the other hand, increases in the housing wealth and bank credit reduce the stock market capitalization growth in the short-run.

When the residual diagnostics and vector misspecification tests are examined for the parsimonious conditional VEC model in Table 4.20, results indicate that system residuals satisfy the normality, autocorrelation, ARCH effect and heteroscedasticity conditions. Individual equations show no sign for autocorrelation in residuals. Furthermore the residuals appear normally distributed in all equations and system normality cannot be rejected. ARCH and heteroscedasticity tests indicate that residuals of the individual equations and the system are consistent with constant variance. Figure 4.12 indicates that the scaled residuals satisfy the conditions for white noise. The residual density and histogram confirms the results from the tables regarding normality of the residuals. There is no autocorrelation and partial autocorrelation detected in residuals of the individual equations. Furthermore one-step residuals lie within two standard error confidence bounds indicating there are no large outliers. The one-step Chow test looks at the sequence of one-

period ahead predictions from the recursive estimation. The results show that there is no point that is above the one percent significance level. The break point Chow test results display no structural break. All of the equations satisfy the parameter constancy condition at one percent significance level and system itself is stable. Therefore, the conditional parsimonious VEC model for the non-durables consumption in Table 4.19 successfully explains the data generating process and is robust.

4.6.2 Modeling the Wealth Effects on Durables Consumption in Turkey

The second empirical model looks at the wealth effects on the durables consumption in Turkey, *gcdr*, using the VEC model with the same endogenous variables. The first step in the cointegration testing and formulation of a VEC model is to determine the appropriate lag length to be used in the VAR system in levels. The previously mentioned exogenous variables are included in the system as unrestricted variables that will not enter the cointegrating vector except for the trend term.

To determine the appropriate lag structure, models are compared using log-likelihood, Akaike information, Schwarz and Hannan-Quinn criteria in Table 4.21-a. Despite the fact that lag length tests suggest using four or two lags, these lags create misspecification problems with respect to autocorrelation and normality, and they fail to satisfy the residual diagnostic tests at later stages. Therefore Table 4.22 displays the coefficient estimates from the VAR system in levels using 3 lags of the endogenous variables*, gcdr, gyd, who, deptsvfx, isemcap, bnkcred*, and *rer* together with the unrestricted and restricted exogenous variables. The estimation period covers 1987:Q4-2006:Q4 using 77 observations.

Table 4.23 looks at the explanatory power of each variable and each lag in the VAR system. F-statistics shows that all of the variables are significant although lag 3 does not have any significance. This result is also supported by the lag exclusion test. However due to problems appearing in the VEC model using two lags, current system will be maintained.

Table 4.24 looks at the residual diagnostics of the individual equations and the VAR system as a whole. On the basis of the diagnostic and misspecification tests related with autocorrelation, normality, ARCH effects and heteroscedasticity of residuals, VAR model in levels successfully captures the data generating process.

Figure 4.13 displays that scaled residuals from the individual equations are clearly white noise. The residual density and histogram confirm that the residuals appear normal. Autocorrelation and partial autocorrelation functions displayed in Figure 4.13 confirm the results for no autocorrelation for individual equations. Heteroscedasticity tests indicate that residuals of the individual equations and the system have constant variance. Recursive graphs in Figure 4.13 indicate that one-step residuals lie within two standard error confidence interval, therefore there are no large outliers that may violate the parameter stability. The sequentially estimated one-step ahead Chow statistics shows that there are no points that are above the one percent significance level for the system and the individual equations except for *gcdr* and *gyd*. The last plot shows that there are only three points in the system, which are above the 1 percent significance level, but these are numerically very small. The breakpoint Chow test for all equations except *gyd* and the system verify the parameter constancy condition at one percent significance level.

Having determined the appropriate lag length, the next step is to test for cointegration among the endogenous variables using multivariate Johansen methodology. The results from the trace (λ_{trace}) and maximum eigenvalue ($\lambda_{\max}$) statistics in Table 4.25 also indicate that there is one cointegrating relationship at the 5 percent significance level.

Table 4.26 shows the unconditional VEC model using two lags of the first differences of the endogenous variables and the error correction term. The adjustment coefficient for the error correction term is negative and significant for $\Delta gcdr$ equation. However unrestricted α coefficients in other equations are statistically insignificant indicating potential weak exogeneity for these variables.

Table 4.27 shows that each variable and the first lags included in the unconditional VEC model are significant and have explanatory power in the system. Table 4.28 displays the residual diagnostics of the individual equations of the VEC model and the system as a whole. There is no residual autocorrelation found in the model except for $\Delta isemcap$ equation at 5 percent significance level. Furthermore the residuals seem normally distributed in all equations except for Δgyd due to excess kurtosis, and system normality can be rejected at 1 percent significance level, but not at 2.5 percent significance level. ARCH tests indicate that residuals of the individual equations and the system have constant variance except $\Delta isemcap$ and Δrer equations. Figure 4.14 indicate that overall scaled residuals satisfy the conditions for white noise. The graphs for the residual density and histogram confirm normality and no autocorrelation. The one-step residuals lie within two standard error confidence interval therefore there are no large outliers that may violate the parameter stability. The one-step ahead Chow statistics and breakpoint Chow test show that the model satisfies the parameter constancy condition at one percent significance level. All

of the equations except Δgyd satisfy the parameter constancy condition at 1 percent significance level. Therefore it can be accepted that the unconditional VEC model is stable.

Table 4.29-a shows the individual and the combined restrictions that are placed on the β coefficients of the cointegrating vector and α adjustment coefficients. The initial results show that all the coefficients from the cointegrating vector are statistically different from zero except for net private disposable income, *gyd* and housing wealth, *who*. The multivariate stationarity tests in Table 4.29-b also indicate that all of the variables are non-stationary.

Various alternative joint hypotheses on β and α coefficients are tested in Table 4.29-a. The first restriction that jointly tests the hypothesis that coefficients on disposable income, *gyd* and housing wealth, *who* in the cointegrating vector are zero and all of the α coefficients except on $\Delta gcdr$ and $\Delta deptsvfx$ equations are weakly exogenous, is marginally insignificant.

On the other hand, when the cointegrating vector is normalized with *gcdr,* and the restriction that sum of the β coefficients on net private disposable income, *gyd* and bank credit to private sector, *bnkcred* equal to negative of the coefficient on time, savings and foreign currency deposits, *deptsvfx* is imposed, statistically significant and more interesting long-run relationship can be observed in Table 4.29-a. The β coefficients obtained from this restriction show that the sum of the long-run elasticities of the durables consumption with respect to disposable income and bank credit is equal to the long-run elasticity of durables consumption with respect to financial wealth proxied by savings. On the other hand, housing wealth has no long-run relationship with the consumption of durables. The final cointegrating vector also indicates that stock market capitalization, *isemcap* and real

exchange rate appreciation, *rer* have a positive long-run cointegrating relationship with the consumption of durables. The trend term is also significant. The weak exogeneity applies to all of the adjustment coefficients except for Δ*gcdr* and Δ*deptsvfx* equations. The savings adjust in the short-run in response to deviations of the durables consumption from the long-run equilibrium. The $\chi^2(7)$ statistics for the joint restrictions equal to 7.88 with a p-value of 0.34 indicating that these restrictions cannot be rejected.

The incorporation of the coefficient restrictions of the cointegrating vector and the adjustment coefficients into the unconditional VEC model transforms the system into the conditional VEC model, which is displayed in Table 4.30. However the model in Table 4.30 can be transformed further into a final version by excluding all of the weakly exogenous equations except for Δ*gcdr* and Δ*deptsvfx*. The final conditional VEC model is displayed in Table 4.32. The F tests regarding the explanatory power of residuals and the model residual diagnostic tests are displayed in Table 4.33 and Table 4.34. The Figure 4.16 also displays the tests regarding normality, autocorrelation and heteroscedasticity of the residuals and the stability conditions by recursive coefficient estimates.

The model in Table 4.32 is still overparameterized due to the existence of the insignificant variables. The final step of the general-to-specific methodology is to reduce the system in Table 4.32 into a more parsimonious representation in Table 4.35 after examining the explanatory power of different lag lengths and set of variables. Using the results displayed in Table 4.33, the variables that are significant at or below 10 percent significance level are retained after comparing the fit against the conditional model and the previous reductions. The test for overidentifying restrictions give $\chi^2(25)$ statistics of 22.829 with a p-value of 0.58. Together with the model comparison results using Akaike

information, Schwarz and Hannan-Quinn criteria, test results indicate that reduction of the final conditional VEC model to a parsimonious version is accepted.

$$gcdr = 0.1696\times gyd - 0.6246\times deptsvfx + 0.05336\times isemcap + 0.45499\times bnkcred + 0.50814\times rer + 0.009859\times trend \quad (4.23)$$

The long-run cointegrating vector for the consumption of durables is displayed in equation (4.23). The trend term regarding the per capita non-durables consumption is found to be positive and significant. In contrast to the non-durables consumption, the housing wealth has no statistically significant positive long-run relationship with durables consumption. On the other hand, a one percent increase in per capita stock market capitalization raises the per capita durables consumption by 0.05 percent. Despite the fact that equity ownership is very small in Turkish economy, the movements of the stock market capitalization, which is a reflection of capital flows into the economy, functions as a leading indicator of the boom-bust periods, and reflects the consumer confidence about the future economic conditions. Therefore, the stock market fluctuations are associated with the durables consumption, which are highly sensitive to the cyclical conditions and income uncertainty in the Turkish economy.

The coefficients of the error correction equation show that a one percent increase in disposable income raises the real per capita durables consumption by 0.17 percent, which indicates the sensitivity of durables consumption to disposable income in the long-run in contrast to the non-durables consumption. The results are consistent with the findings of Duygan (2005) that households' decision for the consumption of durable goods in Turkey is strongly determined by the uncertainty about real income and employment expectations.

There is a significant and positive long-run cointegrating relationship between bank credit and durables consumption. A one percent increase in the availability of bank credit to private sector increases the durables consumption by 0.45 percent, which is more than three times the elasticity of non-durables consumption. The elimination of financial constraint of the households through the availability of bank credit to private sector stimulates the consumption of durables in the long-run. This result is consistent with findings by Çimenoğlu and Yentürk (2005).

Even though coefficient estimates of the cointegrating vector indicate an absence of a distinct long-run relationship between durables consumption and housing wealth, the coefficient capturing the elasticity with respect to bank credit may actually incorporate the collateral channel, through which housing wealth affects the household consumption spending. The estimated housing wealth series based on urban dwellings with occupancy permits allows the collateral channel to be effective because the housing asset is legally recognized in formal transactions in financial institutions or can be transferred legally to next generations as bequest. As discussed in previous sections in detail, the housing assets constitute the most important form of collateral available to large segments of the population. It is very likely that rise in housing values leads to more borrowing from the banking system using the housing asset as collateral and encourage households to purchase durables such as automobiles.

In addition, the results show that there is negative relationship between durables consumption and time, savings and foreign currency deposits in the banking system. A one percent increase in financial savings reduces the consumption by 0.62 percent in the long-run. The sum of the elasticities of durables consumption with respect to disposable income and bank credit is equal to the magnitude of the elasticity with respect to the financial savings.

In contrast to the non-durables consumption, a one percent real exchange rate appreciation increases the durables consumption by 0.51 percent. Real appreciation of the Turkish Lira significantly affects the durables consumption in the long-run due to the fact that imports become cheaper for domestic households. Many of the durables items such as household appliances, electronics or vehicles are either directly purchased from abroad or require a significant amount of imported components in the production process. This finding is consistent with the observation that the appreciation of the real exchange rate coincides with the widening of current account in Turkey. Another explanation could be that strengthening of the domestic currency creates a wealth perception as a result of the decline in uncertainty associated with the depreciation of the Lira denominated assets or inflation, which stimulates the consumption of durables as argued by de Gregorio, Guidotti and Végh (1998). The concurrent fall in nominal interest rates provides the consumers with more liquidity and results in a wealth effect, which induces many consumers to bring forward their purchases of durable goods in Turkey. The appearance of credit following exchange rate appreciation provides an additional channel, which could trigger the boom in consumption of durables.

$$\Delta gcdr = -1.0304\times CointEq.(-1) - 0.4707\times \Delta gyd(-1) - 0.6461\times \Delta gyd(-2) \quad (4.24)$$

$$+ 0.5589\times \Delta deptsvfx(-1) + 0.3158\times \Delta deptsvfx(-2) + 0.1272\times \Delta isemcap(-1) +$$

$$0.0969\times \Delta isemcap(-2) + 0.7748\times \Delta bnkcred(-1) - 0.4914\times \Delta bnkcred(-2) +$$

$$1.09347 - 0.2641\times CSeasonal - 0.2003\times CSeasonal_1 - 0.2512\times CSeasonal_2 +$$

$$0.2015\times DUM1993Q1 - 0.7446\times DUM1994Q2 - 0.2703\times DUM2001Q1 -$$

$$0.2962\times DUM2001Q2$$

$$\Delta deptsvfx = -0.2667\times CointEq.(-1) + 0.0803\times \Delta gyd(-1) - 0.1626\times \Delta gyd(-2) + \quad (4.25)$$

$$0.1576\times \Delta deptsvfx(-2) -0.0676\times \Delta isemcap(-1) + 0.3247\times \Delta bnkcred(-1) + 0.2922$$

$$+ 0.2047\times DUM1994Q1 + 0.1662\times DUM2001Q1 - 0.10403\times DUM2001Q2$$

where

$$CointEq.(-1) = gcdr(-1) - 0.16961\times gyd(-1) + 0.624659\times deptsvfx(-1) - 0.053356\times$$

$$isemcap(-1) -0.45499\times bnkcred(-1) - 0.50814\times rer(-1) - 0.0098592\times trend$$

As displayed in the system equations of the parsimonious model above, the α adjustment coefficient for the error correction term of $\Delta gcdr$ equation is -1.0304 that is significant and negative indicating that deviations from the long-run equilibrium of durables consumption is completely adjusted. The short-run coefficients of the parsimonious VEC model displayed in Equation (4.24) show that quarterly change in durables consumption is positively affected by lagged quarterly changes in financial wealth proxied by savings and foreign currency deposits, the stock market wealth proxied by market capitalization although the magnitude of the short-term effect from the stock market wealth is smaller.

In contrast to the non-durables, increase in per capita bank credit in previous periods leads to a net increase in the durables consumption in the short-run. Together with

the positive long-term effects, it can be clearly seen that the availability of bank credit plays a significant role in the financing of durables consumption in Turkey. [92]

Changes in disposable income in the previous period also have a negative effect on the changes in consumption of durables similar to the previous model for non-durables consumption. The negative coefficients in front of the dummy variables for 1994 and 2001 capture the negative effects of the crisis episodes on durables consumption.

When the Δ*deptsvfx* equation is examined, changes in savings and foreign currency deposits, which is a proxy for financial wealth, is positively influenced by changes in disposable income and changes in bank credit, but negatively by changes in stock market capitalization. The magnitude of the speed of adjustment of savings to the deviations from the long-run equilibrium of the durables consumption is -0.2667, which is significant although the speed of adjustment is slower than the case with non-durables consumption.

When the residual diagnostics and vector misspecification tests are examined for the parsimonious conditional VEC model in Table 4.36, the results indicate that system residuals satisfy the normality, autocorrelation, ARCH effect and heteroscedasticity conditions. Furthermore the residuals appear to be normally distributed in all equations and system normality cannot be rejected. ARCH and heteroscedasticity tests indicate that residuals of the individual equations and the system have constant variance. Figure 4.15 indicates that scaled residuals satisfy the conditions for white noise. The residual density and histogram confirms the results from the tables regarding normality of the residuals. There is no significant autocorrelation and partial autocorrelation detected in other

[92] This observation is consistent with the fact that there has been an increase in the nationwide acceptability of credit card usage in major retail stores in the last decade and availability of consumer loans for automobiles since 2002. (See Türkan, 2008). The Figure 4.4 shows that the share of household credit reached 40 percent of the loan portfolio of the Turkish banking system in 2006.

equations. Furthermore one-step residuals lie within two standard error confidence bounds indicating there are no large outliers. One-step Chow test shows that there is no point that is above the one percent significance level. The break point Chow test results display no structural break. Both equations satisfy the parameter constancy condition at one percent significance level and the system itself is stable. Therefore conditional parsimonious VEC model for durables consumption in Table 4.35 is robust.

4.7 Conclusion

There is a growing recognition that fluctuations in the stock market and housing wealth can have strong effects on the private consumption behaviour. Over the recent years with the broadening of equity ownership, financial deregulation in mortgage markets and the growing importance of consumer financing through mortgage equity withdrawal, economists paid more attention to the role of movements of major asset prices in determining wealth and consumer demand in the OECD economies. On the other hand, there are only a limited number of empirical studies assessing the link in the context of emerging market economies.

This research is the first attempt in the literature to explicitly investigate the role of stock market, housing and financial wealth in determining the durables and non-durables consumption behaviour in Turkey by developing a vector error correction model using quarterly time series data for the 1987-2006 period. Unlike previous studies on consumption behaviour in Turkey that employed Engle-Granger single equation estimation with annual data, the model developed in this paper uses longer and higher frequency data and captures the long-run and short-run interrelationships across variables in system estimation.

The paper uses an originally constructed housing wealth series in addition to the stock market capitalization and deposits in the banking system as a proxy for the stock market and financial wealth respectively. Consistent with the life-cycle and permanent-income hypotheses, net private disposable income, bank credit to private sector, and real exchange rate fluctuations are controlled for in the estimation as a proxy for income, liquidity constraints, import demand and depreciation of non-indexed assets.

One of the main findings of this research is that in the long-run, an increase in housing wealth raises the consumption of non-durables. This result is consistent with the fact that ownership of housing asset is widespread in Turkey. As a consequence, the developments in the housing market have important implications for stimulating aggregate demand. Following the recent enactment of the mortgage market legislation in 2007, it can be assumed that fluctuations in the housing wealth will have even larger effects on consumption over time as a consequence of the effective use of collateral channel in the financial markets. In addition, housing prices will respond more strongly to monetary policy and overall cyclical developments in the economy. Therefore, policymakers need to monitor the developments in the real estate market more closely and take appropriate measures to prevent bubbles in property prices and inflationary pressures coming from excess consumption in the economy.

Another important finding of this paper is that although the coefficient estimates are quantitatively small, the stock market wealth significantly affects the durables consumption in Turkish economy, but has no effect on non-durables consumption. This result is consistent with the fact that equity ownership is very limited in Turkey. The movement of the stock market capitalization, which is predominantly driven by international capital

inflows and foreign investor sentiment, functions as a leading indicator of the business cycles and reflects the consumer confidence about the future economic conditions. In addition, with continuing financial integration, domestic asset prices function as a transmission mechanism of international financial conditions and are increasingly influenced by regional and global shocks. Turkish policymakers need to pay special attention to the fact that the stock market wealth is indirectly associated with the durables consumption, which is highly sensitive to the cyclical conditions and income uncertainty in the economy.

This paper also finds a strong impact from the elimination of liquidity constraints on consumption of both durables and non-durables. A one percent increase in bank credit raises durables consumption by 0.45 percent, which is more than three times the elasticity of non-durables consumption. Even though there is no distinct long-run relationship between durables consumption and housing wealth, the high elasticity of durables consumption with respect to bank credit may incorporate the additional collateral channel, through which housing wealth allows the liquidity constrained households to have access to credit and therefore increase consumption spending. The estimated housing wealth series based on urban dwellings with occupancy permits represents the housing asset that is legally recognized in formal transactions in financial institutions or can be transferred legally to next generations as bequest.

In contrast to the non-durables, increase in per capita bank credit in previous periods leads to a net increase in the durables consumption in the short-run. Together with the positive long-term effects, it can be clearly seen that the availability of bank credit plays a significant role in the financing of durables consumption in Turkey. The

increasing role of credit cards and consumer loans in financing the consumption of durables while the disposable income continues to fall, makes the lending booms a particular concern for the soundness of the banking system (see Terrones and Mendoza, 2004). In particular, during the times of appreciation in the currency, consumer spending leads to a higher import demand and a widening of the current account deficit. The Turkish policymakers should be vigilant about excessive lending by the banking system financed by borrowing from international capital markets, and implement stringent prudential regulations to prevent defaults on consumer loans.

Another set of interesting findings is that in the long-run increases in financial wealth proxied by savings move in the opposite direction for both durables and non-durables consumption. One possible interpretation of this result is that consumers reduce their savings in the banking system to finance their consumption in the long-run. Disposable income has no influence on the consumption of non-durables in the long-run indicating evidence in favor of permanent-income hypothesis. On the other hand, a one percent increase in disposable income raises the consumption of durables by 0.17 percent, which indicates that consumption of durable goods in Turkey is strongly determined by the uncertainty about real income and employment expectations.

The short-run coefficients show positive wealth effects from the stock market capitalization and financial savings for both durables and non-durables consumption. However increases in the housing wealth lower the consumption of non-durables in the short-run due to the fact that cost of acquiring housing services also increases for households.

Table 4.1: Annual Growth Rates of the Variables

	Inflation (%)	3 Months' Time Deposits Rate (per annum, %)	Real 3 Months' Time Deposits Rate (per annum, %)	Per Capita GDP Growth (%)	Per Capita Non-Durables Consumption Growth (%)	Per Capita Durables Consumption Growth (%)	Per Capita Net Private Disposable Income Growth (%)	Per Capita Housing Wealth Growth (%)	Per Capita Time, Savings and Foreign Currency Deposits Growth (%)	Per Capita Istanbul Stock Exchange Market Capitalization Growth (%)	Per Capita Bank Credit to Private Sector Growth (%)	Real Effective Exchange Rate Growth (%)
1987	44.43	35.00	-6.53	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1988	70.76	66.67	-2.40	0.51	-6.14	-9.58	-0.31	13.23	-3.88	-38.21	-15.91	-7.04
1989	64.99	50.30	-8.90	4.68	7.72	8.25	4.64	-7.09	8.31	28.09	-4.04	21.53
1990	60.65	49.17	-7.15	6.09	8.91	32.24	9.63	-2.15	-5.42	364.00	6.25	8.66
1991	68.20	69.67	0.87	-5.75	-2.82	-2.67	1.03	16.25	5.79	-13.17	-4.82	-3.21
1992	67.86	68.63	0.46	0.46	-0.98	-4.67	-1.46	2.56	12.17	-31.40	5.75	0.59
1993	69.35	64.00	-3.16	6.64	5.06	14.48	12.92	1.02	-3.54	94.51	16.96	4.29
1994	115.80	71.43	-20.56	-7.57	-2.66	-27.37	-6.30	-2.06	16.44	6.99	-20.74	-27.42
1995	80.46	77.45	-1.67	5.60	5.23	8.19	0.36	-8.86	6.42	13.73	8.72	14.09
1996	79.91	79.60	-0.17	2.67	-3.02	15.50	9.21	-4.17	15.01	3.30	30.14	-3.26
1997	96.11	82.90	-6.74	3.34	2.05	22.78	2.71	2.78	10.12	63.77	28.17	12.60
1998	72.91	82.21	5.38	-2.86	-0.47	-8.00	2.99	-5.38	11.12	-6.17	1.96	8.59
1999	66.06	69.26	1.93	-11.84	-7.23	-13.06	-2.05	-5.34	13.57	9.82	-16.38	3.77
2000	42.32	68.19	18.18	2.78	-1.31	21.51	-3.82	-9.78	4.26	63.69	2.22	15.74
2001	67.45	62.64	-2.88	-9.57	-4.27	-30.56	-5.41	1.89	17.96	-46.78	-11.24	-27.52
2002	31.61	46.35	11.20	7.20	-1.88	-4.68	0.21	-10.56	-6.67	-25.61	-33.76	12.45
2003	14.21	27.95	12.03	5.79	3.97	19.60	0.31	-1.16	-8.88	-5.29	13.18	9.98
2004	9.42	23.48	12.85	8.76	5.12	30.17	-4.10	3.33	10.10	45.62	47.78	-0.05
2005	7.62	20.42	11.89	3.38	2.80	20.46	-8.12	1.42	8.34	37.20	38.08	18.84
2006	9.83	23.79	12.71	6.43	5.19	3.77	0.13	8.87	15.28	28.91	34.97	-6.60

Notes: This table displays the annual inflation, nominal and real 3 months' time deposits rate, and the annual percentage growth rates of per capita GDP, non-durables and durables consumption, net private disposable income, housing wealth, time, savings, and foreign currency deposits, stock market capitalization, bank credit to private sector as well as real effective exchange rate. Inflation and annual growth rate of real effective exchange rate is constructed by taking the percentage growth rate of the consumer price index and real effective exchange rate index values from the last quarter of each year. 3 months' time deposit interest rates correspond to the per annum interest rates in the last quarter of each year. Real 3 months' time deposit interest rates are calculated using Fisher equation with nominal interest rates from the last quarter of each year and annualized inflation rate obtained from percentage change of consumer price index from the last quarter of the previous year. Non-durables consumption refers to real private consumption excluding durables. Quarterly real per capita GDP, non-durables and durables consumption, and disposable income growth rates are annualized by summing each quarter in every year, and growth rates are obtained by taking the percentage change of the annualized series. The quarterly real per capita housing wealth, time, savings, and foreign currency deposits, stock market capitalization and bank credit series are annualized by averaging four quarters in every year and growth rates are obtained by taking the percentage change of the annualized series.

Table 4.2: Chronology of Major Legal, Economic, Political and Financial Events in Turkey

1986	Commencement of stock trading at the Istanbul Stock Exchange.
1987	Turkey's application to the European Economic Community.
1988	Foreign investors and investment funds were admitted to the Turkish capital markets.
1989	IFC Liberalization Date. Foreign institutional and individual investors were allowed to purchase or sell securities and repatriate the capital and profits without any restrictions from Istanbul Stock Exchange.
1990	Foreign capital outflow triggered by impending Gulf War following Iraqi invasion of Kuwait.
1991	Coalition government was formed between DYP and Social Democratic Populist Party.
1992	Introduction of corporate bonds trading and preferential tax rates on mutual funds and investment trusts with 25 percent equity content.
1993	Death of President Özal led to the Turkish parliament approving prime minister Süleyman Demirel as the new Turkish president. Ms. Tansu Çiller was approved as prime minister.
1994	Moody's and Standard & Poors downgraded Turkey's foreign debt rating. Exchange rate worries triggered panic selling by domestic and foreign institutional investors from capital markets. Three-month austerity program with the IMF was announced. Lira was devalued.
1995	Signing of Customs Union agreement with the European Union.
1996	DYP-ANAP coalition collapsed and the Islamist Refah Party ascended to power.
1997	The Islamist Refah Party government stepped out of the government due to the pressures by the secularist military. The Constitutional Court ruled that Refah Party violated the secularist constitution.
1998	Foreign investors started withdrawing from emerging markets following Asian crisis. Russian crisis created massive outflow of funds from Istanbul Stock Exchange.
1999	Tension between Syria and Turkey over Damascus's support for Kurdish rebels. Abdullah Öcalan, leader of the Kurdish separatist rebel group, was arrested. Prime minister Bülent Ecevit's party won the largest number of seats in the parliament. Three-party coalition of DSP with MHP and ANAP was formed. Earthquake hit the country with the epicenter in industrial region İzmit. IMF agreed a two year stand-by loan for fighting inflation. The European Union invited Turkey to become an E.U. member candidate in December.
2000	Ahmet Necdet Sezer was elected Turkey's president. Banking crisis was triggered by the liquidity problems in banking sector. Investors pulled out 7 billion U.S. dollars in November.
2001	Public quarrel between president Ahmet Necdet Sezer and prime minister Bülent Ecevit triggered financial crisis, which was contained with 10 billion U.S. dollars funding from the IMF in exchange for Turkey's agreement to open the air space to US anti-terrorism forces, and accelerate privatization.
2002	Islamist-based AKP won landslide victory in general elections.
2003	Parliament decides not to allow deployment of US forces ahead of war in Iraq passing Turkish territory but allows the U.S. to use the air space.
2004	The European Union leaders agreed to open talks in 2005 on Turkey's E.U. accession.
2005	New Lira currency introduced as six zeroes were removed from old Lira.
2006	The European Union partially freezes Turkey's membership talks because of Ankara's failure to open ports and airports to Cypriot traffic.

Source: The chronology of major events derived from Central Bank (2002), Bekaert, and Harvey (2002), Standard & Poors Emerging Markets Factbooks (1990-2002), and BBC Country Profiles.

Table 4.3: Augmented Dickey Fuller Test

	Intercept and Trend			Intercept			None	
Levels	Lag	t-statistics	Fseas	Lag	t-statistics	Fseas	Lag	t-statistics
GCFINEXLDR	0, CSD	-2.2476	332.65***	0, CSD	-2.2215	337.04***	8	0.8253
GCDR	8	-2.8440		8	-2.3458		8	0.7818
GYD	4, CSD	-0.9503	3.53**	4, CSD	-1.7839	3.36**	4	0.2653
WHO	1, CSD	-2.1894	2.45*	1, CSD	-1.0638	2.56*	1	-0.2786
DEPTSVFX	0, CSD	-2.9084	4.01**	2, CSD	0.0865	3.43**	3	3.0650
ISEMCAP	1	-2.8759		1	-2.0649		1	0.7353
BNKCRED	1, CSD	-1.9272	3.69**	1, CSD	-0.9538	3.66**	1	0.7869
RER	2, CSD	-2.6767		2	-1.7760		2	0.6361
First Differences								
ΔGCFINEXLDR	0, CSD	-9.9103***	546.87***	0,CSD	-9.9786***	554.32***	7	-2.8145***
ΔGCDR	4	-4.139***		4	-4.1723***		7	-3.0842***
ΔGYD	3, CSD	-5.4273***	3.88**	3,CSD	-4.9331***	3.77**	3	-4.6453***
ΔWHO	0, CSD	-13.9404***	2.53*	0,CSD	14.0165**	2.58*	0	-15.8804***
ΔDEPTSVFX	1, CSD	-6.6264***	3.41**	1,CSD	-6.6192***	3.48**	4	-3.4594***
ΔISEMCAP	4	-5.509***		4	-5.3566***		0	-7.3948***
ΔBNKCRED	0, CSD	-5.5378***	3.47**	0,CSD	-5.4039***	3.58**	0	-5.8383***
ΔRER	1	-7.6775***		1	-7.7213***		1	-7.7183***

MacKinnon Critical Values Ho: γ=0

	ττ	τμ	τ
1 % Significance Level	-4.10	-3.53	-2.60
5 % Significance Level	-3.48	-2.91	-1.95

Notes: $\Delta y_t = a_0 + \alpha_1 CSD_1 + \alpha_2 CSD_2 + \alpha_3 CSD_3 + \gamma y_{t-1} + a_2 t + \sum_{i=2}^{p} \beta_i \Delta y_{t-i+1} + \varepsilon_t$

The general specification of the augmented Dickey Fuller test is used for testing the null hypothesis of a unit root i.e. Ho: $\gamma = 0$ under the presence of intercept, trend and centered seasonal dummies. The sample period is 1987:Q1-2006:Q4. The obtained t-statistics are compared to the MacKinnon critical values for τ_τ statistics. If only intercept a_0 and centered seasonal dummies are included, τ_μ statistics is used for the unit root test. The MacKinnon critical values for τ statistics are used if none of the deterministic regressors are included in the augmented Dickey Fuller test. Failure to reject the null hypothesis signifies that the variable has a unit root. The lag length selection in all specifications was determined by minimizing the Akaike information criteria and by checking the Ljung Box Q-statistics in order to verify the presence of white noise residuals. F tests for seasonal dummies are also provided.

$$\Delta^2 y_t = a_0 + \alpha_1 CSD_1 + \alpha_2 CSD_2 + \alpha_3 CSD_3 + \gamma \Delta y_{t-1} + a_2 t + \sum_{i=2}^{p} \beta_i \Delta^2 y_{t-i+1} + \varepsilon_t$$

In order to determine the order of integration, the Augmented Dickey Fuller test is conducted with the first difference of the series in this general specification with intercept, trend and centered seasonal dummies. The null hypothesis of a unit root i.e. Ho: $\gamma = 0$ is tested against the corresponding MacKinnon critical values under three specifications.

In order to account for purely deterministic seasonal patterns in the series, quarterly seasonal dummy variables are introduced into the augmented Dickey Fuller test. Since the mean of each D_i series is 1/4, presence of seasonals affects the magnitude of the intercept term a_0. To correct for this, centered seasonal dummy variables are used by simply letting $CSD_i = 0.75$ in season i and -0.25 in each of the three quarters of the year. Hence the mean of $CSD_i = 0$ and the magnitude of a_0 is unchanged (see Enders, 2003).

Table 4.4: HEGY Seasonal Unit Root Test

	I,CSD,T		I,CSD		I		I, T		No I,CSD,T	
	AICc	Lag	AICc	Lag	AICc	Lag	AICc	Lag	AICc	Lag
GCFINEXLDR	-5.671	1	**-5.708***	1	-5.496	5	-5.467	5	-5.423	5
GCDR	-2.633	1	-2.616	1	**-2.669***	5	-2.668	5	-2.620	5
GYD	-4.482	1	**-4.492***	1	-4.454	1	-4.399	3	-4.425	1
WHO	-4.529	0	-4.506	1	-4.553	1	-4.564	0	**-4.575***	1
DEPTSVFX	**-4.563***	0	-4.520	0	-4.515	0	-4.556	0	-4.546	0
ISEMCAP	-1.883	2	-1.875	2	-1.945	2	**-1.955***	2	-1.856	2
BNKCRED	-4.058	1	-4.019	1	-4.042	1	**-4.091***	1	-4.034	2
RER	-4.205	0	-4.186	0	-4.197	0	**-4.218***	0	-4.188	0

	Ho: Π_1=0		Ho: Π_2=0		Ho: Π_3=0		Ho: Π_4=0		Ho: Π_3=0 and Π_4=0	
	Π_1	t-statistics	Π_2	t-statistics	Π_3	t-statistics	Π_4	t-statistics	Wald F-statistics	
GCFINEXLDR	-0.036537	-2.1112	-0.366095	-3.6845***	-0.468917	-4.1169***	-0.425416	-3.5778***	15.1399***	Unit Root at Non-Seasonal Frequency
GCDR	-0.073142	-2.3458	-0.021244	-0.2775	-0.065117	-0.8211	-0.001187	-0.0146	0.3373	Unit Root at Non-Seasonal,Semi-Annual and Seasonal Frequency
GYD	-0.03380	-1.7839	-0.108357	-1.4659	-0.131272	-1.6567	-0.202030	-2.6381**	4.8870	Unit Root at Non-Seasonal,Semi-Annual and Seasonal Frequency
WHO	-0.000143	-0.5971	-0.181922	-2.8542***	-0.635348	-5.7211***	-0.334012	-2.5926***	19.8042***	Unit Root at Non-Seasonal Frequency
DEPTSVFX	-0.042144	-2.2546	-0.381519	-4.0886***	-0.520784	-5.1941***	-0.404360	-3.9545***	30.7472***	Unit Root at Non-Seasonal Frequency
ISEMCAP	-0.041997	-2.9387	-0.457629	-3.8879***	-0.787152	-6.0302***	-0.443105	-3.2748***	33.5274***	Unit Root at Non-Seasonal Frequency
BNKCRED	-0.033728	-3.1241	-0.478240	-3.4318***	-0.242135	-2.0107**	-0.468502	-4.1998***	10.8508***	Unit Root at Non-Seasonal Frequency
RER	-0.054956	-2.5849	-0.669811	-5.8041***	-0.309289	-3.4334***	-0.411389	-4.5847***	21.5488***	Unit Root at Non-Seasonal Frequency

Notes: Following Hylleberg, Engle, Granger, and Yoo (1990) for quarterly data, the polynomial ($1-L^4$) can be expressed as: $(1-L^4)=(1-L)(1+L)(1+iL)(1-iL)=(1-L)(1+L)(1+L^2)$ such that the unit roots 1, -1, i and $-i$ correspond to zero frequency, ½ cycle per quarter or 2 cycles per year (semi-annual), and ¼ cycle per quarter or one cycle per year respectively. The last root, $-i$ is indistinguishable from the one at i with quarterly data and is therefore also interpreted as the annual cycle.

Based on the expansion of an autoregressive representation such as $\Phi(B)x_t=\varepsilon_t$ around the points $\theta_k=\pm 1$, $\pm i$, a test procedure extending the well-known Dickey-Fuller test for integration at frequency θ = 0 can be developed. The test is based on an auxiliary regression,

$$y_{4,t}=(1-L^4)x_t=\Pi_1 y_{1,t-1}+\Pi_2 y_{2,t-1}+\Pi_3 y_{3,t-2}+\Pi_4 y_{3,t-1}+\varepsilon_t$$

where

$$y_{1,t}=(1+L)(1+L^2)x_t=(1+L+L^2+L^3)x_t$$

$$y_{2,t}=-(1-L)(1+L^2)x_t=-(1-L+L^2-L^3)x_t$$

$$y_{3,t}=-(1-L^2)x_t$$

$$y_{4,t}=(1-L^4)x_t=\Delta_4 x_t$$

The auxiliary regression can be augmented by lagged values of the dependent variable $(1-L^4)x_t$ without any effect on the distribution under the null as is the case with the Dickey-Fuller procedure in order to whiten the errors.

To test the hypothesis that $\varphi(\theta_k)=0$, where θ_k is either 1, - 1, or $\pm$ i, one can test $\Pi_1 = 0$ for the root 1, and $\Pi_2 = 0$ for the root - 1. For the complex roots, both Π_3 and Π_4 must equal zero, which requires a joint F test on $\Pi_3 \cap \Pi_4=0$. There will be no seasonal unit roots if Π_2 and either Π_3 or Π_4 are different from zero, which therefore requires the rejection of both a test for Π_2 and a joint test for Π_3 and Π_4. To find that a series has no unit roots and is therefore stationary, it must be established that each of the Π is different from zero.

If $\Pi_1 = 0$, this is the case of a non-seasonal unit root and the appropriate degree of differencing is Δx_t.

If either Π_3 or Π_4 equals to zero, x_t sequence has an annual cycle so that it replicates itself every fourth period.

The appropriate degree of differencing is $\Delta_4 x_t=(1-L^4)x_t$.

I, CSD, and T indicate the intercept, centered seasonal dummies and trend respectively. They are used as deterministic regressors in the auxiliary regression. The auxiliary regression is further augmented by the lagged values of the dependent variable $(1-L^4)x_t$ for each case. Lag order is determined by minimizing the AIC_c and by examining the Ljung Box Q-statistics in order to obtain no serial correlation in residuals. Hurvich and Tsai (1989) have shown that the small sample properties of Akaike information criteria (AIC) lead to overfitting. Hurvich and Tsai (1989) derived AIC_c, which outperforms AIC in small samples but is asymptotically equivalent to AIC in large samples.

McQuarrie and Tsai(1998) computes the AIC_c as follows: $AIC_{ck}=\ln\hat{\sigma}_k^2+\frac{n+k}{n-k-2}$

where n is sample size adjusted for lagged terms, k is the number of explanatory variables and $\hat{\sigma}_k^2=\frac{RSS}{n}$ where $\hat{\sigma}_k^2$ is the maximum likelihood estimates of σ^2.

RSS is the residual sum of squares from the OLS estimation of auxiliary regression.

Using different deterministic regressors and appropriate augmentation, the best model is selected by choosing the minimum AIC_c among the alternative specifications in the first table.

The second table summarizes coefficient estimates from the selected model for the seasonal unit root tests.
The evaluation of the obtained t-statistics is based on 1 percent and 5 percent significance levels using the critical values provided by HEGY (1990). The sample period for the HEGY test is 1987:Q1-2006:Q4.

Modeling the Wealth Effects on Non-Durables Consumption (GCFINEXLDR)

Table 4.5-a: Lag Length Selection

Lag	Log-likelihood	AIC	SC	HQ
1	846.487	-18.776	**-14.697***	-17.146
2	927.310	-19.613	-14.032	**-17.383***
3	971.553	-19.488	-12.404	-16.657
4	1043.910	**-20.103***	-11.516	-16.671

Notes: Endogenous variables in the VAR system are GCFINEXLDR, GYD, WHO, DEPTSVFX, ISEMCAP, BNKCRED, RER. All variables are in natural logarithm. VAR system is estimated using the sample period of 1987:Q1-2006:Q4. Observations are adjusted on the basis of the lag length included in the VAR system. Unrestricted exogenous variables are constant, centered seasonal dummies, dummies for 1993:Q1, 1993:Q2, 1994:Q1, 1994:Q2, 1998:Q3, 2001:Q1, 2001:Q2 and restricted exogenous variable is trend. The following criteria are used to select the lag order of an unrestricted VAR: Log-likelihood; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion. * Indicates lag order selected by the information criterion.

Table 4.5-b: VAR System Model Comparison using F and χ^2 Tests

Lags	1	2	3	4
1	n.a.			
2	F(49,227) = 2.4192 [0.0000]***	n.a.		
3	F(98,242) = 1.6923 [0.0006]***	F(49,192) = 1.0114 [0.4622]	n.a.	
4	χ2 (147) = 394.85 [0.0000]***	χ2 (98) = 233.20 [0.0000]***	χ2 (49) = 144.71 [0.0000]***	n.a.

Notes: Numbers in [ ] are p-values. *** indicates 1 percent significance level.

Modeling the Wealth Effects on Non-Durables Consumption (GCFINEXLDR)

Table 4.6: VAR System in Levels

	GCFINEXLDR	GYD	WHO	DEPTSVFX	ISEMCAP	BNKCRED	RER
GCFINEXLDR(-1)	0.334130*	0.176673	0.324591	-0.427084	0.575962	0.489777	-0.093574
	(0.19536)	(0.37558)	(0.28511)	(0.35844)	(1.47899)	(0.42819)	(0.37175)
	[1.71031]	[0.47040]	[1.13847]	[-1.19150]	[0.38943]	[1.14384]	[-0.25171]
GCFINEXLDR(-2)	0.154955	0.001268	0.166423	-0.250713	-1.049718	-0.449665	0.087708
	(0.17586)	(0.33809)	(0.25665)	(0.32267)	(1.33136)	(0.38545)	(0.33465)
	[0.88112]	[0.00375]	[0.64844]	[-0.77701]	[-0.78846]	[-1.16661]	[0.26209]
GCFINEXLDR(-3)	-0.089328	-0.146945	-0.166381	0.209034	1.409339	-0.133467	-0.625282*
	(0.16799)	(0.32297)	(0.24517)	(0.30823)	(1.27180)	(0.36820)	(0.31968)
	[-0.53174]	[-0.45498]	[-0.67864]	[0.67817]	[1.10815]	[-0.36248]	[-1.95599]
GCFINEXLDR(-4)	-0.041745	0.129654	0.045453	0.000582	-0.458051	-0.123985	0.428965
	(0.15684)	(0.30152)	(0.22889)	(0.28776)	(1.18735)	(0.34375)	(0.29845)
	[-0.26616]	[0.43000]	[0.19858]	[0.00202]	[-0.38578]	[-0.36068]	[1.43732]
GYD(-1)	0.018240	0.484963***	-0.038352	0.176031	0.746012	-0.115861	-0.089983
	(0.07802)	(0.15000)	(0.11386)	(0.14315)	(0.59066)	(0.17100)	(0.14847)
	[0.23378]	[3.23317]	[-0.33682]	[1.22968]	[1.26301]	[-0.67753]	[-0.60608]
GYD(-2)	-0.121669*	-0.046863	-0.095807	-0.171886	0.601533	-0.055539	0.244970*
	(0.06999)	(0.13455)	(0.10214)	(0.12841)	(0.52983)	(0.15339)	(0.13318)
	[-1.73848]	[-0.34830]	[-0.93802]	[-1.33859]	[1.13534]	[-0.36207]	[1.83945]
GYD(-3)	0.039139	0.019049	0.075625	0.052856	-0.670755	0.370564**	0.003091
	(0.06914)	(0.13292)	(0.10090)	(0.12686)	(0.52342)	(0.15154)	(0.13157)
	[0.56608]	[0.14331]	[0.74949]	[0.41666]	[-1.28147]	[2.44534]	[0.02349]
GYD(-4)	0.003085	0.446605***	-0.005355	-0.02936	0.593537	-0.221633	-0.144995
	(0.06087)	(0.11703)	(0.08884)	(0.11169)	(0.46083)	(0.13342)	(0.11583)
	[0.05068]	[3.81626]	[-0.06028]	[-0.26288]	[1.28796]	[-1.66119]	[-1.25175]
WHO(-1)	0.081579	0.026391	0.306167*	0.233874	0.007808	-0.013962	0.012583
	(0.11751)	(0.22590)	(0.17149)	(0.21560)	(0.88958)	(0.25755)	(0.22360)
	[0.69426]	[0.11682]	[1.78535]	[1.08478]	[0.00878]	[-0.05421]	[0.05628]
WHO(-2)	0.160549*	-0.068648	0.318926**	-0.024865	0.507790	-0.000867	-0.03301
	(0.08118)	(0.15606)	(0.11847)	(0.14894)	(0.61455)	(0.17792)	(0.15447)
	[1.97775]	[-0.43987]	[2.69204]	[-0.16694]	[0.82628]	[-0.00487]	[-0.21370]
WHO(-3)	-0.132232	0.230450	-0.043454	-0.123246	0.465442	-0.273711	-0.259593
	(0.10166)	(0.19544)	(0.14837)	(0.18653)	(0.76963)	(0.22282)	(0.19345)
	[-1.30070]	[1.17910]	[-0.29288]	[-0.66074]	[0.60476]	[-1.22840]	[-1.34189]
WHO(-4)	0.118792	-0.120372	0.056632	-0.065251	-0.289757	0.109390	0.332959
	(0.10688)	(0.20548)	(0.15598)	(0.19610)	(0.80914)	(0.23426)	(0.20338)
	[1.11144]	[-0.58582]	[0.36307]	[-0.33274]	[-0.35810]	[0.46697]	[1.63710]
DEPTSVFX(-1)	-0.045599	-0.210631	-0.041761	0.493736**	-0.768936	0.150944	-0.206504
	(0.09443)	(0.18154)	(0.13781)	(0.17326)	(0.71489)	(0.20697)	(0.17969)
	[-0.48288]	[-1.16023]	[-0.30303]	[2.84969]	[-1.07560]	[0.72930]	[-1.14921]
DEPTSVFX(-2)	-0.118477	0.257396	-0.250679	0.401971*	1.478663	-0.307605	0.098852
	(0.12061)	(0.23187)	(0.17602)	(0.22129)	(0.91307)	(0.26435)	(0.22951)
	[-0.98232]	[1.11008]	[-1.42417]	[1.81648]	[1.61943]	[-1.16364]	[0.43071]
DEPTSVFX(-3)	0.082601	0.017754	0.202240	-0.251399	0.509437	0.047760	0.030193
	(0.11231)	(0.21592)	(0.16391)	(0.20606)	(0.85025)	(0.24616)	(0.21372)
	[0.73547]	[0.08223]	[1.23388]	[-1.22000]	[0.59916]	[0.19402]	[0.14128]
DEPTSVFX(-4)	-0.152874	0.111986	0.054205	-0.158438	-1.914175**	-0.274432	0.080761
	(0.09738)	(0.18721)	(0.14212)	(0.17867)	(0.73721)	(0.21343)	(0.18530)
	[-1.56988]	[0.59818]	[0.38142]	[-0.88677]	[-2.59651]	[-1.28580]	[0.43583]
ISEMCAP(-1)	0.063467***	-0.006158	-0.041886	-0.00325	0.922509***	0.086500*	0.046758
	(0.01973)	(0.03793)	(0.02879)	(0.03620)	(0.14935)	(0.04324)	(0.03754)
	[3.21709]	[-0.16236]	[-1.45483]	[-0.08979]	[6.17679]	[2.00049]	[1.24554]
ISEMCAP(-2)	-0.017372	0.054894	0.045379	0.067701	-0.062609	-0.094747*	-0.06691
	(0.02296)	(0.04414)	(0.03351)	(0.04212)	(0.17381)	(0.05032)	(0.04369)
	[-0.75665]	[1.24369]	[1.35435]	[1.60718]	[-0.36022]	[-1.88289]	[-1.53154]
ISEMCAP(-3)	-0.042078*	-0.104729**	-0.04302	-0.082231*	0.119571	0.009031	0.045105
	(0.02357)	(0.04532)	(0.03440)	(0.04325)	(0.17846)	(0.05167)	(0.04486)
	[-1.78502]	[-2.31093]	[-1.25049]	[-1.90125]	[0.67002]	[0.17479]	[1.00553]
ISEMCAP(-4)	0.001048	0.058340	0.061559**	0.033420	-0.428758***	0.034444	-0.022694
	(0.01992)	(0.03830)	(0.02907)	(0.03655)	(0.15080)	(0.04366)	(0.03791)
	[0.05262]	[1.52341]	[2.11755]	[0.91441]	[-2.84319]	[0.78892]	[-0.59871]

BNKCRED(-1)	0.074109	0.192449	0.044970	0.079957	-0.014254	1.274142***	0.097628
	(0.06042)	(0.11615)	(0.08817)	(0.11085)	(0.45737)	(0.13242)	(0.11496)
	[1.22666]	[1.65693]	[0.51003]	[0.72133]	[-0.03117]	[9.62230]	[0.84921]
BNKCRED(-2)	-0.085268	-0.359357*	0.048675	-0.243203	-0.61142	-0.413724*	0.104893
	(0.09465)	(0.18197)	(0.13814)	(0.17367)	(0.71658)	(0.20746)	(0.18012)
	[-0.90083]	[-1.97480]	[0.35236]	[-1.40039]	[-0.85325]	[-1.99424]	[0.58236]
BNKCRED(-3)	0.014025	0.268323	0.018708	0.188716	0.082292	0.223390	-0.244972
	(0.09968)	(0.19164)	(0.14547)	(0.18289)	(0.75464)	(0.21848)	(0.18968)
	[0.14070]	[1.40017]	[0.12860]	[1.03184]	[0.10905]	[1.02249]	[-1.29148]
BNKCRED(-4)	0.044590	-0.132429	-0.089807	0.094526	0.606952	-0.062773	0.072660
	(0.06910)	(0.13285)	(0.10085)	(0.12678)	(0.52313)	(0.15145)	(0.13149)
	[0.64529]	[-0.99686]	[-0.89053]	[0.74556]	[1.16023]	[-0.41447]	[0.55258]
RER(-1)	0.044971	-0.265034*	-0.051254	0.065956	0.195034	0.057404	0.913187***
	(0.07729)	(0.14858)	(0.11279)	(0.14180)	(0.58510)	(0.16939)	(0.14707)
	[0.58188]	[-1.78374]	[-0.45441]	[0.46513]	[0.33334]	[0.33888]	[6.20925]
RER(-2)	-0.089609	0.397635*	0.037503	0.122650	0.719281	-0.155458	-0.315059*
	(0.09754)	(0.18751)	(0.14234)	(0.17895)	(0.73839)	(0.21377)	(0.18560)
	[-0.91873]	[2.12060]	[0.26347]	[0.68537]	[0.97412]	[-0.72721]	[-1.69751]
RER(-3)	0.045877	-0.110747	0.130384	-0.153796	-0.225129	0.188799	0.250528
	(0.09276)	(0.17833)	(0.13537)	(0.17019)	(0.70223)	(0.20330)	(0.17651)
	[0.49459]	[-0.62103]	[0.96316]	[-0.90367]	[-0.32059]	[0.92865]	[1.41935]
RER(-4)	-0.090969	-0.077973	-0.012948	-0.182793	-0.642609	-0.258529*	0.055953
	(0.06572)	(0.12634)	(0.09591)	(0.12058)	(0.49753)	(0.14404)	(0.12506)
	[-1.38421]	[-0.61714]	[-0.13500]	[-1.51596]	[-1.29161]	[-1.79483]	[0.44742]
C	3.713361**	-1.353831	0.477996	5.050266	-10.20946	5.181691	0.920179
	(1.68865)	(3.24642)	(2.46442)	(3.09829)	(12.7839)	(3.70112)	(3.21333)
	[2.19901]	[-0.41702]	[0.19396]	[1.63002]	[-0.79862]	[1.40003]	[0.28636]
CSeasonal	-0.069843	-0.064272	0.069338	-0.028437	0.474212	-0.004513	-0.071912
	(0.05427)	(0.10433)	(0.07920)	(0.09957)	(0.41084)	(0.11894)	(0.10327)
	[-1.28698]	[-0.61604]	[0.87548]	[-0.28559]	[1.15425]	[-0.03794]	[-0.69636]
CSeasonal_1	0.065134	0.223679	0.125474	-0.106672	0.175440	-0.025055	0.033993
	(0.07108)	(0.13666)	(0.10374)	(0.13042)	(0.53814)	(0.15580)	(0.13527)
	[0.91631]	[1.63678]	[1.20951]	[-0.81789]	[0.32601]	[-0.16082]	[0.25130]
CSeasonal_2	0.240228***	0.149892	0.054650	-0.12046	0.444144	-0.021879	-0.024967
	(0.04950)	(0.09517)	(0.07224)	(0.09083)	(0.37476)	(0.10850)	(0.09420)
	[4.85288]	[1.57503]	[0.75647]	[-1.32628]	[1.18515]	[-0.20165]	[-0.26505]
DUM1993Q1	-0.029433	0.112971*	0.198391***	0.023063	-0.024298	0.079680	-0.003861
	(0.03451)	(0.06635)	(0.05037)	(0.06332)	(0.26128)	(0.07564)	(0.06567)
	[-0.85281]	[1.70261]	[3.93880]	[0.36420]	[-0.09300]	[1.05335]	[-0.05880]
DUM1993Q2	-0.023973	0.014224	-0.202032***	-0.104504	0.309483	0.067176	0.021421
	(0.04583)	(0.08811)	(0.06689)	(0.08409)	(0.34698)	(0.10045)	(0.08721)
	[-0.52305]	[0.16143]	[-3.02045]	[-1.24273]	[0.89195]	[0.66872]	[0.24561]
DUM1994Q1	-0.111086**	0.123529	0.108411	0.154061	-0.40646	-0.046402	-0.256105**
	(0.05004)	(0.09620)	(0.07303)	(0.09181)	(0.37881)	(0.10967)	(0.09522)
	[-2.22003]	[1.28412]	[1.48457]	[1.67807]	[-1.07299]	[-0.42310]	[-2.68970]
DUM1994Q2	-0.027885	-0.121701	-0.00803	-0.062234	-0.403729	-0.230106**	-0.202049**
	(0.04048)	(0.07781)	(0.05907)	(0.07426)	(0.30642)	(0.08871)	(0.07702)
	[-0.68893]	[-1.56400]	[-0.13593]	[-0.83802]	[-1.31756]	[-2.59381]	[-2.62329]
DUM1998Q3	-0.024524	0.052810	-0.030393	0.125289**	-0.382054	-0.203679**	0.003870
	(0.03319)	(0.06381)	(0.04844)	(0.06089)	(0.25126)	(0.07274)	(0.06316)
	[-0.73892]	[0.82766]	[-0.62748]	[2.05747]	[-1.52056]	[-2.79997]	[0.06128]
DUM2001Q1	0.045910	-0.181244***	-0.002364	0.207154***	0.127063	0.046806	-0.097739
	(0.03455)	(0.06643)	(0.05043)	(0.06340)	(0.26159)	(0.07573)	(0.06575)
	[1.32865]	[-2.72836]	[-0.04689]	[3.26749]	[0.48573]	[0.61803]	[-1.48647]
DUM2001Q2	0.027197	0.001243	-0.065012	0.081997	0.779783**	-0.215788**	-0.147643
	(0.04663)	(0.08964)	(0.06805)	(0.08555)	(0.35299)	(0.10220)	(0.08873)
	[0.58329]	[0.01387]	[-0.95539]	[0.95846]	[2.20906]	[-2.11150]	[-1.66401]
TREND	0.005289***	-0.00288	-0.002761	0.008565***	0.027479**	0.005661	0.000255
	(0.00170)	(0.00328)	(0.00249)	(0.00313)	(0.01291)	(0.00374)	(0.00324)
	[3.10190]	[-0.87861]	[-1.10983]	[2.73800]	[2.12900]	[1.51505]	[0.07875]
Sigma (σ)	0.0263637	0.050684	0.0384752	0.0483713	0.199586	0.0577829	0.0501674

Notes: Endogenous variables in the VAR system are GCFINEXLDR, GYD, WHO, DEPTSVFX, ISEMCAP, BNKCRED, RER. All variables are in levels estimated for the period of 1988:Q1-2006:Q4 using 76 observations. Data used for the estimation is for the period of 1987:Q1-2006:Q4. Unrestricted exogenous variables are constant, centered seasonal dummies, dummies for 1993:Q1, 1993:Q2, 1994:Q1, 1994:Q2, 1998:Q3, 2001:Q1, 2001:Q2 and restricted exogenous variable is trend. Standard errors are in ( ) and t-statistics in [ ]. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.7-a: F Tests on Regressors

F Tests on Regressors except Unrestricted:			F(203,216) = 15.7035 [0.0000] ***		
F Tests on Retained Regressors			F(7,30) =		
GCFINEXLDR (-1)	1.03858	[0.426]	GYD (-1)	1.60861	[0.171]
GCFINEXLDR (-2)	0.47526	[0.845]	GYD (-2)	1.66394	[0.156]
GCFINEXLDR (-3)	1.13822	[0.366]	GYD (-3)	1.03793	[0.426]
GCFINEXLDR (-4)	0.60580	[0.746]	GYD (-4)	3.22269	[0.011]**
WHO (-1)	0.99228	[0.456]	DEPTSVFX (-1)	1.91982	[0.101]
WHO (-2)	1.86450	[0.111]	DEPTSVFX (-2)	1.23585	[0.315]
WHO (-3)	1.88254	[0.108]	DEPTSVFX (-3)	0.64887	[0.712]
WHO (-4)	0.92241	[0.503]	DEPTSVFX (-4)	2.20995	[0.062]*
ISEMCAP (-1)	8.64614	[0.000]***	BNKCRED (-1)	13.8463	[0.000]***
ISEMCAP (-2)	1.91510	[0.102]	BNKCRED (-2)	1.12339	[0.375]
ISEMCAP (-3)	2.27780	[0.055]*	BNKCRED (-3)	0.51732	[0.814]
ISEMCAP (-4)	2.45768	[0.041]**	BNKCRED (-4)	0.82169	[0.577]
RER (-1)	8.48408	[0.000]***	Trend	5.41865	[0.000]**
RER (-2)	1.64194	[0.162]	Constant (U)	2.70443	[0.027]**
RER (-3)	0.83429	[0.568]	DUM1993Q1 (U)	3.60403	[0.006]***
RER (-4)	1.25408	[0.306]	DUM1993Q2 (U)	2.20422	[0.062]*
CSeasonal (U)	0.99463	[0.454]	DUM1994Q1 (U)	2.36261	[0.048]**
CSeasonal_1 (U)	0.75985	[0.625]	DUM1994Q2 (U)	3.31440	[0.010]***
CSeasonal_2 (U)	3.16721	[0.012]**	DUM1998Q3 (U)	3.89377	[0.004]***
DUM2001Q1 (U)	5.05175	[0.001]***			
DUM2001Q2 (U)	1.95142	[0.096]*			

Table 4.7-b: F Tests on Significance of Each Variable

Variable	F-test	[Prob.]
GCFINEXLDR	F(28,109) = 0.8016	[0.7452]
GYD	F(28,109) = 2.2718	[0.0014]***
WHO	F(28,109) = 1.4927	[0.0747]*
DEPTSVFX	F(28,109) = 2.0813	[0.0039]***
ISEMCAP	F(28,109) = 2.9078	[0.0000]***
BNKCRED	F(28,109) = 4.6894	[0.0000]***
RER	F(28,109) = 3.9327	[0.0000]***
DUM1993Q1	F(7,30) = 3.6040	[0.0062]***
DUM1993Q2	F(7,30) = 2.2042	[0.0624]*
DUM1994Q1	F(7,30) = 2.3626	[0.0477]**
DUM1994Q2	F(7,30) = 3.3144	[0.0098]***
DUM1998Q3	F(7,30) = 3.8938	[0.0039]***
DUM2001Q1	F(7,30) = 5.0517	[0.0007]***
DUM2001Q2	F(7,30) = 1.9514	[0.0959]*
Constant	F(7,30) = 2.7044	[0.0268]**
CSeasonal	F(21,86) = 2.3205	[0.0035]***
Trend	F(7,30) = 5.4186	[0.0004]***

Table 4.7-c: F Tests for Lag Exclusion

Tests on the Significance of Each Lag		
Lag 1	F(49,156) = 5.3760	[0.0000]**
Lag 2	F(49,156) = 1.4201	[0.0554]*
Lag 3	F(49,156) = 1.0771	[0.3586]
Lag 4	F(49,156) = 1.4556	[0.0439]**
Tests on the Significance of All Lags up to 4		
Lag 1 - 4	F(196,216) = 8.8179	[0.0000]***
Lag 2 - 4	F(147,211) = 1.6921	[0.0002]***
Lag 3 - 4	F(98,198) = 1.2658	[0.0833]*
Lag 4 - 4	F(49,156) = 1.4556	[0.0439]**

Notes: Numbers in [ ] are p-values. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.8-a: Residual Diagnostics for Individual VAR Equations

	Portmanteau (12) Test for Autocorrelation	AR 1-5 Test	Normality Test	Skewness	Skewness (Transformed)	Excess Kurtosis	Excess Kurtosis (Transformed)	ARCH 1-5 Test	Heteroscesdasticity Test
GCFINEXLDR	12.7264	F(5,31) = 1.4922 [0.2208]	$\chi2(2)$ = 3.5547 [0.1691]	-0.4268	-1.5903	2.7153	-0.9944	F(5,26) = 0.0552 [0.9978]	$\chi^2(58)$ = 54.141 [0.6195]
GYD	7.4880	F(5,31) = 0.5637 [0.7270]	$\chi2(2)$ = 0.5890 [0.7449]	0.0397	0.1529	3.0938	0.8071	F(5,26) = 0.2995 [0.9087]	$\chi^2(58)$ = 57.425 [0.4966]
WHO	15.2469	F(5,31) = 1.4769 [0.2257]	$\chi2(2)$ = 1.6212 [0.4446]	0.3182	1.2021	4.0541	2.1204	F(5,26) = 0.3092 [0.9029]	$\chi^2(58)$ = 52.568 [0.6767]
DEPTSVFX	11.8083	F(5,31) = 1.3306 [0.2773]	$\chi2(2)$ = 2.1153 [0.3473]	0.4649	1.7230	2.6019	-1.4874	F(5,26) = 0.5246 [0.7555]	$\chi^2(58)$ = 63.392 [0.2921]
ISEMCAP	9.7015	F(5,31) = 0.9431 [0.4672]	$\chi2(2)$ = 0.0061 [0.9970]	0.0314	0.1207	3.0365	0.6910	F(5,26) = 0.2754 [0.9224]	$\chi^2(58)$ = 66.951 [0.1968]
BNKCRED	10.2574	F(5,31) = 0.5579 [0.7313]	$\chi2(2)$ = 2.5800 [0.2753]	0.1106	0.4248	3.9034	2.2518	F(5,26) = 0.5728 [0.7202]	$\chi^2(58)$ = 63.208 [0.2976]
RER	9.3073	F(5,31) = 1.9306 [0.1176]	$\chi2(2)$ = 0.5117 [0.7743]	-0.1424	-0.5460	2.9311	0.3681	F(5,26) = 1.4375 [0.2442]	$\chi^2(58)$ = 67.539 [0.1834]

Table 4.8-b: Residual Diagnostics and Vector Misspecification Tests for VAR System

Vector Portmanteau Statistics (12)	595.816	
Vector AR 1-5 Test	F(196,25) = 1.9635	[0.0241]**
Vector Normality Test for Residuals	χ^2 (14) = 21.492	[0.0897]*
Vector Heteroscedasticity Test	$\chi2$ (1902) = 1923	[0.3769]

Table 4.8-c Correlation of Residuals (Standard Deviations on Diagonal)

	GCFINEXLDR	GYD	WHO	DEPTSVFX	ISEMCAP	BNKCRED	RER
GCFINEXLDR	0.02636	0.43047	-0.07151	-0.34533	0.22731	-0.15348	0.21929
GYD	0.43047	0.05068	-0.16201	0.07764	0.30099	-0.01819	0.03439
WHO	-0.07151	-0.16201	0.03848	0.05396	-0.27464	0.13969	-0.40307
DEPTSVFX	-0.34533	0.07764	0.05396	0.04837	0.16496	0.28870	-0.47738
ISEMCAP	0.22731	0.30099	-0.27464	0.16496	0.19959	-0.27560	0.16614
BNKCRED	-0.15348	-0.01819	0.13969	0.28870	-0.27560	0.05778	-0.26814
RER	0.21929	0.03439	-0.40307	-0.47738	0.16614	-0.26814	0.05017

Modeling the Wealth Effects on Non-Durables Consumption (GCFINEXLDR)

Table 4.9: Johansen Cointegration Test

Hypothesized No. of CE(s)	Alternative	Eigenvalue	Log-likelihood for Rank	λ_{trace} Statistic	Prob.
r=0 *	**r >0**	**0.565735**	960.9232	**165.9730**	**0.004**
r ≤ 1	r > 1	0.406988	992.619	102.5814	0.304
r ≤ 2	r >2	0.266866	1012.476	62.86829	0.772
r ≤ 3	r > 3	0.204543	1024.272	39.27583	0.868
r ≤ 4	r > 4	0.160977	1032.968	21.88412	0.911
r ≤ 5	r > 5	0.087530	1039.637	8.544777	0.965
r ≤ 6	r > 6	0.020616	1043.118	1.583157	0.977

Hypothesized No. of CE(s)	Alternative	Eigenvalue	Log-likelihood for Rank	λ_{max} Statistic	Prob.
r=0 *	**r =1**	**0.565735**	960.9232	**63.39163**	**0.001**
r =1	r =2	0.406988	992.619	39.71306	0.154
r =2	r =3	0.266866	1012.476	23.59247	0.768
r =3	r =4	0.204543	1024.272	17.39171	0.834
r =4	r =5	0.160977	1032.968	13.33934	0.778
r =5	r =6	0.087530	1039.637	6.961621	0.893
r =6	r = 7	0.020616	1043.118	1.583157	0.978

Notes: λ_{max} and λ_{trace} test indicates one cointegrating equation at the 5 percent significance level.

The trace statistic tests the null hypothesis of r cointegrating relations against the alternative of n cointegrating relations, where n is the number of endogenous variables. The alternative hypothesis corresponds to the case where none of the series has a unit root and a stationary VAR may be specified in terms of the levels of all of the series. The maximum eigenvalue statistic tests the null hypothesis of r cointegrating relations against the alternative of *r+1* cointegrating relations.

* denotes rejection of the hypothesis at the 5 percent significance level. Adjusted sample has 76 observations during the period of 1988:Q1-2006:Q4. Endogenous variables are GCFINEXLDR, GYD, WHO, DEPTSVFX, ISEMCAP, BNKCRED, RER. Linear deterministic trend is restricted to the co-integrating vector. Cointegration test is based on the VAR system in levels, which has 4 lags of each endogenous variable. Exogenous variables are constant, centered seasonal dummies, dummies for 1993:Q1, 1993:Q2, 1994:Q1, 1994:Q2, 1998:Q3, 2001:Q1 and 2001:Q2. The critical values are taken from Osterwald-Lenum (1992).

Modeling the Wealth Effects on Non-Durables Consumption (GCFINEXLDR)

Table 4.10: Unconditional Vector Error Correction Model

Cointegrating Eq:	GYD	WHO	DEPTSVFX	ISEMCAP	BNKCRED	RER	TREND
GCFINEXLDR(-1)	-0.013107	-0.264410**	0.572269***	-0.004492	-0.114753***	0.171781***	-0.011589***
	(0.06981)	(0.09133)	(0.06877)	(0.01273)	(0.02497)	(0.04448)	(0.00123)
	[-0.18774]	[-2.89512]	[8.32200]	[-0.35297]	[-4.59502]	[3.86159]	[-9.41609]

	ΔGCFINEXLDR	ΔGYD	ΔWHO	ΔDEPTSVFX	ΔISEMCAP	ΔBNKCRED	ΔRER
CointEq.(-1)	-0.473125***	0.279081	0.247395	-0.693957**	-2.15194*	-0.41765	-0.021226
	(0.14219)	(0.27649)	(0.22437)	(0.26086)	(1.18993)	(0.31993)	(0.25912)
	[-3.32749]	[1.00935]	[1.10264]	[-2.66022]	[-1.80845]	[-1.30544]	[-0.08192]
ΔGCFINEXLDR (-1)	-0.057269	0.032314	-0.052942	0.043598	3.125786**	0.713324**	-0.030391
	(0.13597)	(0.26441)	(0.21456)	(0.24946)	(1.13791)	(0.30594)	(0.24779)
	[-0.42119]	[0.12221]	[-0.24675]	[0.17477]	[2.74695]	[2.33155]	[-0.12265]
ΔGCFINEXLDR (-2)	0.144184	0.031833	0.135163	-0.287381	0.638379	0.368897	0.088404
	(0.14052)	(0.27326)	(0.22174)	(0.25782)	(1.17603)	(0.31619)	(0.25609)
	[1.02604]	[0.11649]	[0.60954]	[-1.11468]	[0.54283]	[1.16669]	[0.34521]
ΔGCFINEXLDR (-3)	0.013387	-0.158225	-0.016662	0.003733	1.362944	0.252417	-0.511007**
	(0.12930)	(0.25143)	(0.20403)	(0.23722)	(1.08206)	(0.29093)	(0.23563)
	[0.10354]	[-0.62930]	[-0.08167]	[0.01574]	[1.25958]	[0.86763]	[-2.16873]
ΔGYD (-1)	0.034809	-0.462470***	-0.014081	0.180178	0.212215	-0.142272	-0.0628
	(0.07070)	(0.13748)	(0.11156)	(0.12971)	(0.59167)	(0.15908)	(0.12884)
	[0.49235]	[-3.36387]	[-0.12622]	[1.38908]	[0.35867]	[-0.89435]	[-0.48742]
ΔGYD (-2)	-0.065274	-0.477506***	-0.135791	-0.014856	0.790070	-0.221954*	0.170274
	(0.05846)	(0.11367)	(0.09224)	(0.10725)	(0.48921)	(0.13153)	(0.10653)
	[-1.11665]	[-4.20072]	[-1.47212]	[-0.13852]	[1.61500]	[-1.68747]	[1.59841]
ΔGYD (-3)	-0.014562	-0.432324***	-0.050961	0.034628	0.035146	0.182404	0.157387
	(0.05330)	(0.10365)	(0.08411)	(0.09779)	(0.44606)	(0.11993)	(0.09713)
	[-0.27321]	[-4.17113]	[-0.60591]	[0.35412]	[0.07879]	[1.52093]	[1.62034]
ΔWHO (-1)	-0.090188	-0.005991	-0.290151**	0.175278	-1.038153	-0.002572	-0.056301
	(0.07797)	(0.15161)	(0.12303)	(0.14304)	(0.65248)	(0.17543)	(0.14208)
	[-1.15676]	[-0.03952]	[-2.35841]	[1.22536]	[-1.59108]	[-0.01466]	[-0.39626]
ΔWHO (-2)	0.062524	-0.092311	0.171081	0.195657	-0.573173	0.036131	-0.118809
	(0.08239)	(0.16022)	(0.13002)	(0.15117)	(0.68955)	(0.18540)	(0.15015)
	[0.75883]	[-0.57613]	[1.31583]	[1.29431]	[-0.83123]	[0.19488]	[-0.79125]
ΔWHO (-3)	-0.077739	0.142471	0.129388	0.093197	0.189920	-0.261589	-0.396478**
	(0.08981)	(0.17465)	(0.14172)	(0.16477)	(0.75161)	(0.20208)	(0.16367)
	[-0.86559]	[0.81577]	[0.91298]	[0.56561]	[0.25268]	[-1.29447]	[-2.42245]
ΔDEPTSVFX (-1)	0.207143**	-0.341417*	-0.165046	-0.038361	0.562595	0.382250**	-0.19239
	(0.08560)	(0.16646)	(0.13508)	(0.15705)	(0.71638)	(0.19261)	(0.15600)
	[2.41987]	[-2.05106]	[-1.22187]	[-0.24426]	[0.78533]	[1.98459]	[-1.23330]
ΔDEPTSVFX (-2)	0.055292	-0.120798	-0.320354*	0.458531**	1.555555*	0.067703	-0.088268
	(0.10492)	(0.20403)	(0.16556)	(0.19250)	(0.87808)	(0.23608)	(0.19121)
	[0.52698]	[-0.59206]	[-1.93492]	[2.38201]	[1.77155]	[0.28678]	[-0.46164]
ΔDEPTSVFX (-3)	0.154309*	-0.108917	-0.11882	0.154086	2.202667**	0.139758	-0.065981
	(0.08880)	(0.17267)	(0.14012)	(0.16291)	(0.74311)	(0.19980)	(0.16182)
	[1.73781]	[-0.63078]	[-0.84801]	[0.94584]	[2.96412]	[0.69950]	[-0.40775]
ΔISEMCAP (-1)	0.055003***	-0.016838	-0.034939	-0.002863	0.123240	0.069406*	0.038500
	(0.01682)	(0.03270)	(0.02654)	(0.03085)	(0.14074)	(0.03784)	(0.03065)
	[3.27061]	[-0.51488]	[-1.31659]	[-0.09279]	[0.87565]	[1.83416]	[1.25621]
ΔISEMCAP (-2)	0.035878*	0.038655	0.027595	0.075679**	0.067201	-0.03125	-0.027574
	(0.01894)	(0.03684)	(0.02989)	(0.03476)	(0.15854)	(0.04263)	(0.03452)
	[1.89387]	[1.04929]	[0.92312]	[2.17741]	[0.42387]	[-0.73312]	[-0.79872]
ΔISEMCAP (-3)	-0.010638	-0.066154*	-0.028799	-0.005371	0.277283*	-0.013501	0.016720
	(0.01730)	(0.03363)	(0.02729)	(0.03173)	(0.14475)	(0.03892)	(0.03152)
	[-0.61502]	[-1.96685]	[-1.05516]	[-0.16924]	[1.91560]	[-0.34691]	[0.53045]
ΔBNKCRED (-1)	-0.000684	0.205805*	0.049651	0.009144	-0.134322	0.304353**	0.063708
	(0.05776)	(0.11231)	(0.09114)	(0.10597)	(0.48336)	(0.12996)	(0.10525)
	[-0.01184]	[1.83240]	[0.54478]	[0.08629]	[-0.27789]	[2.34193]	[0.60528]
ΔBNKCRED (-2)	-0.085314	-0.169751	0.088129	-0.250565**	-0.667887	-0.131888	0.168340
	(0.06404)	(0.12453)	(0.10105)	(0.11749)	(0.53592)	(0.14409)	(0.11670)
	[-1.33225]	[-1.36316]	[0.87214]	[-2.13270]	[-1.24625]	[-0.91532]	[1.44251]
ΔBNKCRED (-3)	-0.082953	0.108516	0.134910	-0.025975	-0.504237	0.116583	-0.074548
	(0.06307)	(0.12265)	(0.09953)	(0.11572)	(0.52784)	(0.14192)	(0.11494)
	[-1.31519]	[0.88476]	[1.35551]	[-0.22447]	[-0.95528]	[0.82148]	[-0.64858]

ΔRER (-1)	0.106646	-0.302175*	-0.066591	0.242468*	0.205623	0.182004	-0.037063
	(0.07440)	(0.14467)	(0.11739)	(0.13649)	(0.62260)	(0.16740)	(0.13558)
	[1.43350]	[-2.08874]	[-0.56725]	[1.77644]	[0.33026]	[1.08727]	[-0.27338]
ΔRER (-2)	0.025253	0.122297	-0.026966	0.373650***	1.220952*	-0.040791	-0.353519**
	(0.07530)	(0.14643)	(0.11882)	(0.13815)	(0.63017)	(0.16943)	(0.13722)
	[0.33536]	[0.83521]	[-0.22695]	[2.70467]	[1.93750]	[-0.24076]	[-2.57623]
ΔRER (-3)	0.076352	0.016737	0.048594	0.179011	1.028254**	0.208337	-0.093739
	(0.05873)	(0.11420)	(0.09267)	(0.10774)	(0.49147)	(0.13214)	(0.10702)
	[1.30015]	[0.14656]	[0.52439]	[1.66148]	[2.09222]	[1.57667]	[-0.87590]
C	3.24427***	-1.90438	-1.69116	4.76496***	14.717*	2.87246	0.164163
	(0.9735)	(1.893)	(1.536)	(1.786)	(8.147)	(2.190)	(1.774)
	[3.33]	[-1.01]	[-1.10]	[2.67]	[1.81]	[1.31]	[0.0925]
CSeasonal	-0.049099	-0.04329	0.068690	-0.05266	0.625822	-0.068339	-0.063176
	(0.05210)	(0.10132)	(0.08222)	(0.09559)	(0.43605)	(0.11724)	(0.09495)
	[-0.94231]	[-0.42726]	[0.83545]	[-0.55088]	[1.43520]	[-0.58290]	[-0.66535]
CSeasonal_1	0.120736*	0.284648**	0.095640	-0.184549	0.272775	-0.105321	0.056584
	(0.06546)	(0.12730)	(0.10330)	(0.12010)	(0.54785)	(0.14730)	(0.11930)
	[1.84431]	[2.23604]	[0.92585]	[-1.53658]	[0.49790]	[-0.71502]	[0.47430]
CSeasonal_2	0.279765***	0.192424**	0.020335	-0.185818**	0.637883*	-0.06481	-0.022586
	(0.04264)	(0.08291)	(0.06728)	(0.07822)	(0.35682)	(0.09594)	(0.07770)
	[6.56167]	[2.32087]	[0.30224]	[-2.37549]	[1.78771]	[-0.67556]	[-0.29069]
DUM1993Q1	-0.019019	0.128881**	0.174123***	0.011157	0.131638	0.030465	-0.011444
	(0.02946)	(0.05728)	(0.04648)	(0.05404)	(0.24652)	(0.06628)	(0.05368)
	[-0.64566]	[2.24999]	[3.74606]	[0.20645]	[0.53399]	[0.45965]	[-0.21319]
DUM1993Q2	-0.004471	0.047147	-0.295215***	-0.144609**	0.573121*	-0.011145	0.028476
	(0.03437)	(0.06684)	(0.05423)	(0.06306)	(0.28764)	(0.07734)	(0.06263)
	[-0.13009]	[0.70543]	[-5.44327]	[-2.29329]	[1.99252]	[-0.14412]	[0.45463]
DUM1994Q1	-0.106855**	0.131329	0.137141*	0.174071**	-0.281713	-0.114774	-0.278375***
	(0.04163)	(0.08096)	(0.06570)	(0.07638)	(0.34842)	(0.09368)	(0.07587)
	[-2.56660]	[1.62217]	[2.08752]	[2.27894]	[-0.80855]	[-1.22520]	[-3.66909]
DUM1994Q2	-0.032882	-0.122858	-0.059411	-0.072522	-0.310698	-0.226203**	-0.196578***
	(0.03781)	(0.07352)	(0.05966)	(0.06936)	(0.31639)	(0.08507)	(0.06890)
	[-0.86975]	[-1.67113]	[-0.99586]	[-1.04556]	[-0.98200]	[-2.65911]	[-2.85323]
DUM1998Q3	-0.040815	0.040686	-0.004588	0.161695***	-0.454529*	-0.198242***	0.009532
	(0.02929)	(0.05695)	(0.04621)	(0.05373)	(0.24510)	(0.06590)	(0.05337)
	[-1.39365]	[0.71440]	[-0.09927]	[3.00931]	[-1.85449]	[-3.00832]	[0.17860]
DUM2001Q1	0.045409	-0.205504***	0.017800	0.205748***	-0.154531	0.042336	-0.101997*
	(0.03078)	(0.05986)	(0.04857)	(0.05647)	(0.25760)	(0.06926)	(0.05609)
	[1.47525]	[-3.43334]	[0.36648]	[3.64338]	[-0.59990]	[0.61128]	[-1.81835]
DUM2001Q2	0.028443	-0.020011	-0.048187	0.079225	0.493002	-0.231455**	-0.143804*
	(0.04369)	(0.08496)	(0.06894)	(0.08016)	(0.36563)	(0.09831)	(0.07962)
	[0.65103]	[-0.23554]	[-0.69896]	[0.98838]	[1.34836]	[-2.35445]	[-1.80617]
Sigma(σ)	0.0259129	0.0503899	0.0408899	0.0475415	0.21686	0.0583061	0.0472226

Notes: The endogenous variables in the vector error correction model are ΔGCFINEXLDR, ΔGYD, ΔWHO, ΔDEPTSVFX, ΔISEMCAP, ΔBNKCRED, ΔRER. Unrestricted exogenous variables are constant, centered seasonal dummies, dummies for 1993:Q1, 1993:Q2, 1994:Q1, 1994:Q2, 1998:Q3, 2001:Q1, 2001:Q2 and restricted exogenous variable is trend. Standard errors are in ( ) and t-statistics in [ ]. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.11-a: F Tests on Regressors

F Tests on Regressors except Unrestricted:	F(161,260) = 2.49208 [0.0000]***
F Tests on Retained Regressors	F(7,37) =

ΔGCFINEXLDR (-1)	2.60807	[0.027]**	ΔGYD (-1)	3.58845	[0.005]***
ΔGCFINEXLDR (-2)	0.82315	[0.575]	ΔGYD (-2)	3.86700	[0.003]***
ΔGCFINEXLDR (-3)	1.48871	[0.202]	ΔGYD (-3)	4.27157	[0.002]***
ΔWHO (-1)	2.00547	[0.081]*	ΔDEPTSVFX (-1)	4.64782	[0.001]***
ΔWHO (-2)	0.99275	[0.452]	ΔDEPTSVFX (-2)	2.36992	[0.042]**
ΔWHO (-3)	1.63844	[0.155]	ΔDEPTSVFX (-3)	2.73676	[0.022]**
ΔISEMCAP (-1)	3.84277	[0.003]***	ΔBNKCRED (-1)	1.58436	[0.171]
ΔISEMCAP (-2)	2.02369	[0.078]*	ΔBNKCRED (-2)	1.62453	[0.159]
ΔISEMCAP (-3)	1.33622	[0.261]	ΔBNKCRED (-3)	1.21679	[0.318]
ΔRER (-1)	3.45533	[0.006]***	CointEq. (-1)	6.88592	[0.000]***
ΔRER (-2)	2.06981	[0.072]*	Constant (U)	6.90811	[0.000]***
ΔRER (-3)	1.98149	[0.084]*	DUM1993Q1(U)	4.01047	[0.002]***
Cseasonal (U)	1.03000	[0.427]	DUM1993Q2 (U)	5.64909	[0.000]***
CSeasonal_1 (U)	1.3150	[0.271]	DUM1994Q1(U)	4.54172	[0.001]***
CSeasonal_2 (U)	6.08547	[0.000]***	DUM1994Q2 (U)	4.30206	[0.001]***
DUM2001Q1(U)	8.11648	[0.000]***	DUM1998Q3 (U)	5.55515	[0.000]***
DUM2001Q2 (U)	2.08899	[0.069]*			

Table 4.11-b: F Tests on Significance of Each Variable

Variable	F-Test	[Prob.]
ΔGCFINEXLDR	F(21,106) = 1.4886	[0.0970]*
ΔGYD	F(21,106) = 2.7438	[0.0004]***
ΔWHO	F(21,106) = 2.2668	[0.0035]***
ΔDEPTSVFX	F(21,106) = 2.5036	[0.0012]***
ΔISEMCAP	F(21,106) = 2.3614	[0.0022]***
ΔBNKCRED	F(21,106) = 1.5037	[0.0915]*
ΔRER	F(21,106) = 2.1333	[0.0064]***
CointEq.	F(7,37) = 6.8859	[0.0000]***
DUM1993Q1	F(7,37) = 4.0105	[0.0023]***
DUM1993Q2	F(7,37) = 5.6491	[0.0002]***
DUM1994Q1	F(7,37) = 4.5417	[0.0010]***
DUM1994Q2	F(7,37) = 4.3021	[0.0014]***
DUM1998Q3	F(7,37) = 5.5552	[0.0002]***
DUM2001Q1	F(7,37) = 8.1165	[0.0000]***
DUM2001Q2	F(7,37) = 2.089	[0.0693]*
Constant	F(7,37) = 6.9081	[0.0000]***
CSeasonal	F(21,106) = 3.3079	[0.0000]***

Table 4.11-c: Lag Exclusion Tests

Tests on the Significance of Each Lag		
Lag 1	F(56,204)=2.7754	[0.0000]***
Lag 2	F(49,192)=1.7859	[0.0031]***
Lag 3	F(49,192)=1.7912	[0.0029]***

Tests on the Significance of All Lags up to 3		
Lag 1 - 3	F(154,259) = 2.4236	[0.0000]***
Lag 2 - 3	F(98,242) = 1.7198	[0.0004]***
Lag 3 - 3	F(49,192) =1.7912	[0.0029]***

Notes: Numbers in [ ] are p-values. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.12-a: Residual Diagnostics for Individual Equations in Unconditional VEC Model

	Portmanteau (12) Test for Autocorrelation	AR 1-5 test	Normality Test	Skewness	Skewness (Transformed)	Excess Kurtosis	Excess Kurtosis (Transformed)	ARCH 1-5 Test	Heteroscedasticity Test
ΔGCFINEXLDR	7.5602	F(5,38) = 1.0108 [0.4248]	$\chi^2(2) = 1.4863$ [0.4756]	-0.2379	-0.9062	3.1652	0.6859	F(5,33) = 0.2802 [0.9207]	χ2 (44) = 41.373 [0.5849]
ΔGYD	5.32496	F(5,38) = 0.5001 [0.7742]	$\chi^2(2) = 1.3801$ [0.5015]	-0.2536	-0.9644	3.3736	1.0666	F(5,33) = 0.8573 [0.5198]	χ2 (44) = 48.423 [0.2991]
ΔWHO	15.8204	F(5,38) = 0.9613 [0.4536]	$\chi^2(2) = 2.2243$ [0.3289]	0.2853	1.0816	3.9182	1.9776	F(5,33) = 0.2642 [0.9294]	χ2 (44) = 33.543 [0.8739]
ΔDEPTSVFX	9.52663	F(5,38) = 0.8893 [0.4979]	$\chi^2(2) = 2.0080$ [0.3664]	0.3221	1.2165	2.1619	-2.1403	F(5,33) = 0.2370 [0.9433]	χ2 (44) = 45.564 [0.4068]
ΔISEMCAP	9.90703	F(5,38) = 1.1557 [0.3486]	$\chi^2(2) = 3.5659$ [0.1681]	0.4689	1.7367	2.9799	-0.5397	F(5,33) = 0.3919 [0.8508]	χ2 (44) = 49.006 [0.2792]
ΔBNKCRED	6.47919	F(5,38) = 0.1809 [0.9681]	$\chi^2(2) = 3.7456$ [0.1537]	0.1968	0.7518	3.6005	1.6096	F(5,33) = 1.3346 [0.2741]	χ2 (44) = 44.194 [0.4635]
ΔRER	9.69556	F(5,38) = 1.4425 [0.2315]	$\chi^2(2) = 0.8896$ [0.6409]	-0.3749	-1.4070	2.9612	-0.1764	F(5,33) = 2.5573 [0.0462]**	χ2 (44) = 52.411 [0.1800]

Table 4.12-b: Residual Diagnostics and Vector Misspecification Tests for Unconditional VEC System

Vector Portmanteau	545.015	
Vector AR 1-5 Test	F(245,26) = 1.6919	[0.0552]*
Vector Normality Test for	$\chi^2(14)$ = 22.975	[0.0607]*
Vector Heteroscedasticity	χ2 (1232) = 1232.5	[0.4906]

Table 4.12-c: Correlation of Residuals (Standard Deviations on Diagonal)

	ΔGCFINEXLDR	ΔGYD	ΔWHO	ΔDEPTSVFX	ΔISEMCAP	ΔBNKCRED	ΔRER
ΔGCFINEXLDR	0.02591	0.45641	-0.08357	-0.37982	0.18918	-0.22690	0.23427
ΔGYD	0.45641	0.05039	-0.15963	0.08267	0.25684	-0.05200	0.07965
ΔWHO	-0.08357	-0.15963	0.04089	0.13227	-0.29590	0.16294	-0.41308
ΔDEPTSVFX	-0.37982	0.08267	0.13227	0.04754	0.07925	0.32330	-0.45607
ΔISEMCAP	0.18918	0.25684	-0.29590	0.07925	0.21686	-0.29205	0.16321
ΔBNKCRED	-0.22690	-0.05200	0.16294	0.32330	-0.29205	0.05831	-0.28027
ΔRER	0.23427	0.07965	-0.41308	-0.45607	0.16321	-0.28027	0.04722

Modeling the Wealth Effects on Non-Durables Consumption (GCFINEXLDR)

Table 4.13-a: Restrictions on β Coefficients and Weak Exogeneity Tests on α Adjustment Coefficients

Ho: β_i =0	LR Test of Restrictions	Probability	Ho: α_i =0	LR Test of Restrictions	Probability
GCFINEXLDR	$\chi^2(1)$= 16.973	[0.0000]***	GCFINEXLDR	$\chi^2(1)$= 14.1089	[0.0002] ***
GYD	$\chi 2(1)$= 0.0342	[0.8533]	GYD	$\chi^2(1)$= 1.4939	[0.2216]
WHO	$\chi^2(1)$= 7.7772	[0.0053]***	WHO	$\chi^2(1)$ = 1.4262	[0.2324]
DEPTSVFX	$\chi^2(1)$= 21.150	[0.0000]***	DEPTSVFX	$\chi^2(1)$ = 8.8699	[0.0029]***
ISEMCAP	$\chi^2(1)$= 0.0493	[0.8243]	ISEMCAP	$\chi^2(1)$= 3.1753	[0.0747]*
BNKCRED	$\chi^2(1)$= 12.118	[0.0005] ***	BNKCRED	$\chi^2(1)$= 2.3832	[0.1226]
RER	$\chi^2(1)$= 10.979	[0.0009] ***	RER	$\chi^2(1)$= 0.0112	[0.9159]

Joint Restrictions on Coefficients	LR Test of Restrictions	Probability
Ho: β GYD =β ISEMCAP = 0 *α GYD= α WHO = α BNKCRED = α RER = 0*	$\chi^2(6)$ = 6.350357	[0.3851]

Table 4.13-b: Multivariate Stationarity Test

Ho: *Series is Stationary*	Restriction R*β'=0	LR Test of Restrictions	Probability
GCFINEXLDR	R=[1 0 0 0 0 0 0]	$\chi^2(6)$= 47.16067	[0.000]***
GYD	R= [0 1 0 0 0 0 0]	$\chi 2(6)$= 47.54620	[0.000]***
WHO	R= [0 0 1 0 0 0 0]	$\chi^2(6)$= 48.92304	[0.000]***
DEPTSVFX	R= [0 0 0 1 0 0 0]	$\chi^2(6)$= 38.22964	[0.000]***
ISEMCAP	R= [0 0 0 0 1 0 0]	$\chi^2(6)$= 43.72644	[0.000]***
BNKCRED	R= [0 0 0 0 0 1 0]	$\chi^2(6)$= 43.76246	[0.000]***
RER	R= [0 0 0 0 0 0 1]	$\chi^2(6)$= 47.93471	[0.000]***

Modeling the Wealth Effects on Non-Durables Consumption (GCFINEXLDR)
Table 4.14: Conditional Vector Error Correction Model

Restrictions on Coefficients			LR Test of Restrictions		[Prob.]		
Ho: β GYD =β ISEMCAP = 0 *α GYD= α WHO = α BNKCRED = α RER = 0*			$\chi^2(6) = 6.350357$		[0.3851]		
Cointegrating Equation:							
GCFINEXLDR	WHO	DEPTSVFX	BNKCRED	RER	TREND		
1	-0.27216*** (0.07201) [-3.7796]	0.59423*** (0.07227) [8.2222]	-0.12750*** (0.02533) [-5.0334]	0.15953*** (0.04714) [3.3842]	-0.011928*** (0.00110) [-10.8220]		
	ΔGCFINEXLDR	ΔGYD	ΔWHO	ΔDEPTSVFX	ΔISEMCAP	ΔBNKCRED	ΔRER
CointEq.(-1)	-0.541551*** (0.1138) [-4.76]			-0.615194*** (0.2093) [-2.94]	-2.38809** (1.006) [-2.37]		
ΔGCFINEXLDR (-1)	-0.0706817 (0.132) [-0.536]	0.0745809 (0.2611) [0.286]	-0.0154863 (0.2124) [-0.0729]	0.00468548 (0.2446) [0.0192]	3.05669*** (1.112) [2.75]	0.650125** (0.3045) [2.14]	-0.0336109 (0.2419) [-0.139]
ΔGCFINEXLDR (-2)	0.128265 (0.1376) [0.932]	0.0161446 (0.2729) [0.0592]	0.121248 (0.2219) [0.546]	-0.296635 (0.2551) [-1.16]	0.571862 (1.159) [0.493]	0.392425 (0.3182) [1.23]	0.0895815 (0.2528) [0.354]
ΔGCFINEXLDR (-3)	0.0218603 (0.1261) [0.173]	-0.120865 (0.2487) [-0.486]	0.0164428 (0.2023) [0.0813]	-0.00760658 (0.2337) [-0.0326]	1.39157 (1.063) [1.31]	0.196497 (0.2901) [0.677]	-0.51384** (0.2304) [-2.23]
ΔGYD (-1)	0.0566333 (0.06745) [0.84]	-0.400993*** (0.1233) [-3.25]	0.0404025 (0.1003) [0.403]	0.170506 (0.1249) [1.37]	0.294104 (0.5725) [0.514]	-0.234283 (0.1438) [-1.63]	-0.0674656 (0.1142) [-0.591]
ΔGYD (-2)	-0.0506082 (0.05614) [-0.902]	-0.434403*** (0.1054) [-4.12]	-0.0975944 (0.0857) [-1.14]	-0.0223611 (0.104) [-0.215]	0.844709* (0.4753) [1.78]	-0.286461** (0.1229) [-2.33]	0.167001* (0.09761) [1.71]
ΔGYD (-3)	-0.0182203 (0.05209) [-0.35]	-0.443464*** (0.1031) [-4.3]	-0.060836 (0.08383) [-0.726]	0.0367216 (0.09655) [0.38]	0.0216211 (0.4389) [0.0493]	0.199069 (0.1202) [1.66]	0.158236 (0.09548) [1.66]
ΔWHO (-1)	-0.108568 (0.07648) [-1.42]	-0.0116421 (0.1515) [-0.077]	-0.295186** (0.1232) [-2.4]	0.157582 (0.1418) [1.11]	-1.11767* (0.6443) [-1.73]	0.00590124 (0.1767) [0.0335]	-0.0558695 (0.1404) [-0.398]
ΔWHO (-2)	0.0355226 (0.08082) [0.440]	-0.0914325 (0.1603) [-0.571]	0.17182 (0.1303) [1.32]	0.164526 (0.1498) [1.1]	-0.692099 (0.6808) [-1.02]	0.0348299 (0.1869) [0.186]	-0.118877 (0.1484) [-0.801]
ΔWHO (-3)	-0.110309 (0.08835) [-1.25]	0.134131 (0.1745) [0.769]	0.121963 (0.1419) [0.86]	0.060887 (0.1638) [0.372]	0.0485444 (0.7446) [0.0652]	-0.249101 (0.2035) [-1.22]	-0.395833** (0.1616) [-2.45]
ΔDEPTSVFX (-1)	0.226924*** (0.08138) [2.79]	-0.269649* (0.1505) [-1.79]	-0.101416 (0.1224) [-0.828]	-0.0561289 (0.1507) [-0.372]	0.632881 (0.6899) [0.917]	0.274851 (0.1755) [1.57]	-0.197856 (0.1394) [-1.42]
ΔDEPTSVFX (-2)	0.087326 (0.09613) [0.908]	0.0060143 (0.1608) [0.0374]	-0.207952 (0.1308) [-1.59]	0.423817** (0.1778) [2.38]	1.66719** (0.8214) [2.03]	-0.12207 (0.1875) [-0.651]	-0.097908 (0.149) [-0.657]
ΔDEPTSVFX (-3)	0.170779** (0.08437) [2.02]	-0.037355 (0.1575) [-0.237]	-0.0554193 (0.1281) [-0.433]	0.132673 (0.1563) [0.849]	2.25870*** (0.7148) [3.16]	0.0326695 (0.1836) [0.178]	-0.0714139 (0.1459) [-0.49]
ΔISEMCAP (-1)	0.0581937*** (0.01629) [3.57]	-0.00757272 (0.0314) [-0.241]	-0.0267268 (0.02553) [-1.05]	-0.0044345 (0.03018) [-0.147]	0.13515 (0.1376) [0.982]	0.0555386 (0.03661) [1.52]	0.0377955 (0.02908) [1.3]
ΔISEMCAP (-2)	0.0407118** (0.01742) [2.34]	0.0603323** (0.02994) [2.02]	0.0468084* (0.02435) [1.92]	0.0690156** (0.03222) [2.14]	0.0834485 (0.1485) [0.562]	-0.0636916* (0.03491) [-1.82]	-0.0292218 (0.02773) [-1.05]
ΔISEMCAP (-3)	-0.0056021 (0.01617) [-0.346]	-0.0480969* (0.02849) [-1.69]	-0.0127916 (0.02317) [-0.552]	-0.00977772 (0.02993) [-0.327]	0.295244** (0.1377) [2.14]	-0.0405245 (0.03322) [-1.22]	0.0153474 (0.02639) [0.582]
ΔBNKCRED (-1)	-0.0116969 (0.05533) [-0.211]	0.164547 (0.1046) [1.57]	0.0130846 (0.0851) [0.154]	0.0197674 (0.1025) [0.193]	-0.173204 (0.4682) [-0.37]	0.366087*** (0.122) [3]	0.0668441 (0.09692) [0.69]
ΔBNKCRED (-2)	-0.097953 (0.06131) [-1.6]	-0.216431* (0.1156) [-1.87]	0.0467524 (0.09405) [0.497]	-0.238756** (0.1136) [-2.1]	-0.71271 (0.5189) [-1.37]	-0.0620272 (0.1349) [-0.46]	0.171886 (0.1071) [1.6]
ΔBNKCRED (-3)	-0.0973385 (0.06068) [-1.6]	0.0649055 (0.1148) [0.565]	0.0962709 (0.09338) [1.03]	-0.0178569 (0.1124) [-0.159]	-0.557561 (0.5135) [-1.09]	0.181842 (0.1339) [1.36]	-0.0712358 (0.1064) [-0.67]
ΔRER (-1)	0.121223* (0.07) [1.73]	-0.234361* (0.1281) [-1.83]	-0.00647003 (0.1042) [-0.0621]	0.221005* (0.1296) [1.71]	0.253961 (0.594) [0.428]	0.0805278 (0.1494) [0.539]	-0.042229 (0.1187) [-0.356]
ΔRER (-2)	0.0320095 (0.06999) [0.457]	0.192917 (0.1287) [1.5]	0.0356072 (0.1046) [0.34]	0.341737** (0.1296) [2.64]	1.23442** (0.5937) [2.08]	-0.146482 (0.15) [-0.976]	-0.358877*** (0.1192) [-3.01]
ΔRER (-3)	0.0809313 (0.05662) [1.43]	0.048142 (0.1099) [0.438]	0.0764427 (0.08938) [0.855]	0.166599 (0.1049) [1.59]	1.04104** (0.478) [2.18]	0.161339 (0.1282) [1.26]	-0.0961364 (0.1018) [-0.944]

C	3.73777*** (0.7845) [4.76]	0.00628965 (0.008108) [0.776]	0.00257239 (0.006594) [0.39]	4.25417*** (1.443) [2.95]	16.4442** (6.931) [2.37]	0.0131066 (0.009454) [1.39]	0.0188466** (0.00751) [2.51]
CSeasonal	-0.0604264 (0.05098) [-1.19]	-0.0606001 (0.09988) [-0.607]	0.0533408 (0.08123) [0.657]	-0.0558143 (0.09449) [-0.591]	0.579945 (0.43) [1.35]	-0.0424189 (0.1165) [-0.364]	-0.0618604 (0.09252) [-0.669]
CSeasonal_1	0.102624 (0.06358) [1.61]	0.245957** (0.1214) [2.03]	0.0613326 (0.09874) [0.621]	-0.183403 (0.1178) [-1.56]	0.202036 (0.5375) [0.376]	-0.0473881 (0.1416) [-0.335]	0.0595209 (0.1125) [0.529]
CSeasonal_2	0.266435*** (0.04106) [6.49]	0.15999** (0.07645) [2.09]	-0.00841989 (0.06217) [-0.135]	-0.182769** (0.07604) [-2.4]	0.586771* (0.3479) [1.69]	-0.0162668 (0.08914) [-0.182]	-0.020121 (0.07081) [-0.284]
DUM1993Q1	-0.02138 (0.02882) [-0.742]	0.129991** (0.05728) [2.27]	0.175109*** (0.04659) [3.76]	0.00784982 (0.05343) [0.147]	0.120952 (0.2428) [0.498]	0.0288002 (0.0668) [0.431]	-0.011528 (0.05306) [-0.217]
DUM1993Q2	-0.0100481 (0.03314) [-0.303]	0.0264563 (0.06363) [0.416]	-0.313547*** (0.05175) [-6.06]	-0.139347** (0.0614) [-2.27]	0.553323* (0.28) [1.98]	0.0198195 (0.0742) [0.267]	0.0300464 (0.05894) [0.51]
DUM1994Q1	-0.122831*** (0.04069) [-3.02]	0.106317 (0.07709) [1.38]	0.114961* (0.06269) [1.83]	0.169949** (0.07537) [2.25]	-0.346217 (0.3442) [-1.01]	-0.0773397 (0.08989) [-0.86]	-0.276471*** (0.07141) [-3.87]
DUM1994Q2	-0.0343654 (0.03628) [-0.947]	-0.144695** (0.07028) [-2.06]	-0.0787628 (0.05716) [-1.38]	-0.0619629 (0.06722) [-0.922]	-0.312152 (0.3063) [-1.02]	-0.193521** (0.08195) [-2.36]	-0.194921*** (0.0651) [-2.99]
DUM1998Q3	-0.0383187 (0.0285) [-1.34]	0.0513711 (0.05597) [0.918]	0.00488295 (0.04552) [0.107]	0.158538*** (0.05281) [3]	-0.446015* (0.2403) [-1.86]	-0.214233*** (0.06527) [-3.28]	0.00872102 (0.05185) [0.168]
DUM2001Q1	0.0526832* (0.02974) [1.77]	-0.185898*** (0.05663) [-3.28]	0.0351774 (0.04606) [0.764]	0.203020*** (0.0551) [3.68]	-0.127037 (0.2515) [-0.505]	0.0129968 (0.06603) [0.197]	-0.103488* (0.05246) [-1.97]
DUM2001Q2	0.0444906 (0.04061) [1.1]	0.0306768 (0.06855) [0.448]	-0.0032619 (0.05575) [-0.0585]	0.0690322 (0.07511) [0.919]	0.551907 (0.3468) [1.59]	-0.307311*** (0.07993) [-3.84]	-0.147656** (0.06349) [-2.33]
Sigma (σ)	0.0253616	0.0504007	0.04099	0.0470145	0.213598	0.0587708	0.0466866

Notes: The endogenous variables in the vector error correction model are ΔGCFINEXLDR, ΔGYD, ΔWHO, ΔDEPTSVFX, ΔISEMCAP, ΔBNKCRED, ΔRER. Unrestricted exogenous variables are constant, centered seasonal dummies, dummies for 1993:Q1, 1993:Q2, 1994:Q1, 1994:Q2, 1998:Q3, 2001:Q1, 2001:Q2 and restricted exogenous variable is trend. Standard errors are in ( ) and t-statistics in [ ]. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.15-a: Residual Diagnostics for Individual Equations in Conditional VEC Model

	Portmanteau (12) Test for Autocorrelation	AR 1-5 Test		Normality Test		Skewness	Skewness (Transformed)	Excess Kurtosis	Excess Kurtosis (Transformed)	ARCH 1-5 Test		Heteroscedasticity Test	
ΔGCFINEXLDR	8.4938	F(5,38) = 1.0576	[0.3989]	$\chi2(2)$ = 1.3686	[0.5045]	-0.3178	-1.2008	3.2223	0.5886	F(5,34) = 0.2805	[0.9206]	$\chi2$ (44) = 41.327	[0.5868]
ΔGYD	9.2655	F(5,38) = 0.7701	[0.5772]	$\chi2(2)$ = 1.8002	[0.4065]	-0.3665	-1.3770	3.6042	1.1831	F(5,34) = 1.0788	[0.3895]	$\chi2$ (44) = 50.271	[0.2390]
ΔWHO	17.741	F(5,38) = 1.2447	[0.3077]	$\chi2(2)$ = 2.5081	[0.2853]	0.3412	1.2856	4.1221	2.1684	F(5,34) = 0.1747	[0.9702]	$\chi2$ (44) = 31.987	[0.9110]
ΔDEPTSVFX	9.3954	F(5,38) = 0.9263	[0.4747]	$\chi2(2)$ = 1.6700	[0.4339]	0.3346	1.2617	2.1084	-2.3726	F(5,34) = 0.1550	[0.9771]	$\chi2$ (44) = 44.876	[0.4350]
ΔISEMCAP	10.0445	F(5,38) = 1.1962	[0.3295]	$\chi2(2)$ = 3.5704	[0.1678]	0.4579	1.6986	2.9839	-0.4775	F(5,34) = 0.3789	[0.8597]	$\chi2$ (44) = 47.536	[0.3307]
ΔBNKCRED	6.1583	F(5,38) = 0.3310	[0.8910]	$\chi2(2)$ = 2.5911	[0.2737]	0.2522	0.9595	3.3803	1.0827	F(5,34) = 1.9232	[0.1161]	$\chi2$ (44) = 42.952	[0.5165]
ΔRER	9.6513	F(5,38) = 1.4073	[0.2437]	$\chi2(2)$ = 0.8967	[0.6387]	-0.3725	-1.3982	2.9477	-0.1980	F(5,34) = 2.5951	[0.0431]**	$\chi2$ (44) = 52.385	[0.1807]

Table 4.15-b: Residual and Vector Misspecification Tests for Conditional VEC Model

Vector Portmanteau Statistics (12)	555.173	
Vector AR 1-5 Test	F(245,33) = 1.3618	[0.1441]
Vector Normality Test for Residuals	χ^2 (14) = 25.860	[0.0270]**
Vector Heteroscedasticity Test	$\chi2$ (1232) = 1225.8	[0.5444]

Table 4.15-c: Correlation of Structural Residuals (Standard Deviations on Diagonal)

	ΔGCFINEXLDR	ΔGYD	ΔWHO	ΔDEPTSVFX	ΔISEMCAP	ΔBNKCRED	ΔRER
ΔGCFINEXLDR	0.02536	0.45123	-0.09442	-0.39596	0.17940	-0.21858	0.23545
ΔGYD	0.45123	0.05040	-0.13036	0.06507	0.25120	-0.08011	0.07681
ΔWHO	-0.09442	-0.13036	0.04099	0.10838	-0.30013	0.12522	-0.40940
ΔDEPTSVFX	-0.39596	0.06507	0.10838	0.04701	0.07267	0.33862	-0.45544
ΔISEMCAP	0.17940	0.25120	-0.30013	0.07267	0.21360	-0.28259	0.16330
ΔBNKCRED	-0.21858	-0.08011	0.12522	0.33862	-0.28259	0.05877	-0.27241
ΔRER	0.23545	0.07681	-0.40940	-0.45544	0.16330	-0.27241	0.04669

Modeling the Wealth Effects on Non-Durables Consumption (GCFINEXLDR)

Table 4.16: Final Conditional Vector Error Correction Model

Restrictions on Coefficients	LR Test of Restrictions	[Prob.]
Ho: β GYD =β ISEMCAP = 0 *α GYD= α WHO = α BNKCRED = α RER = 0*	$\chi^2(6) = 6.350357$	[0.3851]

Cointegrating Equation:

GCFINEXLDR	WHO	DEPTSVFX	BNKCRED	RER	TREND
1	-0.27216***	0.59423***	-0.12750***	0.15953***	-0.011928***
	(0.07201)	(0.07227)	(0.02533)	(0.04714)	(0.00110)
	[-3.7796]	[8.2222]	[-5.0334]	[3.3842]	[-10.8220]

Table 4.16: Final Conditional Vector Error Correction Model (continued)

ΔGCFINEXLDR	Coefficient	Std.Error	t-value	[Prob.]
CointEq. (-1)	-0.473243	0.13390	-3.5400	[0.0010]***
ΔGCFINEXLDR (-1)	-0.078024	0.13330	-0.5850	[0.5614]
ΔGCFINEXLDR (-2)	0.133630	0.13890	0.9620	[0.3413]
ΔGCFINEXLDR (-3)	0.012797	0.12750	0.1000	[0.9205]
ΔGYD (-1)	0.040736	0.06989	0.5830	[0.5630]
ΔGYD (-2)	-0.061675	0.05770	-1.0700	[0.2911]
ΔGYD (-3)	-0.015375	0.05261	-0.2920	[0.7715]
ΔWHO (-1)	-0.105040	0.07721	-1.3600	[0.1808]
ΔWHO (-2)	0.038744	0.08157	0.4750	[0.6372]
ΔWHO (-3)	-0.104420	0.08930	-1.1700	[0.2487]
ΔDEPTSVFX (-1)	0.209084	0.08402	2.4900	[0.0168]**
ΔDEPTSVFX (-2)	0.056168	0.10190	0.5510	[0.5844]
ΔDEPTSVFX (-3)	0.153398	0.08687	1.7700	[0.0845]*
ΔISEMCAP (-1)	0.055810	0.01660	3.3600	[0.0016]***
ΔISEMCAP (-2)	0.035467	0.01834	1.9300	[0.0598]*
ΔISEMCAP (-3)	-0.010099	0.01693	-0.5960	[0.5540]
ΔBNKCRED (-1)	-0.001485	0.05675	-0.0262	[0.9792]
ΔBNKCRED (-2)	-0.086379	0.06292	-1.3700	[0.1769]
ΔBNKCRED (-3)	-0.086195	0.06222	-1.3900	[0.1731]
ΔRER (-1)	0.104884	0.07249	1.4500	[0.1552]
ΔRER (-2)	0.016055	0.07239	0.2220	[0.8255]
ΔRER (-3)	0.073638	0.05757	1.2800	[0.2078]
Constant	3.266960	0.92260	3.5400	[0.0010]***
CSeasonal	-0.055295	0.05168	-1.0700	[0.2906]
CSeasonal_1	0.113185	0.06500	1.7400	[0.0888]*
CSeasonal_2	0.275052	0.04231	6.5000	[0.0000]***
DUM1993Q1	-0.021320	0.02907	-0.7330	[0.4673]
DUM1993Q2	-0.004920	0.03382	-0.1460	[0.8850]
DUM1994Q1	-0.115468	0.04170	-2.7700	[0.0083]***
DUM1994Q2	-0.029508	0.03691	-0.7990	[0.4284]
DUM1998Q3	-0.040919	0.02886	-1.4200	[0.1634]
DUM2001Q1	0.047573	0.03043	1.5600	[0.1253]
DUM2001Q2	0.031627	0.04296	0.7360	[0.4656]
sigma (σ) = 0.025				

Table 4.16: Final Conditional Vector Error Correction Model (continued)

ΔDEPTSVFX	Coefficient	Std.Error	t-value	[Prob.]
CointEq. (-1)	-0.662130	0.24880	-2.6600	[0.0109]**
ΔGCFINEXLDR (-1)	0.009717	0.24770	0.0392	[0.9689]
ΔGCFINEXLDR (-2)	-0.300348	0.25810	-1.1600	[0.2510]
ΔGCFINEXLDR (-3)	-0.001375	0.23690	-0.0058	[0.9954]
ΔGYD (-1)	0.181424	0.12990	1.4000	[0.1697]
ΔGYD (-2)	-0.014760	0.10720	-0.1380	[0.8912]
ΔGYD (-3)	0.034768	0.09778	0.3560	[0.7239]
ΔWHO (-1)	0.155148	0.14350	1.0800	[0.2857]
ΔWHO (-2)	0.162287	0.15160	1.0700	[0.2904]
ΔWHO (-3)	0.056825	0.16600	0.3420	[0.7337]
ΔDEPTSVFX (-1)	-0.043873	0.15620	-0.2810	[0.7801]
ΔDEPTSVFX (-2)	0.445220	0.18940	2.3500	[0.0234]**
ΔDEPTSVFX (-3)	0.144610	0.16150	0.8960	[0.3754]
ΔISEMCAP (-1)	-0.002796	0.03086	-0.0906	[0.9282]
ΔISEMCAP (-2)	0.072619	0.03409	2.1300	[0.0389]**
ΔISEMCAP (-3)	-0.006687	0.03147	-0.2130	[0.8327]
ΔBNKCRED (-1)	0.012752	0.10550	0.1210	[0.9043]
ΔBNKCRED (-2)	-0.246703	0.11690	-2.1100	[0.0408]**
ΔBNKCRED (-3)	-0.025513	0.11560	-0.2210	[0.8264]
ΔRER (-1)	0.232229	0.13470	1.7200	[0.0919]*
ΔRER (-2)	0.352688	0.13450	2.6200	[0.0121]**
ΔRER (-3)	0.171613	0.10700	1.6000	[0.1161]
Constant	4.577680	1.71500	2.6700	[0.0107]**
CSeasonal	-0.059344	0.09604	-0.6180	[0.5399]
CSeasonal_1	-0.190676	0.12080	-1.5800	[0.1218]
CSeasonal_2	-0.188696	0.07864	-2.4000	[0.0208]**
DUM1993Q1	0.007810	0.05403	0.1450	[0.8857]
DUM1993Q2	-0.142866	0.06285	-2.2700	[0.0281]**
DUM1994Q1	0.164888	0.07750	2.1300	[0.0391]**
DUM1994Q2	-0.065299	0.06861	-0.9520	[0.3465]
DUM1998Q3	0.160325	0.05363	2.9900	[0.0046]***
DUM2001Q1	0.206529	0.05656	3.6500	[0.0007]***
DUM2001Q2	0.077870	0.07984	0.9750	[0.3349]
sigma (σ) = 0.047				

Table 4.16: Final Conditional Vector Error Correction Model (continued)

ΔISEMCAP	Coefficient	Std.Error	t-value	[Prob.]
CointEq. (-1)	-2.160660	1.13000	-1.9100	[0.0626]*
ΔGCFINEXLDR (-1)	3.032270	1.12600	2.6900	[0.0100]***
ΔGCFINEXLDR (-2)	0.589734	1.17300	0.5030	[0.6176]
ΔGCFINEXLDR (-3)	1.361350	1.07600	1.2600	[0.2128]
ΔGYD (-1)	0.241077	0.59010	0.4090	[0.6849]
ΔGYD (-2)	0.807769	0.48720	1.6600	[0.1046]
ΔGYD (-3)	0.031108	0.44420	0.0700	[0.9445]
ΔWHO (-1)	-1.106130	0.65200	-1.7000	[0.0970]*
ΔWHO (-2)	-0.681720	0.68880	-0.9900	[0.3278]
ΔWHO (-3)	0.067859	0.75400	0.0900	[0.9287]
ΔDEPTSVFX (-1)	0.573559	0.70940	0.8090	[0.4232]
ΔDEPTSVFX (-2)	1.563270	0.86050	1.8200	[0.0762]*
ΔDEPTSVFX (-3)	2.200600	0.73350	3.0000	[0.0045]***
ΔISEMCAP (-1)	0.127194	0.14020	0.9070	[0.3693]
ΔISEMCAP (-2)	0.065958	0.15490	0.4260	[0.6723]
ΔISEMCAP (-3)	0.280272	0.14300	1.9600	[0.0564]*
ΔBNKCRED (-1)	-0.139191	0.47910	-0.2910	[0.7728]
ΔBNKCRED (-2)	-0.674115	0.53130	-1.2700	[0.2113]
ΔBNKCRED (-3)	-0.520318	0.52540	-0.9900	[0.3275]
ΔRER (-1)	0.199568	0.61210	0.3260	[0.7460]
ΔRER (-2)	1.181030	0.61120	1.9300	[0.0599]*
ΔRER (-3)	1.016780	0.48610	2.0900	[0.0424]**
Constant	14.876600	7.79000	1.9100	[0.0629]*
CSeasonal	0.597025	0.43630	1.3700	[0.1783]
CSeasonal_1	0.237169	0.54880	0.4320	[0.6678]
CSeasonal_2	0.615411	0.35730	1.7200	[0.0921]*
DUM1993Q1	0.121163	0.24550	0.4940	[0.6241]
DUM1993Q2	0.570463	0.28550	2.0000	[0.0521]*
DUM1994Q1	-0.321771	0.35210	-0.9140	[0.3659]
DUM1994Q2	-0.295934	0.31170	-0.9490	[0.3477]
DUM1998Q3	-0.454688	0.24370	-1.8700	[0.0689]*
DUM2001Q1	-0.144075	0.25700	-0.5610	[0.5779]
DUM2001Q2	0.509025	0.36270	1.4000	[0.1677]
sigma (σ) = 0.215				

Notes: *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.17-a: F Tests on Regressors

F test on Regressors except Unrestricted:		F(69,123) = 2.15116 [0.0001] ***			
F Tests on Retained Regressors:		F(3,41) =			
ΔGCFINEXLDR (-1)	2.82102	[0.051]*	ΔGYD (-1)	1.10509	[0.358]
ΔGCFINEXLDR (-2)	0.59837	[0.620]	ΔGYD (-2)	1.75251	[0.171]
ΔGCFINEXLDR (-3)	0.52234	[0.669]	ΔGYD (-3)	0.05107	[0.985]
ΔWHO (-1)	1.50587	[0.227]	ΔDEPTSVFX (-1)	2.17457	[0.106]
ΔWHO (-2)	1.22680	[0.312]	ΔDEPTSVFX (-2)	3.13322	[0.036]**
ΔWHO (-3)	0.47403	[0.702]	ΔDEPTSVFX (-3)	3.91074	[0.015]**
ΔISEMCAP (-1)	4.17122	[0.011]**	ΔBNKCRED (-1)	0.03608	[0.991]
ΔISEMCAP (-2)	4.39922	[0.009]***	ΔBNKCRED (-2)	3.35838	[0.028]**
ΔISEMCAP (-3)	1.73485	[0.175]	ΔBNKCRED (-3)	0.95876	[0.421]
ΔRER (-1)	2.68456	[0.059]*	CointEq. (-1)	10.2934	[0.000]***
ΔRER (-2)	3.46913	[0.025]**	Constant	10.3354	[0.000]***
ΔRER (-3)	2.95779	[0.043]**	DUM1993Q1	0.32056	[0.810]
CSeasonal	1.78614	[0.165]	DUM1993Q2	4.02535	[0.013]**
CSeasonal_1	1.28774	[0.291]	DUM1994Q1	2.95993	[0.043]**
CSeasonal_2	13.5400	[0.000]***	DUM1994Q2	0.92609	[0.437]
DUM2001Q1	8.46577	[0.000]***	DUM1998Q3	4.24605	[0.011]**
DUM2001Q2	1.15218	[0.340]			

Table 4.17-b: F Tests on Significance of Each Variable

Variable	F-test	[Prob.]
ΔGCFINEXLDR	F(9,99) = 1.4037	[0.1968]
ΔGYD	F(9,99) = 1.4626	[0.1725]
ΔWHO	F(9,99) = 1.4287	[0.1861]
ΔDEPTSVFX	F(9,99) = 2.543	[0.0114]**
ΔISEMCAP	F(9,99) = 3.2007	[0.0019]***
ΔBNKCRED	F(9,99) = 1.5576	[0.1387]
ΔRER	F(9,99) = 2.2807	[0.0228]**
CointEq.	F(3,41) = 10.293	[0.0000]***
DUM1993Q1	F(3,41) = 0.32056	[0.8104]
DUM1993Q2	F(3,41) = 4.0253	[0.0134]**
DUM1994Q1	F(3,41) = 2.9599	[0.0433]**
DUM1994Q2	F(3,41) = 0.92609	[0.4368]
DUM1998Q3	F(3,41) = 4.246	[0.0106]**
DUM2001Q1	F(3,41) = 8.4658	[0.0002]***
DUM2001Q2	F(3,41) = 1.1522	[0.3396]
Constant	F(3,41) = 10.335	[0.0000]***
CSeasonal	F(9,99) = 5.4811	[0.0000]***

Table 4.17-c: Tests on Significance of Each Lag

F Tests on Significance of Each Lag		
Lag 1	F(24,119) = 2.582	[0.0004]***
Lag 2	F(21,118) = 1.8561	[0.0203]**
Lag 3	F(21,118) = 1.2324	[0.2376]
F Tests on Significance of Each Lag up to 3		
Lag 1-3	F(66,123) = 2.1259	[0.0002]***
Lag 2-3	F(42,122) = 1.6318	[0.0206]**
Lag 3-3	F(21,118) = 1.2324	[0.2376]

Notes: Numbers in [ ] are p-values. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.18-a: Residual Diagnostics for Equations in Final Conditional VEC Model

	ΔGCFINEXLDR	ΔDEPTSVFX	ΔISEMCAP
Portmanteau (12) Test for Autocorrelation	8.52751	9.58211	10.0093
AR 1-5 Test	F(5,38) = 1.1015 [0.3757]	F(5,38) = 0.8977 [0.4926]	F(5,38) = 1.1544 [0.3493]
Normality Test	χ2(2) = 1.3788 [0.5019]	χ2(2) = 1.9729 [0.3729]	χ2(2) = 3.1860 [0.2033]
Skewness	-0.3568	0.32329	0.40809
Skewness (Transformed)	-1.342	1.2208	1.5247
Excess Kurtosis	3.4304	2.4015	2.6604
Excess Kurtosis (Transformed)	0.88235	-1.4105	-1.0522
ARCH 1-5 Test	F(5,33) = 0.2499 [0.9369]	F(5,33) = 0.1568 [0.9764]	F(5,33) = 0.3428 [0.8831]
Heteroscedasticity Test	χ2(44) = 40.606 [0.6179]	χ2(44) = 44.825 [0.4371]	χ2(44) = 48.078 [0.3111]

Table 4.18-b: Residual and Vector Misspecification Tests for Final Conditional VEC Model

Vector Portmanteau Statistics (12)	84.2749
Vector AR 1-5 Test	F(45,78) = 1.1444 [0.2967]
Vector Normality Test for Residuals	χ2(6) = 9.4916 [0.1478]
Vector Heteroscedasticity Test	χ2(264) = 253.92 [0.6611]

Table 4.18-c: Correlation of Residuals (Standard Deviations on Diagonal)

	ΔGCFINEXLDR	ΔDEPTSVFX	ΔISEMCAP
ΔGCFINEXLDR	0.02558	-0.39508	0.17764
ΔDEPTSVFX	-0.39508	0.04754	0.07361
ΔISEMCAP	0.17764	0.07361	0.21597

Modeling the Wealth Effects on Non-Durables Consumption (GCFINEXLDR)

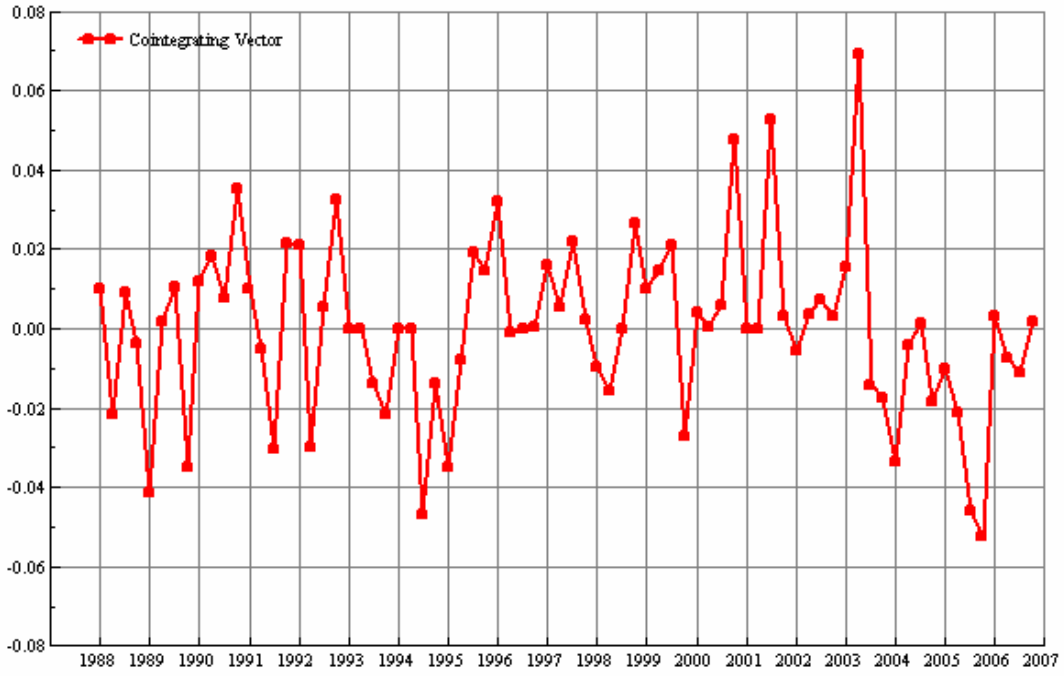
Table 4.19: Parsimonious Conditional Vector Error Correction Model

Restrictions on Coefficients	LR Test of Restrictions	[Prob.]
Ho: β GYD =β ISEMCAP = 0 *α GYD= α WHO = α BNKCRED = α RER = 0*	$\chi^2(6) = 6.350357$	[0.3851]

Cointegrating Equation:

GCFINEXLDR	WHO	DEPTSVFX	BNKCRED	RER	TREND
1	-0.27216***	0.59423***	-0.12750***	0.15953***	-0.011928***
	(0.07201)	(0.07227)	(0.02533)	(0.04714)	(0.00110)
	[-3.7796]	[8.2222]	[-5.0334]	[3.3842]	[-10.8220]

Graph of the Cointegrating Vector for Non-Durables Consumption



Notes: Lagged Δy and unrestricted regressors removed.

Table 4.19: Parsimonious Conditional Vector Error Correction Model (continued)

ΔGCFINEXLDR	Coefficient	Std.Error	t-value	[Prob.]
CointEq. (-1)	-0.386698	0.04155	-9.3100	[0.0000]***
ΔGYD (-2)	-0.066311	0.03513	-1.8900	[0.0658]*
ΔWHO (-1)	-0.120868	0.04402	-2.7500	[0.0088]***
ΔWHO (-3)	-0.122293	0.05229	-2.3400	[0.0241]**
ΔDEPTSVFX (-1)	0.189090	0.05269	3.5900	[0.0008]***
ΔDEPTSVFX (-3)	0.191512	0.05569	3.4400	[0.0013]***
ΔISEMCAP (-1)	0.046577	0.01104	4.2200	[0.0001]***
ΔISEMCAP (-2)	0.019116	0.01093	1.7500	[0.0874]*
ΔBNKCRED (-3)	-0.098773	0.03936	-2.5100	[0.0159]**
ΔRER (-1)	0.075490	0.04415	1.7100	[0.0945]*
ΔRER (-3)	0.080482	0.04757	1.6900	[0.0979]*
Constant	2.668580	0.28690	9.3000	[0.0000]***
CSeasonal_1	0.105438	0.01444	7.3000	[0.0000]***
CSeasonal_2	0.282540	0.02022	14.000	[0.0000]***
DUM1994Q1	-0.094723	0.03030	-3.1300	[0.0032]***
DUM1998Q3	-0.042696	0.02531	-1.6900	[0.0988]*
DUM2001Q1	0.038780	0.02440	1.5900	[0.1194]
sigma (σ) = 0.0237793				

ΔDEPTSVFX	Coefficient	Std.Error	t-value	[Prob.]
CointEq. (-1)	-0.809232	0.13630	-5.9400	[0.0000]***
ΔGYD (-1)	0.193280	0.08105	2.3800	[0.0216]**
ΔDEPTSVFX (-2)	0.468825	0.11850	3.9600	[0.0003]***
ΔISEMCAP (-2)	0.076805	0.02318	3.3100	[0.0019]***
ΔBNKCRED (-2)	-0.310672	0.07335	-4.2400	[0.0001]***
ΔRER (-1)	0.247207	0.08864	2.7900	[0.0078]***
ΔRER (-2)	0.292600	0.08266	3.5400	[0.0010]***
ΔRER (-3)	0.156484	0.08009	1.9500	[0.0572]*
Constant	5.594840	0.94090	5.9500	[0.0000]***
CSeasonal	-0.120375	0.02865	-4.2000	[0.0001]***
CSeasonal_1	-0.129679	0.04326	-3.0000	[0.0045]***
CSeasonal_2	-0.157242	0.03650	-4.3100	[0.0001]***
DUM1993Q2	-0.111325	0.04524	-2.4600	[0.0180]**
DUM1994Q1	0.126671	0.04614	2.7500	[0.0088]***
DUM1994Q2	-0.068119	0.04521	-1.5100	[0.1392]***
DUM1998Q3	0.148360	0.04604	3.2200	[0.0024]***
DUM2001Q1	0.228537	0.04663	4.9000	[0.0000]***
DUM2001Q2	0.110400	0.05202	2.1200	[0.0396]**
sigma (σ) = 0.0432932				

ΔISEMCAP	Coefficient	Std.Error	t-value	[Prob.]
CointEq. (-1)	-1.662430	0.61640	-2.7000	[0.0100]***
ΔGCFINEXLDR (-1)	2.762280	0.67430	4.1000	[0.0002]***
ΔGCFINEXLDR (-3)	1.327910	0.51450	2.5800	[0.0133]**
ΔGYD (-2)	0.783121	0.33230	2.3600	[0.0231]**
ΔWHO (-1)	-1.382700	0.47510	-2.9100	[0.0057]***
ΔWHO (-2)	-1.162420	0.47540	-2.4500	[0.0187]**
ΔDEPTSVFX (-2)	1.259110	0.48660	2.5900	[0.0131]**
ΔDEPTSVFX (-3)	2.383330	0.61180	3.9000	[0.0003]***
ΔISEMCAP (-3)	0.272307	0.10190	2.6700	[0.0106]**
ΔBNKCRED (-3)	-0.748670	0.37840	-1.9800	[0.0543]*
ΔRER (-2)	1.094930	0.41590	2.6300	[0.0117]**
ΔRER (-3)	1.004020	0.40450	2.4800	[0.0170]**
Constant	11.435400	4.25300	2.6900	[0.0102]**
CSeasonal	0.585840	0.16470	3.5600	[0.0009]***
CSeasonal_2	0.582820	0.18180	3.2100	[0.0025]***
DUM1993Q2	0.684386	0.22560	3.0300	[0.0041]***
DUM1998Q3	-0.432906	0.20940	-2.0700	[0.0447]**
DUM2001Q2	0.466525	0.22060	2.1100	[0.0403]**
sigma (σ) = 0.19749				

LR Test of Overidentifying Restrictions:		$\chi 2$ (46) = 30.141 [0.9658]			
	(T, p)	Log Likelihood	SC	HQ	AIC
Conditional VECM	(76, 99)	376.66211	-4.2708	-6.0935	-7.3069
Parsimonious VECM	(76, 53)	361.59174	-6.4955*	-7.4713*	-8.1208*

Notes: *, **, *** denote 10 percent, 5 percent and 1 percent significance levels.

Table 4.20-a: Residual Diagnostics for Equations in Parsimonious Conditional VEC Model

	ΔGCFINEXLDR	ΔDEPTSVFX	ΔISEMCAP
Portmanteau (12) Test for Autocorrelation	7.93334	10.475	13.1252
AR 1-5 Test	F(5,38) = 2.1553 [0.0796]*	F(5,38) = 1.8289 [0.1304]	F(5,38) = 1.9316 [0.1117]
Normality Test	χ2(2) = 3.4822 [0.1753]	χ2(2) = 0.7966 [0.6715]	χ2(2) = 2.1133 [0.3476]
Skewness	0.19543	0.24193	0.26372
Skewness (Transformed)	0.74683	0.92109	1.0021
Excess Kurtosis	3.7079	2.5871	2.3505
Excess Kurtosis (Transformed)	1.8035	-0.64726	-1.3518
ARCH 1-5 Test	F(5,49) = 0.2644 [0.9303]	F(5,49) = 0.4478 [0.8128]	F(5,49) = 1.4398 [0.2268]
Heteroscedasticity Test	F(54,4) = 0.1663 [0.9996]	F(54,4) = 0.2893 [0.9862]	F(54,4) = 0.3474 [0.9689]

Table 4.20-b: Residual Diagnostics and Vector Misspecification Tests for Parsimonious Conditional VEC Model

Vector Portmanteau Statistics (12)	95.5282
Vector AR 1-5 Test	F(45,125) = 1.1516 [0.2685]
Vector Normality Test for Residuals	χ^2 (6) = 7.9093 [0.2448]
Vector Heteroscedasticity Test	F(324,3) = 0.0291 [1.0000]

Table 4.20-c: Correlation of Residuals (Standard Deviations on Diagonal)

	ΔGCFINEXLDR	ΔDEPTSVFX	ΔISEMCAP
ΔGCFINEXLDR	0.02378	-0.41553	0.23146
ΔDEPTSVFX	-0.41553	0.04329	0.03860
ΔISEMCAP	0.23146	0.03860	0.19749

Modeling the Wealth Effects on Durables Consumption (GCDR)

Table 4.21-a: Lag Length Selection

Lag	Log-likelihood	AIC	SC	HQ
1	754.1116	-16.345	**-12.266***	-14.715
2	833.3921	-17.142	-11.56	**-14.911***
3	871.7848	-16.863	-9.779	-14.032
4	948.7137	**-17.598***	-9.011	-14.166

Notes: Endogenous variables in the VAR system are GCDR, GYD, WHO, DEPTSVFX, ISEMCAP, BNKCRED, RER. All variables are in natural logarithm. VAR system is estimated using sample for 1987:Q1-2006:Q4. Observations are adjusted on the basis of the lag length included in the VAR system. Unrestricted exogenous variables are constant, centered seasonal dummies, dummies for 1993:Q1, 1993:Q2, 1994:Q1, 1994:Q2, 1998:Q3, 2001:Q1, 2001:Q2 and restricted exogenous variable is trend. Following criteria are used to select the lag order of an unrestricted VAR: Log-likelihood; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion. * Indicates lag order selected by the information criterion.

Table 4.21-b: VAR System Model Comparison using F and χ^2 Tests

Lags	1	2	3	4
1	n.a.			
2	F(49,227) =2.3629 [0.0000]***	n.a.		
3	F(98,242) =1.5659 [0.0030]***	F(49,192) =0.86399 [0.7224]	n.a.	
4	χ2(147) =389.20 [0.0000]***	χ2(98) =230.64 [0.0000]***	χ2(49) =153.86 [0.0000]***	n.a.

Notes: Numbers in [ ] are p-values. *** indicates 1 percent significance level.

Modeling the Wealth Effects on Durables Consumption (GCDR)

Table 4.22: VAR System in Levels

	GCDR	GYD	WHO	DEPTSVFX	ISEMCAP	BNKCRED	RER
GCDR (-1)	-0.076365	0.024562	-0.017844	-0.222449***	-0.095381	0.007355	0.126462
	(0.14051)	(0.08995)	(0.05593)	(0.06411)	(0.32914)	(0.08277)	(0.07896)
	[-0.54347]	[0.27304]	[-0.31903]	[-3.46975]	[-0.28978]	[0.08887]	[1.60161]
GCDR (-2)	-0.090964	-0.085055	-0.047193	-0.066357	0.671134*	0.007310	0.026888
	(0.14808)	(0.09480)	(0.05895)	(0.06756)	(0.34687)	(0.08722)	(0.08321)
	[-0.61429]	[-0.89722]	[-0.80062]	[-0.98214]	[1.93484]	[0.08380]	[0.32313]
GCDR (-3)	0.007809	-0.116988	0.012819	-0.023813	-0.053725	0.169389**	-0.000498
	(0.13019)	(0.08335)	(0.05182)	(0.05940)	(0.30496)	(0.07669)	(0.07316)
	[0.05998]	[-1.40364]	[0.24735]	[-0.40088]	[-0.17617]	[2.20885]	[-0.00681]
GYD (-1)	-0.232156	0.608913***	0.064453	0.263746**	0.890229	0.024476	-0.113845
	(0.24282)	(0.15545)	(0.09666)	(0.11079)	(0.56878)	(0.14303)	(0.13645)
	[-0.95610]	[3.91715]	[0.66683]	[2.38064]	[1.56515]	[0.17112]	[-0.83436]
GYD (-2)	-0.086398	0.068191	-0.085189	-0.277412**	-0.271622	-0.215828	0.227435
	(0.25382)	(0.16249)	(0.10104)	(0.11581)	(0.59455)	(0.14951)	(0.14263)
	[-0.34039]	[0.41966]	[-0.84315]	[-2.39546]	[-0.45685]	[-1.44358]	[1.59459]
GYD (-3)	0.591676***	0.153823	-0.032212	0.134432	0.364059	0.192183	-0.071149
	(0.20808)	(0.13321)	(0.08283)	(0.09494)	(0.48742)	(0.12257)	(0.11693)
	[2.84345]	[1.15472]	[-0.38889]	[1.41596]	[0.74690]	[1.56796]	[-0.60848]
WHO (-1)	-0.036797	-0.053947	0.424208***	0.193475	-0.298316	0.030023	-0.010012
	(0.38091)	(0.24385)	(0.15163)	(0.17380)	(0.89226)	(0.22437)	(0.21405)
	[-0.09660]	[-0.22123]	[2.79771]	[1.11323]	[-0.33434]	[0.13381]	[-0.04677]
WHO (-2)	-0.063151	-0.042063	0.374128***	0.007523	-0.047751	0.051366	0.043720
	(0.25421)	(0.16274)	(0.10119)	(0.11599)	(0.59547)	(0.14974)	(0.14285)
	[-0.24842]	[-0.25847]	[3.69725]	[0.06486]	[-0.08019]	[0.34304]	[0.30606]
WHO (-3)	-0.087408	0.195716	-0.020546	-0.193977	0.889111	-0.15932	0.007144
	(0.27968)	(0.17904)	(0.11133)	(0.12761)	(0.65512)	(0.16474)	(0.15716)
	[-0.31253]	[1.09311]	[-0.18455]	[-1.52013]	[1.35717]	[-0.96711]	[0.04546]
DEPTSVFX (-1)	-0.01402	-0.313128	-0.158178	0.563813***	0.091361	0.192741	-0.202783
	(0.34087)	(0.21822)	(0.13569)	(0.15553)	(0.79846)	(0.20078)	(0.19155)
	[-0.04113]	[-1.43492]	[-1.16575]	[3.62522]	[0.11442]	[0.95994]	[-1.05867]
DEPTSVFX (-2)	-0.38193	0.340621	-0.092258	0.342018**	0.203271	-0.109129	0.158013
	(0.37337)	(0.23903)	(0.14862)	(0.17035)	(0.87459)	(0.21993)	(0.20981)
	[-1.02293]	[1.42504]	[-0.62075]	[2.00770]	[0.23242]	[-0.49621]	[0.75313]
DEPTSVFX (-3)	-0.382285	-0.098719	0.056601	-0.339131**	-0.51822	-0.267215	0.183772
	(0.31679)	(0.20281)	(0.12610)	(0.14454)	(0.74207)	(0.18660)	(0.17802)
	[-1.20673]	[-0.48676]	[0.44884]	[-2.34626]	[-0.69834]	[-1.43199]	[1.03233]
ISEMCAP (-1)	0.172872***	-0.013701	-0.027538	-0.041114	0.964380***	0.069084**	0.032191
	(0.05394)	(0.03453)	(0.02147)	(0.02461)	(0.12634)	(0.03177)	(0.03031)
	[3.20512]	[-0.39678]	[-1.28261]	[-1.67069]	[7.63310]	[2.17449]	[1.06210]
ISEMCAP (-2)	-0.019637	0.058188	0.060468*	0.071639**	0.007186	-0.05535	-0.077720*
	(0.07720)	(0.04942)	(0.03073)	(0.03522)	(0.18084)	(0.04547)	(0.04338)
	[-0.25436]	[1.17735]	[1.96768]	[2.03383]	[0.03974]	[-1.21718]	[-1.79154]
ISEMCAP (-3)	-0.106102	-0.026177	-0.008991	-0.02494	-0.311800**	-0.030474	0.030149
	(0.06632)	(0.04246)	(0.02640)	(0.03026)	(0.15535)	(0.03907)	(0.03727)
	[-1.599981]	[-0.61654]	[-0.34057]	[-0.82419]	[-2.00702]	[-0.78006]	[0.80896]
BNKCRED (-1)	1.263692***	0.315761*	0.097302	0.316124***	0.235615	1.261509***	-0.121772
	(0.25171)	(0.16114)	(0.10020)	(0.11485)	(0.58962)	(0.14827)	(0.14145)
	[5.02037]	[1.95951]	[0.97110]	[2.75257]	[0.39960]	[8.50831]	[-0.86091]
BNKCRED (-2)	-1.139472***	-0.492789**	0.032392	-0.335490**	-1.170972	-0.450658**	0.172590
	(0.34936)	(0.22365)	(0.13907)	(0.15940)	(0.81835)	(0.20578)	(0.19632)
	[-3.26162]	[-2.20335]	[0.23292]	[-2.10472]	[-1.43089]	[-2.18995]	[0.87915]
BNKCRED (-3)	0.353194	0.269016*	-0.059579	0.220550**	0.819778	0.082336	-0.128254
	(0.23711)	(0.15179)	(0.09438)	(0.10818)	(0.55542)	(0.13967)	(0.13324)
	[1.48958]	[1.77223]	[-0.63123]	[2.03865]	[1.47597]	[0.58952]	[-0.96258]

RER (-1)	0.441430*	-0.254628	0.020003	0.228767**	-0.111946	0.144193	0.738409***
	(0.24850)	(0.15909)	(0.09892)	(0.11338)	(0.58210)	(0.14638)	(0.13964)
	[1.77636]	[-1.60054]	[0.20221]	[2.01765]	[-0.19231]	[0.98508]	[5.28787]
RER (-2)	-0.010329	0.397634**	0.036946	0.059345	0.227722	-0.197028	-0.055559
	(0.28367)	(0.18160)	(0.11292)	(0.12943)	(0.66447)	(0.16709)	(0.15940)
	[-0.03641]	[2.18962]	[0.32719]	[0.45852]	[0.34271]	[-1.17918]	[-0.34855]
RER (-3)	0.091163	-0.099833	0.030742	-0.129726	-0.291604	-0.144203	0.120263
	(0.23340)	(0.14942)	(0.09291)	(0.10649)	(0.54673)	(0.13748)	(0.13116)
	[0.39058]	[-0.66813]	[0.33088]	[-1.21817]	[-0.53336]	[-1.04888]	[0.91694]
C	3.028973	0.558753	2.324996*	0.903998	-7.591443	2.377872	-0.501342
	(2.91703)	(1.86744)	(1.16116)	(1.33093)	(6.83295)	(1.71823)	(1.63917)
	[1.03838]	[0.29921]	[2.00230]	[0.67922]	[-1.11100]	[1.38390]	[-0.30585]
Cseasonal	-0.275454***	-0.274935***	0.047136*	0.017368	0.190085	-0.093543**	-0.036750
	(0.06593)	(0.04221)	(0.02625)	(0.03008)	(0.15445)	(0.03884)	(0.03705)
	[-4.17770]	[- 6.51344]	[1.79590]	[0.57733]	[1.23074]	[-2.40856]	[-0.99189]
CSeasonal_1	-0.175841	0.0703886	0.0556065	0.0555707	0.276393	-0.0662375	-0.0671624
	-0.1238	-0.07927	-0.04929	-0.0565	-0.2901	-0.07294	-0.06958
	[-1.42]	[0.888]	[1.13]	[0.984]	[0.953]	[-0.908]	[-0.965]
CSeasonal_2	-0.213449**	0.167358***	0.00949613	-0.00837777	0.24401	-0.119447**	-0.00778519
	-0.08863	-0.05674	-0.03528	-0.04044	-0.2076	-0.0522	-0.0498
	[-2.41]	[2.95]	[0.269]	[-0.207]	[1.18]	[-2.29]	[-0.156]
DUM1993Q1	0.237562**	0.117200	0.201124***	-0.003094	0.054736	0.078479	-0.009732
	(0.11828)	(0.07572)	(0.04708)	(0.05397)	(0.27707)	(0.06967)	(0.06647)
	[2.00841]	[1.54773]	[4.27156]	[-0.05733]	[0.19755]	[1.12639]	[-0.14642]
DUM1993Q2	0.035969	0.015316	-0.234545***	-0.095401	0.303035	0.007164	-0.005908
	(0.15014)	(0.09612)	(0.05977)	(0.06850)	(0.35170)	(0.08844)	(0.08437)
	[0.23957]	[0.15934]	[-3.92434]	[-1.39262]	[0.86163]	[0.08101]	[-0.07003]
DUM1994Q1	-0.012552	0.076897	0.092742*	0.110376*	-0.295503	-0.035917	-0.164089**
	(0.12827)	(0.08212)	(0.05106)	(0.05853)	(0.30047)	(0.07556)	(0.07208)
	[-0.09786]	[0.93641]	[1.81631]	[1.88592]	[-0.98346]	[-0.47536]	[-2.27646]
DUM1994Q2	-0.747999***	-0.131323	-0.037689	-0.017586	-0.567023*	-0.275472***	-0.291243***
	(0.12225)	(0.07826)	(0.04866)	(0.05578)	(0.28636)	(0.07201)	(0.06870)
	[-6.11864]	[-1.67798]	[-0.77450]	[-0.31529]	[-1.98009]	[-3.82550]	[-4.23960]
DUM1998Q3	-0.112278	0.031061	-0.011433	0.091802*	-0.453772*	-0.167476**	0.044306
	(0.10977)	(0.07027)	(0.04369)	(0.05008)	(0.25712)	(0.06466)	(0.06168)
	[-1.02289]	[0.44202]	[-0.26165]	[1.83305]	[-1.76484]	[-2.59028]	[0.71831]
DUM2001Q1	-0.247701**	-0.162327**	0.025230	0.200119***	-0.034715	0.083166	-0.116387*
	(0.11174)	(0.07153)	(0.04448)	(0.05098)	(0.26174)	(0.06582)	(0.06279)
	[-2.21676]	[-2.26920]	[0.56723]	[3.92522]	[-0.13263]	[1.26355]	[-1.85359]
DUM2001Q2	-0.297666**	0.101314	0.008044	-0.000186	0.381417	-0.159669**	-0.134366*
	(0.13504)	(0.08645)	(0.05375)	(0.06161)	(0.31632)	(0.07954)	(0.07588)
	[-2.20430]	[1.17193]	[0.14965]	[-0.00302]	[1.20580]	[-2.00734]	[-1.77071]
TREND	0.010076**	0.000972	0.000761	0.006653***	0.015270	0.004611*	-0.0011
	(0.00424)	(0.00271)	(0.00169)	(0.00193)	(0.00993)	(0.00250)	(0.00238)
	[2.37645]	[0.35823]	[0.45098]	[3.43898]	[1.53743]	[1.84616]	[-0.46166]
Sigma (σ)	0.093864	0.0600906	0.0373639	0.0428266	0.219871	0.0552893	0.0527452

Notes: Endogenous variables are GCDR, GYD, WHO, DEPTSVFX, ISEMCAP, BNKCRED, RER. All variables are in natural logarithm. VAR system is estimated for 1987:Q4-2006:Q4 using 77 observations. Unrestricted exogenous variables are constant, centered seasonal dummies, dummies for 1993:Q1, 1993:Q2, 1994:Q1, 1994:Q2, 1998:Q3, 2001:Q1, 2001:Q2. Restricted exogenous variable is trend. Standard errors are in ( ) and t-statistics in [ ]. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels.

Table 4.23-a: F Tests on Regressors

F Tests on Regressors Except Unrestricted:			F(154,265) = 19.3636 [0.0000] ***		
F Tests on Retained Regressors			F(7,38) =		
GCDR (-1)	2.21017	[0.055]*	GYD (-1)	2.82803	[0.018]**
GCDR (-2)	0.98633	[0.456]	GYD (-2)	1.04173	[0.419]
GCDR (-3)	1.07177	[0.400]	GYD (-3)	1.45260	[0.214]
WHO (-1)	1.45664	[0.212]	DEPTSVFX (-1)	2.56111	[0.029]**
WHO (-2)	2.37352	[0.041]**	DEPTSVFX (-2)	1.17101	[0.342]
WHO (-3)	0.81280	[0.582]	DEPTSVFX (-3)	1.03367	[0.424]
ISEMCAP (-1)	9.86830	[0.000]***	BNKCRED (-1)	10.1231	[0.000]***
ISEMCAP (-2)	1.69431	[0.140]	BNKCRED (-2)	2.38826	[0.040]**
ISEMCAP (-3)	0.91509	[0.506]	BNKCRED (-3)	1.26461	[0.294]
RER (-1)	7.49873	[0.000]***	Trend	2.70970	[0.022]**
RER (-2)	0.81864	[0.578]	Constant (U)	0.82163	[0.576]
RER (-3)	0.45717	[0.859]	DUM1993Q1(U)	3.30253	[0.008]***
Cseasonal (U)	9.53820	[0.000]***	DUM1993Q2 (U)	2.86766	[0.017]**
CSeasonal_1 (U)	0.93407	[0.492]	DUM1994Q1(U)	1.36451	[0.248]
CSeasonal_2 (U)	2.49084	[0.033]**	DUM1994Q2 (U)	9.48056	[0.000]***
DUM2001Q1(U)	3.51711	[0.005]***	DUM1998Q3 (U)	2.80884	[0.019]**
DUM2001Q2 (U)	1.74948	[0.127]			

Table 4.23-b: Tests on Significance of Each Variable

Variable	F-test	[Prob.]
GCDR	F(21,109) = 1.3112	[0.1839]
GYD	F(21,109) = 2.0691	[0.0083]***
WHO	F(21,109) = 2.6582	[0.0005]***
DEPTSVFX	F(21,109) = 2.1570	[0.0056]***
ISEMCAP	F(21,109) = 4.7481	[0.0000]***
BNKCRED	F(21,109) = 4.1229	[0.0000]***
RER	F(21,109) = 3.8405	[0.0000]***
DUM1993Q1	F(7,38) = 3.3025	[0.0076]***
DUM1993Q2	F(7,38) = 2.8677	[0.0166]**
DUM1994Q1	F(7,38) = 1.3645	[0.2483]
DUM1994Q2	F(7,38) = 9.4806	[0.0000]***
DUM1998Q3	F(7,38) = 2.8088	[0.0185]**
DUM2001Q1	F(7,38) = 3.5171	[0.0052]***
DUM2001Q2	F(7,38) = 1.7495	[0.1267]
Constant	F(7,38) = 0.8216	[0.5755]
CSeasonal	F(21,109) = 4.2401	[0.0000]***
Trend	F(7,38) = 2.7097	[0.0221]**

Table 4.23-c: F Test for Lag Exclusion

Tests on the Significance of Each Lag		
Lag 1	F(49,197) = 6.2858	[0.0000]***
Lag 2	F(49,197) = 1.6295	[0.0106]**
Lag 3	F(49,197) = 0.8909	[0.6768]
Significance of All Lags up to 3		
Lag 1 - 3	F(147,264) = 11.250	[0.0000]***
Lag 2 - 3	F(98,249) = 1.6321	[0.0013]***
Lag 3 - 3	F(49,197) = 0.8909	[0.6768]

Notes: Numbers in [ ] are p-values. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.24-a: Residual Diagnostics for Individual VAR Equations

	Portmanteau (12) Test for Autocorrelation	AR 1-5 Test	Normality Test	Skewness	Skewness (Transformed)	Excess Kurtosis	Excess Kurtosis (Transformed)	ARCH 1-5 Test	Heteroscesdasticity Test
GCDR	12.4047	F(5,39) = 1.0952 [0.3785]	$\chi^2(2)$ = 2.9269 [0.2314]	-0.1738	-0.6688	3.8377	2.0657	F(5,34) = 0.2623 [0.9305]	$\chi^2(44)$ = 41.359 [0.5854]
GYD	15.5022	F(5,39) = 1.6954 [0.1586]	$\chi^2(2)$ = 3.6594 [0.1605]	-0.0484	-0.1873	3.8080	2.1378	F(5,34) = 0.8637 [0.5154]	$\chi^2(44)$ = 42.659 [0.5291]
WHO	24.1365	F(5,39) = 1.4149 [0.2404]	$\chi^2(2)$ = 0.2701 [0.8737]	0.1787	0.6875	3.5672	1.5802	F(5,34) = 0.2474 [0.9383]	$\chi^2(44)$ = 53.251 [0.1600]
DEPTSVFX	6.1328	F(5,39) = 0.8950 [0.4940]	$\chi^2(2)$ = 0.5405 [0.7632]	0.1697	0.6534	2.8023	0.0277	F(5,34) = 0.1899 [0.9644]	$\chi^2(44)$ = 42.605 [0.5315]
ISEMCAP	20.9900	F(5,39) = 1.7313 [0.1503]	$\chi^2(2)$ = 3.7363 [0.1544]	0.4721	1.7573	3.6670	0.8948	F(5,34) = 0.3282 [0.8924]	$\chi^2(44)$ = 47.759 [0.3226]
BNKCRED	14.4857	F(5,39) = 0.8343 [0.5334]	$\chi^2(2)$ = 2.5275 [0.2826]	-0.0084	-0.0323	3.4069	1.4298	F(5,34) = 0.7825 [0.5694]	$\chi^2(44)$ = 48.282 [0.3039]
RER	7.5077	F(5,39) = 0.6319 [0.6765]	$\chi^2(2)$ = 2.3109 [0.3149]	-0.2035	-0.7815	3.4248	1.2704	F(5,34) = 5.8020 [0.0006]***	$\chi^2(44)$ = 51.006 [0.2175]

Table 4.24-b: Residual Diagnostics and Vector Misspecification Tests for VAR System

Vector Portmanteau Statistics (12)	596.352	
Vector AR 1-5 Test	F(245,33) = 1.0365	[0.4726]
Vector Normality Test for Residuals	χ^2 (14) = 20.876	[0.1048]
Vector Heteroscedasticity Test	χ^2 (1232) = 1218.4	[0.6033]

Table 4.24-c: Correlation of Residuals (Standard Deviations on Diagonal)

	GCDR	GYD	WHO	DEPTSVFX	ISEMCAP	BNKCRED	RER
GCDR	0.09386	0.12686	0.13797	-0.07095	0.09407	0.39057	-0.03416
GYD	0.12686	0.06009	0.00035	0.18667	0.17289	-0.01721	-0.17660
WHO	0.13797	0.00035	0.03736	0.05078	-0.26674	0.16870	-0.37552
DEPTSVFX	-0.07095	0.18667	0.05078	0.04283	0.03045	0.30761	-0.37441
ISEMCAP	0.09407	0.17289	-0.26674	0.03045	0.21987	-0.12844	0.09270
BNKCRED	0.39057	-0.01721	0.16870	0.30761	-0.12844	0.05529	-0.22621
RER	-0.03416	-0.17660	-0.37552	-0.37441	0.09270	-0.22621	0.05275

Modeling the Wealth Effects on Durables Consumption (GCDR)

Table 4.25: Johansen Cointegration Test

Hypothesized No. of CE(s)	Alternative	Eigenvalue	Log-likelihood for Rank	λ_{trace} Statistic	Prob.
r=0 *	**r >0**	**0.545349**	804.9525	**153.7836**	**0.031**
r ≤ 1	r > 1	0.334222	835.2991	93.09030	0.606
r ≤ 2	r >2	0.291248	850.9609	61.76676	0.805
r ≤ 3	r > 3	0.170906	864.2145	35.25955	0.953
r ≤ 4	r > 4	0.141993	871.4302	20.82811	0.938
r ≤ 5	r > 5	0.085523	877.3262	9.036099	0.952
r ≤ 6	r > 6	0.027562	880.7682	2.152103	0.944

Hypothesized No. of CE(s)	Alternative	Eigenvalue	Log-likelihood for Rank	λ_{max} Statistic	Prob.
r=0 *	**r =1**	**0.545349**	804.9525	**60.69334**	**0.002**
r =1	r =2	0.334222	835.2991	31.32354	0.615
r =2	r =3	0.291248	850.9609	26.50720	0.575
r =3	r =4	0.170906	864.2145	14.43144	0.953
r =4	r =5	0.141993	871.4302	11.79201	0.878
r =5	r =6	0.085523	877.3262	6.883995	0.898
r =6	r = 7	0.027562	880.7682	2.152103	0.945

Notes: λ_{max} and λ_{trace} test indicates one cointegrating equation at the 5 percent significance level.

The trace statistic tests the null hypothesis of r cointegrating relations against the alternative of n cointegrating relations, where n is the number of endogenous variables. The alternative hypothesis corresponds to the case where none of the series has a unit root and a stationary VAR may be specified in terms of the levels of all of the series. The maximum eigenvalue statistic tests the null hypothesis of r cointegrating relations against the alternative of *r+1* cointegrating relations.

* denotes rejection of the hypothesis at the 5 percent significance level. Adjusted sample has 77 observations during the period of 1987:Q4-2006:Q4. Endogenous variables are GCDR, GYD, WHO, DEPTSVFX, ISEMCAP, BNKCRED, RER. Linear deterministic trend is restricted to the co-integrating vector. Cointegration test is based on the VAR system in levels, which has 3 lags of each endogenous variable. Exogenous variables are constant, centered seasonal dummies, dummies for 1993:Q1, 1993:Q2, 1994:Q1, 1994:Q2, 1998:Q3, 2001:Q1 and 2001:Q2. The critical values are taken from Osterwald-Lenum (1992).

Modeling the Wealth Effects on Durables Consumption (GCDR)

Table 4.26: Unconditional Vector Error Correction Model

Cointegrating Equation							
GCDR	GYD	WHO	DEPTSVFX	ISEMCAP	BNKCRED	RER	TREND
1	-0.127525	0.065101	0.510918***	-0.071744***	-0.466161***	-0.540594***	-0.00457645***
	(0.11385)	(0.13977)	(0.11208)	(0.01834)	(0.04038)	(0.07081)	(0.00178)
	[-1.12010]	[0.46577]	[4.55855]	[-3.91143]	[-11.5432]	[-7.63438]	[-2.57299]

	ΔGCDR	ΔGYD	ΔWHO	ΔDEPTSVFX	ΔISEMCAP	ΔBNKCRED	ΔRER
CointEq.(-1)	-1.146190***	-0.235584	-0.059223	-0.195136	0.853344	0.251749	0.129087
	(0.26592)	(0.16459)	(0.11262)	(0.12522)	(0.64805)	(0.16359)	(0.14501)
	[-4.31022]	[-1.43131]	[-0.52586]	[-1.55830]	[1.31678]	[1.53888]	[0.89017]
ΔGCDR (-1)	0.092975	0.241462**	0.030033	-0.040998	-0.972387**	-0.234835**	-0.003411
	(0.19039)	(0.11784)	(0.08063)	(0.08965)	(0.46398)	(0.11712)	(0.10382)
	[0.48834]	[2.04905]	[0.37248]	[-0.45729]	[-2.09577]	[-2.00501]	[-0.03285]
ΔGCDR (-2)	-0.004355	0.132729*	-0.013204	-0.0537	-0.177293	-0.202763***	0.009683
	(0.11753)	(0.07275)	(0.04978)	(0.05535)	(0.28643)	(0.07230)	(0.06409)
	[-0.03705]	[1.82453]	[-0.26526]	[-0.97025]	[-0.61898]	[-2.80429]	[0.15108]
ΔGYD (-1)	-0.503785**	-0.330472**	0.071091	0.151225	0.438493	-0.03462	-0.104956
	(0.21457)	(0.13281)	(0.09087)	(0.10104)	(0.52290)	(0.13200)	(0.11701)
	[-2.34791]	[-2.48838]	[0.78233]	[1.49668]	[0.83858]	[-0.26227]	[-0.89699]
ΔGYD (-2)	-0.531153***	-0.208424*	-0.02111	-0.157466*	0.002589	-0.212000*	0.121869
	(0.18908)	(0.11703)	(0.08008)	(0.08904)	(0.46080)	(0.11632)	(0.10311)
	[-2.80908]	[-1.78090]	[-0.26362]	[-1.76849]	[0.00562]	[-1.82253]	[1.18191]
ΔWHO (-1)	-0.068804	-0.052184	-0.256947**	0.161754	-1.224176*	-0.026114	-0.138225
	(0.25634)	(0.15866)	(0.10856)	(0.12071)	(0.62470)	(0.15770)	(0.13979)
	[-0.26841]	[-0.32890]	[-2.36681]	[1.34001]	[-1.95962]	[-0.16560]	[-0.98881]
ΔWHO (-2)	-0.07071	-0.125068	0.182156*	0.149974	-1.367719**	0.055619	-0.10649
	(0.24844)	(0.15377)	(0.10521)	(0.11699)	(0.60543)	(0.15283)	(0.13548)
	[-0.28462]	[-0.81336]	[1.73128]	[1.28196]	[-2.25907]	[0.36392]	[-0.78603]
ΔDEPTSVFX (-1)	0.507978*	-0.205234	-0.109307	-0.109572	0.248939	0.131872	-0.291478*
	(0.28562)	(0.17678)	(0.12096)	(0.13450)	(0.69605)	(0.17571)	(0.15575)
	[1.77852]	[-1.16095]	[-0.90365]	[-0.81467]	[0.35765]	[0.75052]	[-1.87139]
ΔDEPTSVFX (-2)	0.117284	0.126235	-0.172621	0.292955**	0.478031	0.059668	-0.136051
	(0.28073)	(0.17376)	(0.11889)	(0.13219)	(0.68413)	(0.17270)	(0.15309)
	[0.41779]	[0.72651]	[-1.45194]	[2.21609]	[0.69874]	[0.34551]	[-0.88871]
ΔISEMCAP (-1)	0.097505*	-0.033238	-0.028848	-0.062955**	0.135279	0.071208**	0.037607
	(0.05262)	(0.03257)	(0.02228)	(0.02478)	(0.12823)	(0.03237)	(0.02869)
	[1.85311]	[-1.02059]	[-1.29458]	[-2.54081]	[1.05499]	[2.19987]	[1.31064]
ΔISEMCAP (-2)	0.044258	0.023149	0.047393*	0.023295	0.136527	0.003133	-0.046891
	(0.05645)	(0.03494)	(0.02391)	(0.02658)	(0.13758)	(0.03473)	(0.03079)
	[0.78398]	[0.66251]	[1.98228]	[0.87629]	[0.99238]	[0.09020]	[-1.52316]
ΔBNKCRED (-1)	0.864001***	0.236129*	0.058430	0.309513***	0.810744	0.525471***	-0.075204
	(0.20495)	(0.12685)	(0.08680)	(0.09651)	(0.49945)	(0.12608)	(0.11176)
	[4.21574]	[1.86147]	[0.67318]	[3.20708]	[1.62327]	[4.16777]	[-0.67289]
ΔBNKCRED (-2)	-0.318427	-0.274945**	0.122625	-0.10117	-0.575247	0.003157	0.106628
	(0.21376)	(0.13231)	(0.09053)	(0.10066)	(0.52094)	(0.13150)	(0.11657)
	[-1.48963]	[-2.07807]	[1.35452]	[-1.00505]	[-1.10425]	[0.02401]	[0.91471]
ΔRER (-1)	-0.188631	-0.362240**	-0.021107	0.130136	0.301339	0.281763*	-0.131717
	(0.23218)	(0.14371)	(0.09833)	(0.10933)	(0.56582)	(0.14283)	(0.12661)
	[-0.81243]	[-2.52066]	[-0.21465]	[1.19025]	[0.53257]	[1.97265]	[-1.04030]
ΔRER (-2)	-0.147122	0.028306	0.017750	0.178338*	0.527025	0.111257	-0.176451
	(0.21273)	(0.13167)	(0.09009)	(0.10018)	(0.51843)	(0.13087)	(0.11601)
	[-0.69158]	[0.21497]	[0.19702]	[1.78025]	[1.01659]	[0.85014]	[-1.52102]

C	1.03695***	0.212286	0.0538496	0.182728	-0.75729	-0.216056	-0.0948741
	-0.2379	-0.1473	-0.1008	-0.112	-0.5799	-0.1464	-0.1298
	[4.360]	[1.440]	[0.534]	[1.630]	[-1.310]	[-1.48]	[-0.731]
CSeasonal	-0.274376***	-0.287080***	0.040059	-0.003840	0.200045	-0.111805***	-0.024961
	(0.06206)	(0.03841)	(0.02628)	(0.02922)	(0.15124)	(0.03818)	(0.03384)
	[-4.42125]	[-7.47393]	[1.52418]	[-0.13140]	[1.32274]	[-2.92857]	[-0.73758]
CSeasonal_1	-0.201062	0.077057	0.031366	0.011945	0.208898	-0.109864	-0.047175
	(0.12030)	(0.07446)	(0.05095)	(0.05665)	(0.29316)	(0.07401)	(0.06560)
	[-1.67137]	[1.03491]	[0.61566]	[0.21085]	[0.71256]	[-1.48454]	[-0.71912]
CSeasonal_2	-0.203451**	0.177335***	-0.009582	-0.026754	0.248760	-0.126404**	0.005580
	(0.08701)	(0.05385)	(0.03685)	(0.04097)	(0.21204)	(0.05353)	(0.04745)
	[-2.33826]	[3.29286]	[-0.26002]	[-0.65297]	[1.17317]	[-2.36151]	[0.11759]
DUM1993Q1	0.208915*	0.135100**	0.178778***	0.011159	0.223864	0.052572	-0.017558
	(0.10507)	(0.06503)	(0.04450)	(0.04948)	(0.25606)	(0.06464)	(0.05730)
	[1.98830]	[2.07738]	[4.01759]	[0.22553]	[0.87427]	[0.81333]	[-0.30643]
DUM1993Q2	0.029334	0.031883	-0.321503***	-0.072672	0.647783**	-0.011137	0.016569
	(0.11331)	(0.07013)	(0.04799)	(0.05336)	(0.27613)	(0.06971)	(0.06179)
	[0.25888]	[0.45462]	[-6.69980]	[-1.36200]	[2.34593]	[-0.15977]	[0.26815]
DUM1994Q1	-0.007053	0.061090	0.088881*	0.196853***	-0.0566	0.010956	-0.173296***
	(0.10979)	(0.06795)	(0.04650)	(0.05170)	(0.26756)	(0.06754)	(0.05987)
	[-0.06424]	[0.89897]	[1.91153]	[3.80755]	[-0.21154]	[0.16221]	[-2.89445]
DUM1994Q2	-0.719337***	-0.135391*	-0.053752	0.021868	-0.378136	-0.244166***	-0.287738***
	(0.11754)	(0.07275)	(0.04978)	(0.05535)	(0.28645)	(0.07231)	(0.06410)
	[-6.11987]	[-1.86100]	[-1.07980]	[0.39508]	[-1.32009]	[-3.37669]	[-4.48903]
DUM1998Q3	-0.163216	0.015875	-0.000179	0.099598**	-0.508612**	-0.192518***	0.051937
	(0.10311)	(0.06382)	(0.04367)	(0.04855)	(0.25127)	(0.06343)	(0.05623)
	[-1.58297]	[0.24876]	[-0.00411]	[2.05131]	[-2.02415]	[-3.03513]	[0.92370]
DUM2001Q1	-0.312640***	-0.184537***	0.043975	0.163553***	-0.241304	0.031029	-0.131965**
	(0.10422)	(0.06450)	(0.04414)	(0.04908)	(0.25397)	(0.06411)	(0.05683)
	[-2.99993]	[-2.86086]	[0.99636]	[3.33270]	[-0.95012]	[0.48399]	[-2.32204]
DUM2001Q2	-0.357471***	0.092342	0.014875	-0.074353	0.087934	-0.227280***	-0.141043**
	(0.12367)	(0.07655)	(0.05238)	(0.05824)	(0.30139)	(0.07608)	(0.06744)
	[-2.89050]	[1.20637]	[0.28401]	[-1.27673]	[0.29177]	[-2.98736]	[-2.09136]
Sigma (σ)	0.0945888	0.0585454	0.0400591	0.0445419	0.230512	0.0581895	0.0515816

Notes: Endogenous variables in the vector error correction model are ΔGCDR, ΔGYD, ΔWHO, ΔDEPTSVFX, ΔISEMCAP, ΔBNKCRED, ΔRER. Unrestricted exogenous variables are constant, centered seasonal dummies, dummies for 1993:Q1, 1993:Q2, 1994:Q1, 1994:Q2, 1998:Q3, 2001:Q1, 2001:Q2 and restricted exogenous variable is trend. Standard errors are in ( ) and t-statistics in [ ]. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.27-a: F Tests on Regressors

F Test on Regressors Except Unrestricted:			F(112, 300) = 3.25089 [0.0000]***		
F Tests on Retained Regressors:			F(7, 45) =		
ΔGCDR (-1)	2.35026	[0.039]**	ΔGYD (-1)	2.27164	[0.045]**
ΔGCDR (-2)	1.79577	[0.112]	ΔGYD (-2)	1.77295	[0.116]
ΔWHO (-1)	2.74894	[0.018]**	ΔDEPTSVF	2.01836	[0.073]*
ΔWHO (-2)	1.20521	[0.320]	ΔDEPTSVF	1.20957	[0.317]
ΔISEMCAP (-1)	2.68713	[0.021]**	ΔBNKCRED	4.23021	[0.001]***
ΔISEMCAP (-2)	0.94538	[0.482]	ΔBNKCRED	1.45052	[0.209]
ΔRER (-1)	2.00582	[0.075]*	CointEq.(-1)	7.71102	[0.000]***
ΔRER (-2)	0.80958	[0.584]	Constant (U)	7.75897	[0.000]***
Cseasonal (U)	11.8072	[0.000]***	DUM1993Q1	3.60644	[0.004]***
CSeasonal_1 (U)	0.80341	[0.589]	DUM1993Q2	7.43624	[0.000]***
CSeasonal_2 (U)	2.66738	[0.021]**	DUM1994Q1	2.67293	[0.021]**
DUM2001Q1(U)	4.11778	[0.001]***	DUM1994Q2	9.72369	[0.000]***
DUM2001Q2 (U)	2.86912	[0.015]**	DUM1998Q3	4.14578	[0.001]***

Table 4.27-b: F Tests on Significance of Each Variable

Variable	F-test	[Prob.]
ΔGCDR	F(14,90) = 1.4556	[0.1448]
ΔGYD	F(14,90) = 1.8388	[0.0446]**
ΔWHO	F(14,90) = 2.3422	[0.0083]***
ΔDEPTSVFX	F(14,90) = 1.5766	[0.1013]
ΔISEMCAP	F(14,90) = 1.7822	[0.0535]*
ΔBNKCRED	F(14,90) = 2.6552	[0.0028]***
ΔRER	F(14,90) = 1.2532	[0.2527]
CointEq.	F(7,45) = 7.7110	[0.0000]***
DUM1993Q1	F(7,45) = 3.6064	[0.0036]***
DUM1993Q2	F(7,45) = 7.4362	[0.0000]***
DUM1994Q1	F(7,45) = 2.6729	[0.0211]**
DUM1994Q2	F(7,45) = 9.7237	[0.0000]***
DUM1998Q3	F(7,45) = 4.1458	[0.0014]***
DUM2001Q1	F(7,45) = 4.1178	[0.0014]***
DUM2001Q2	F(7,45) = 2.8691	[0.0145]**
Constant	F(7,45) = 7.7590	[0.0000]***
CSeasonal	F(21,129) = 5.0184	[0.0000]***

Table 4.27-c: Lag Exclusion Tests

Tests on the Significance of Each Lag		
Lag 1	F(56,247) = 3.8219	[0.000]***
Lag 2	F(49,232) = 1.3008	[0.1035]
Tests on the Significance of All Lags up to 2		
Lag 1 - 2	F(105,297)= 3.2187	[0.000]***
Lag 2 - 2	F(49,232) = 1.3008	[0.1035]

Notes: Numbers in [ ] are p-values. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.28-a: Residual Diagnostics for Individual Equations in Unconditional VEC Model

	Portmanteau (12) Test for Autocorrelation	AR 1-5 Test		Normality Test		Skewness	Skewness (Transformed)	Excess Kurtosis	Excess Kurtosis (Transformed)	ARCH 1-5 Test		Heteroscedasticity Test	
ΔGCDR	11.9631	F(5,46) = 2.3961	[0.0517]*	$\chi^2(2) = 0.6230$	[0.7323]	-0.2018	-0.7753	3.1554	0.7391	F(5,41) = 0.1679	[0.9730]	F(30,20) = 0.3165	[0.9978]
ΔGYD	16.0826	F(5,46) = 2.1056	[0.0817]*	$\chi^2(2) = 11.5770$	[0.0031]***	-0.4062	-1.5266	5.2489	3.6515	F(5,41) = 0.6401	[0.6704]	F(30,20) = 0.3709	[0.9931]
ΔWHO	15.4626	F(5,46) = 0.4902	[0.7818]	$\chi^2(2) = 1.6043$	[0.4484]	0.3559	1.3465	3.5434	1.1003	F(5,41) = 0.4813	[0.7881]	F(30,20) = 0.5562	[0.9289]
ΔDEPTSVFX	10.6858	F(5,46) = 1.8295	[0.1258]	$\chi^2(2) = 0.4443$	[0.8008]	-0.0084	-0.0326	2.9492	0.5054	F(5,41) = 0.2057	[0.9582]	F(30,20) = 0.6866	[0.8284]
ΔISEMCAP	16.2042	F(5,46) = 3.1264	[0.0164]**	$\chi^2(2) = 3.1875$	[0.2032]	0.3963	1.4913	3.1341	0.1197	F(5,41) = 2.5276	[0.0439]**	F(30,20) = 0.5073	[0.9549]
ΔBNKCRED	8.57103	F(5,46) = 0.7610	[0.5826]	$\chi^2(2) = 3.1617$	[0.2058]	0.2440	0.9341	3.1549	0.6460	F(5,41) = 1.1195	[0.3652]	F(30,20) = 0.4043	[0.9879]
ΔRER	7.69206	F(5,46) = 1.2253	[0.3126]	$\chi^2(2) = 1.8935$	[0.3880]	-0.3852	-1.4517	3.3569	0.6315	F(5,41) = 4.9970	[0.0012]***	F(30,20) = 0.6778	[0.8364]

Table 4.28-b: Residual Diagnostics and Vector Misspecification Tests for Unconditional VEC System

Vector Portmanteau Statistics (12)	541.08
Vector AR 1-5 Test	F(245,81) = 0.96435 [0.5913]
Vector Normality Test for Residuals	χ2(14) = 26.126 [0.0249]**
Vector Heteroscedasticity Test	F(840,1) = 0.002229([1.0000]

Table 4.28-c: Correlation of Residuals (Standard Deviations on Diagonal)

	ΔGCDR	ΔGYD	ΔWHO	ΔDEPTSVFX	ΔISEMCAP	ΔBNKCRED	ΔRER
ΔGCDR	0.09459	0.07688	0.06289	-0.03800	0.15700	0.46679	-0.00955
ΔGYD	0.07688	0.05855	0.02436	0.16683	0.14732	-0.05117	-0.16447
ΔWHO	0.06289	0.02436	0.04006	0.09405	-0.26160	0.12179	-0.44029
ΔDEPTSVFX	-0.03800	0.16683	0.09405	0.04454	0.10590	0.35130	-0.35523
ΔISEMCAP	0.15700	0.14732	-0.26160	0.10590	0.23051	-0.05924	0.08543
ΔBNKCRED	0.46679	-0.05117	0.12179	0.35130	-0.05924	0.05819	-0.18714
ΔRER	-0.00955	-0.16447	-0.44029	-0.35523	0.08543	-0.18714	0.05158

Modeling the Wealth Effects on Durables Consumption (GCDR)

Table 4.29-a: Restrictions on β Coefficients and Weak Exogeneity Tests on α Adjustment Coefficients

Ho: β_i =0	LR Test of Restrictions	[Prob.]	Ho: α_i =0	LR Test of Restrictions	[Prob.]
GCDR	$\chi^2(1)$= 28.241	[0.0000]***	GCDR	$\chi^2(1)$= 15.731	[0.0001]***
GYD	$\chi^2(1)$=1.1214	[0.2896]	GYD	$\chi^2(1)$= 2.7283	[0.0986]
WHO	$\chi^2(1)$= 0.2652	[0.6065]	WHO	$\chi^2(1)$= 0.2899	[0.5902]
DEPTSVFX	$\chi^2(1)$= 8.9532	[0.0028]***	DEPTSVFX	$\chi^2(1)$= 2.6009	[0.1068]
ISEMCAP	$\chi^2(1)$= 10.290	[0.0013]***	ISEMCAP	$\chi^2(1)$= 1.8625	[0.1723]
BNKCRED	$\chi^2(1)$= 24.722	[0.0000]***	BNKCRED	$\chi^2(1)$= 2.4520	[0.1174]
RER	$\chi^2(1)$= 23.280	[0.0000]***	RER	$\chi^2(1)$= 1.0291	[0.3104]

Joint Restrictions on Beta Coefficients	LR Test of Restrictions	[Prob.]
Ho: $\beta_{GYD} = \beta_{WHO} = 0$	$\chi^2(2)$ = 1.24113	[0.5376]
Ho: $\beta_{DEPTSVFX} = \beta_{ISEMCAP} = \beta_{BNKCRED} = \beta_{RER} = 0$	$\chi^2(4)$ = 29.55701	[0.000]***
Ho: $\beta_{GYD} + \beta_{BNKCRED} = -\beta_{DEPTSVFX}$	$\chi^2(1)$ = 0.46159	[0.4969]
Ho: $\beta_{GYD} + \beta_{BNKCRED} = -\beta_{DEPTSVFX}; \beta_{WHO} = 0$	$\chi^2(2)$ = 0.91225	[0.6337]

Joint Restrictions on Alpha Coefficients	LR Test of Restrictions	[Prob.]
Ho: $\alpha_{GYD} = \alpha_{DEPTSVFX} = 0$	$\chi^2(2)$ = 4.59675	[0.1004]
Ho: $\alpha_{GYD} = \alpha_{BNKCRED} = 0$	$\chi^2(2)$ = 4.52440	[0.1041]
Ho: $\alpha_{DEPTSVFX} = \alpha_{BNKCRED} = 0$	$\chi^2(2)$ = 8.09755	[0.0174]**
Ho: $\alpha_{GYD} = \alpha_{DEPTSVFX} = \alpha_{BNKCRED} = 0$	$\chi^2(3)$ = 8.92311	[0.0303]**
Ho: $\alpha_{WHO} = \alpha_{ISEMCAP} = \alpha_{RER} = 0$	$\chi^2(3)$ = 2.75446	[0.4311]
Ho: $\alpha_{GYD} = \alpha_{WHO} = \alpha_{ISEMCAP} = \alpha_{BNKCRED} = \alpha_{RER} = 0$	$\chi^2(5)$ = 6.73497	[0.2411]

Joint Restrictions on Coefficients	LR Test of Restrictions	[Prob.]
Ho: β *GYD* $=\beta$ *WHO* $= 0$ α *GYD*$=\alpha$ *WHO*$=\alpha$ *ISEMCAP* $=\alpha$ *BNKCRED* $=\alpha$ *RER* $= 0$	$\chi^2(7)$ = 11.8366	[0.1061]

Joint Restrictions on Coefficients	LR Test of Restrictions	[Prob.]
Ho: β *WHO* $= 0$ β *GYD* $+ \beta$ *BNKCRED* $= -\beta$ *DEPTSVFX* α *GYD*$=\alpha$ *WHO*$=\alpha$ *ISEMCAP* $=\alpha$ *BNKCRED* $=\alpha$ *RER* $= 0$	$\chi^2(7)$ = 7.881646	[0.3432]

Table 4.29-b: Multivariate Stationarity Test

Ho: *Series is Stationary*	Restriction R*β'=0	LR Test of Restrictions	[Prob.]
GCDR	R=[1 0 0 0 0 0 0]	χ^2 (6)= 33.041	[0.000]***
GYD	R=[0 1 0 0 0 0 0]	χ2 (6)= 47.868	[0.000]***
WHO	R=[0 0 1 0 0 0 0]	χ^2 (6)= 48.271	[0.000]***
DEPTSVFX	R= [0 0 0 1 0 0 0]	χ^2 (6)= 38.148	[0.000]***
ISEMCAP	R=[0 0 0 0 1 0 0]	χ^2 (6)= 48.761	[0.000]***
BNKCRED	R= [0 0 0 0 0 1 0]	χ^2 (6)= 41.158	[0.000]***
RER	R= [0 0 0 0 0 0 1]	χ^2 (6)= 40.995	[0.000]***

Modeling the Wealth Effects on Durables Consumption (GCDR)

Table 4.30: Conditional Vector Error Correction Model

Restrictions on Coefficients					LR Test of Restrictions	[Prob.]	
Ho: $\beta_{WHO} = 0$					$\chi^2(7) = 7.881646$	[0.3432]	
$\beta_{GYD} + \beta_{BNKCRED} = -\beta_{DEPTSVFX}$							
$\alpha_{GYD} = \alpha_{WHO} = \alpha_{ISEMCAP} = \alpha_{BNKCRED} = \alpha_{RER} = 0$							
Cointegrating Equation:							
GCDR	GYD	DEPTSVFX	ISEMCAP	BNKCRED	RER	TREND	
1	-0.16961**	0.62459***	-0.053356***	-0.45499***	-0.50814***	-0.0078592***	
	(0.07215)	(0.08718)	(0.016041)	(0.03454)	(0.06604)	(0.001743)	
	[-2.35076]	[7.1647]	[-3.3262]	[-13.1713]	[7.6950]	[4.5095]	

	ΔGCDR	ΔGYD	ΔWHO	ΔDEPTSVFX	ΔISEMCAP	ΔBNKCRED	ΔRER
CointEq.(-1)	-1.35449***			-0.247162**			
	(0.2284)			(0.108)			
	[-5.93]			[-2.29]			
ΔGCDR (-1)	0.245583	0.0958563	-0.00656353	-0.00448577	-0.445002*	-0.0792494	0.0763664
	(0.1716)	(0.06008)	(0.04042)	(0.08153)	(0.2359)	(0.0599)	(0.0523)
	[1.43]	[1.6]	[-0.162]	[-0.055]	[-1.89]	[-1.32]	[1.46]
ΔGCDR (-2)	0.0751786	0.0669641	-0.0297313	-0.0352652	0.0608981	-0.132518**	0.0457145
	(0.1098)	(0.05697)	(0.03832)	(0.05248)	(0.2236)	(0.05679)	(0.0496)
	[0.685]	[1.18]	[-0.776]	[-0.672]	[0.272]	[-2.33]	[0.922]
ΔGYD (-1)	-0.486836**	-0.334785**	0.0700137	0.154544	0.454172	-0.0299264	-0.102593
	(0.2042)	(0.1341)	(0.09021)	(0.09824)	(0.5264)	(0.1337)	(0.1167)
	[-2.38]	[-2.5]	[0.776]	[1.57]	[0.863]	[-0.224]	[-0.879]
ΔGYD (-2)	-0.511231***	-0.249073**	-0.031309	-0.151416*	0.14976	-0.168513	0.144108
	(0.1784)	(0.1147)	(0.07714)	(0.08574)	(0.4502)	(0.1143)	(0.09983)
	[-2.87]	[-2.17]	[-0.406]	[-1.77]	[0.333]	[-1.47]	[1.44]
ΔWHO (-1)	0.0443502	-0.0829614	-0.264683**	0.184235	-1.11275*	0.0067481	-0.121358
	(0.2457)	(0.1588)	(0.1068)	(0.1181)	(0.6233)	(0.1583)	(0.1382)
	[0.180]	[-0.522]	[-2.48]	[1.56]	[-1.79]	[0.0426]	[-0.878]
ΔWHO (-2)	0.0562392	-0.139944	0.178399*	0.174029	-1.31384**	0.0714453	-0.0983168
	(0.2383)	(0.155)	(0.1042)	(0.1146)	(0.6083)	(0.1545)	(0.1349)
	[0.236]	[-0.903]	[1.71]	[1.52]	[-2.16]	[0.462]	[-0.729]
ΔDEPTSVFX (-1)	0.619842**	-0.239086	-0.117815	-0.0871324	0.371527	0.168006	-0.272929*
	(0.2734)	(0.177)	(0.119)	(0.1314)	(0.6946)	(0.1764)	(0.154)
	[2.27]	[-1.35]	[-0.99]	[-0.663]	[0.535]	[0.952]	[-1.77]
ΔDEPTSVFX (-2)	0.199915	0.115206	-0.175381	0.308651**	0.518013	0.071564	-0.130019
	(0.2679)	(0.1753)	(0.1179)	(0.1288)	(0.6883)	(0.1748)	(0.1526)
	[0.746]	[0.657]	[-1.49]	[2.4]	[0.753]	[0.409]	[-0.852]
ΔISEMCAP (-1)	0.114266**	-0.0182138	-0.0250748	-0.0607865**	0.0808745	0.0551523*	0.029376
	(0.04834)	(0.03114)	(0.02095)	(0.02324)	(0.1222)	(0.03104)	(0.02711)
	[2.36]	[-0.585]	[-1.2]	[-2.62]	[0.662]	[1.78]	[1.08]
ΔISEMCAP (-2)	0.0684866	0.0421609	0.0521710**	0.0265841	0.0676479	-0.01719	-0.057309**
	(0.05101)	(0.03264)	(0.02196)	(0.02451)	(0.1281)	(0.03254)	(0.02842)
	[1.34]	[1.29]	[2.38]	[1.08]	[0.528]	[-0.528]	[-2.02]
ΔBNKCRED (-1)	0.72704***	0.242855*	0.0601403	0.284109***	0.786439	0.518358***	-0.0789077
	(0.197)	(0.128)	(0.08613)	(0.09473)	(0.5026)	(0.1276)	(0.1115)
	[3.69]	[1.9]	[0.698]	[3]	[1.56]	[4.06]	[-0.708]
ΔBNKCRED (-2)	-0.32745	-0.352096***	0.10321	-0.0982202	-0.295789	0.0855422	0.148931
	(0.1958)	(0.122)	(0.0821)	(0.09402)	(0.4791)	(0.1217)	(0.1062)
	[-1.67]	[-2.89]	[1.26]	[-1.04]	[-0.617]	[0.703]	[1.4]
ΔRER (-1)	-0.209003	-0.294802**	-0.00416483	0.122399	0.0570862	0.209687	-0.168655
	(0.2169)	(0.1371)	(0.09225)	(0.1042)	(0.5383)	(0.1367)	(0.1194)
	[-0.964]	[-2.15]	[-0.045]	[1.17]	[0.106]	[1.53]	[-1.41]
ΔRER (-2)	-0.17454	0.0964303	0.0348683	0.169259*	0.28031	0.0385045	-0.213764*
	(0.1982)	(0.124)	(0.08342)	(0.0952)	(0.4868)	(0.1236)	(0.1079)
	[-0.881]	[0.778]	[0.418]	[1.78]	[0.576]	[0.311]	[-1.98]

C	1.44068*** (0.2411) [5.98]	0.0018405 (0.008567) [0.215]	0.000945405 (0.005763) [0.164]	0.268921** (0.114) [2.36]	0.00500338 (0.03363) [0.149]	0.00882888 (0.00854) [1.03]	0.0204402*** (0.007458) [2.74]
CSeasonal	-0.255784*** (0.05925) [-4.32]	-0.293427*** (0.03854) [-7.61]	0.0384646 (0.02592) [1.48]	-7.2094E-05 (0.02849) [-0.00253]	0.223047 (0.1513) [1.47]	-0.105015*** (0.03842) [-2.73]	-0.0214821 (0.03355) [-0.64]
CSeasonal_1	-0.167655 (0.1148) [-1.46]	0.0674305 (0.0749) [0.9]	0.0289585 (0.05038) [0.575]	0.0186006 (0.05521) [0.337]	0.24377 (0.294) [0.829]	-0.0995267 (0.07467) [-1.33]	-0.0419139 (0.0652) [-0.643]
CSeasonal_2	-0.18837** (0.08164) [-2.31]	0.152234*** (0.05143) [2.96]	-0.0158814 (0.0346) [-0.459]	-0.0225069 (0.03922) [-0.574]	0.339654* (0.2019) [1.68]	-0.0995636* (0.05127) [-1.94]	0.019317 (0.04477) [0.431]
DUM1993Q1	0.193826* (0.1001) [1.94]	0.140419** (0.06558) [2.14]	0.180113*** (0.04412) [4.08]	0.00809026 (0.04813) [0.168]	0.2046 (0.2574) [0.795]	0.0468876 (0.06538) [0.717]	-0.0204706 (0.05709) [-0.359]
DUM1993Q2	-0.0113364 (0.1074) [-0.106]	0.0229474 (0.07055) [0.325]	-0.32375*** (0.04746) [-6.82]	-0.079561 (0.05166) [-1.54]	0.680145** (0.277) [2.46]	-0.00158491 (0.07034) [-0.0225]	0.0214611 (0.06142) [0.349]
DUM1994Q1	-0.069016 (0.1057) [-0.653]	0.0752511 (0.06791) [1.11]	0.0924463** (0.04568) [2.02]	0.184701*** (0.05081) [3.64]	-0.1079 (0.2666) [-0.405]	-0.00415827 (0.0677) [-0.0614]	-0.181061*** (0.05912) [-3.06]
DUM1994Q2	-0.746266*** (0.1105) [-6.75]	-0.154788** (0.07219) [-2.14]	-0.0586336 (0.04857) [-1.21]	0.0181053 (0.05314) [0.341]	-0.307849 (0.2834) [-1.09]	-0.223433*** (0.07197) [-3.1]	-0.277104*** (0.06285) [-4.41]
DUM1998Q3	-0.14586 (0.09755) [-1.5]	0.0274626 (0.06394) [0.43]	0.00273282 (0.04301) [0.0636]	0.102074** (0.04692) [2.18]	-0.55059** (0.251) [-2.19]	-0.204902*** (0.06374) [-3.21]	0.0455881 (0.05566) [0.819]
DUM2001Q1	-0.264906** (0.09935) [-2.67]	-0.182416*** (0.06513) [-2.8]	0.0445134 (0.04382) [1.02]	0.172136*** (0.04779) [3.6]	-0.248992 (0.2557) [-0.974]	0.0287726 (0.06493) [0.443]	-0.133134** (0.0567) [-2.35]
DUM2001Q2	-0.299094** (0.1173) [-2.55]	0.101634 (0.07704) [1.32]	0.0172125 (0.05182) [0.332]	-0.0642597 (0.05642) [-1.14]	0.0542757 (0.3024) [0.179]	-0.237196*** (0.0768) [-3.09]	-0.146137** (0.06706) [-2.18]
Sigma (σ)	0.0900148	0.0591328	0.0397795	0.0433	0.232133	0.05895	0.0514785

Notes: Endogenous variables in the vector error correction model are ΔGCDR, ΔGYD, ΔWHO, ΔDEPTSVFX, ΔISEMCAP, ΔBNKCRED, ΔRER. Unrestricted exogenous variables are constant, centered seasonal dummies, dummies for 1993:Q1, 1993:Q2, 1994:Q1, 1994:Q2, 1998:Q3, 2001:Q1, 2001:Q2 and restricted exogenous variable is trend. Standard errors are in ( ) and t-statistics in [ ]. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.31-a: Residual Diagnostics for Individual Equations in Conditional VEC Model

	Portmanteau (12) Test for Autocorrelation	AR 1-5 Test	Normality Test	Skewness	Skewness (Transformed)	Excess Kurtosis	Excess Kurtosis (Transformed)	ARCH 1-5 Test	Heteroscedasticity Test
ΔGCDR	13.6921	F(5,46) = 2.1211 [0.0797]*	$\chi2(2)$ = 2.2558 [0.3237]	-0.3598	-1.3602	3.4478	0.9026	F(5,42) = 0.2209 [0.9515]	F(30,21) = 0.3146 [0.9981]
ΔGYD	13.5478	F(5,46) = 2.0035 [0.0959]*	$\chi2(2)$ = 6.1730 [0.0457]**	-0.3657	-1.3818	4.3744	2.5034	F(5,42) = 0.9319 [0.4701]	F(30,21) = 0.3640 [0.9943]
ΔWHO	14.3201	F(5,46) = 0.47739 [0.7912]	$\chi2(2)$ = 1.6761 [0.4325]	0.3920	1.4759	3.5429	0.9746	F(5,42) = 0.3811 [0.8589]	F(30,21) = 0.5784 [0.9169]
ΔDEPTSVFX	9.59356	F(5,46) = 1.5762 [0.1857]	$\chi2(2)$ = 0.6744 [0.7138]	0.0214	0.0827	3.0935	0.8092	F(5,42) = 0.2503 [0.9373]	F(30,21) = 0.7211 [0.7980]
ΔISEMCAP	17.8739	F(5,46) = 3.2892 [0.0127]**	$\chi2(2)$ = 2.6758 [0.2624]	0.3049	1.1602	3.2847	0.7503	F(5,42) = 2.4056 [0.0526]*	F(30,21) = 0.5661 [0.9248]
ΔBNKCRED	8.06686	F(5,46) = 0.86788 [0.5099]	$\chi2(2)$ = 1.2254 [0.5419]	0.1523	0.5870	3.0369	0.5775	F(5,42) = 1.0549 [0.3988]	F(30,21) = 0.4661 [0.9727]
ΔRER	5.80653	F(5,46) = 1.1183 [0.3640]	$\chi2(2)$ = 1.0120 [0.6029]	-0.4102	-1.5409	3.1536	0.1063	F(5,42) = 4.9865 [0.0011]***	F(30,21) = 0.6866 [0.8306]

Table 4.31-b: Residual and Vector Misspecification Tests for Conditional VEC Model

Vector Portmanteau Statistics (12)	535.574	
Vector AR 1-5 Test	F(245,88) = 1.0578	[0.3860]
Vector Normality Test for Residuals	$\chi^2(14)$ = 19.604	[0.1431]
Vector Heteroscedasticity Test	F(840,21) = 0.0378	[1.0000]

Table 4.31-c: Correlation of Structural Residuals (Standard Deviations on Diagonal)

	ΔGCDR	ΔGYD	ΔWHO	ΔDEPTSVFX	ΔISEMCAP	ΔBNKCRED	ΔRER
ΔGCDR	0.09002	0.07266	0.08901	-0.10623	0.12046	0.40545	-0.00772
ΔGYD	0.07266	0.05913	0.03825	0.16131	0.10642	-0.09044	-0.18433
ΔWHO	0.08901	0.03825	0.03978	0.10339	-0.26988	0.10326	-0.44482
ΔDEPTSVFX	-0.10623	0.16131	0.10339	0.04330	0.09373	0.32689	-0.35633
ΔISEMCAP	0.12046	0.10642	-0.26988	0.09373	0.23213	-0.01875	0.10580
ΔBNKCRED	0.40545	-0.09044	0.10326	0.32689	-0.01875	0.05895	-0.15548
ΔRER	-0.00772	-0.18433	-0.44482	-0.35633	0.10580	-0.15548	0.05148

Modeling the Wealth Effects on Durables Consumption (GCDR)

Table 4.32: Final Conditional Vector Error Correction Model

Restrictions on Coefficients	LR Test of Restrictions	[Prob.]
Ho: $\beta_{WHO} = 0$ $\beta_{GYD} + \beta_{BNKCRED} = -\beta_{DEPTSVFX}$ $\alpha_{GYD} = \alpha_{WHO} = \alpha_{ISEMCAP} = \alpha_{BNKCRED} = \alpha_{RER} = 0$	$\chi^2(7) = 7.881646$	[0.3432]

Cointegrating Equation:

GCDR	GYD	DEPTSVFX	ISEMCAP	BNKCRED	RER	TREND
1	-0.16961**	0.62459***	-0.053356***	-0.45499***	-0.50814***	-0.0078592***
	(0.07215)	(0.08718)	(0.016041)	(0.03454)	(0.06604)	(0.001743)
	[-2.35076]	[7.1647]	[-3.3262]	[-13.1713]	[7.6950]	[4.5095]

Table 4.32: Final Conditional Vector Error Correction Model (continued)

ΔGCDR	Coefficient	Std.Error	t-value	[Prob.]
CointEq.(-1)	-1.280950	0.25890	-4.9500	[0.0000]***
ΔGCDR (-1)	0.198857	0.18870	1.0500	[0.2970]
ΔGCDR (-2)	0.053541	0.11610	0.4610	[0.6468]
ΔGYD (-1)	-0.489055	0.20610	-2.3700	[0.0215]**
ΔGYD (-2)	-0.523123	0.18100	-2.8900	[0.0056]***
ΔWHO (-1)	0.030120	0.24900	0.1210	[0.9042]
ΔWHO (-2)	0.045528	0.24100	0.1890	[0.8509]
ΔDEPTSVFX (-1)	0.604895	0.27690	2.1800	[0.0335]**
ΔDEPTSVFX (-2)	0.192305	0.27050	0.7110	[0.4804]
ΔISEMCAP (-1)	0.117335	0.04902	2.3900	[0.0204]**
ΔISEMCAP (-2)	0.0721925	0.05181	1.3900	[0.1695]
ΔBNKCRED (-1)	0.736104	0.19930	3.6900	[0.0005]***
ΔBNKCRED (-2)	-0.347223	0.20010	-1.7400	[0.0887]*
ΔRER (-1)	-0.190072	0.22090	-0.8600	[0.3936]
ΔRER (-2)	-0.155137	0.20240	-0.7660	[0.4470]
Constant	1.363180	0.27320	4.9900	[0.0000]***
CSeasonal	-0.258483	0.05994	-4.3100	[0.0001]***
CSeasonal_1	-0.172103	0.11610	-1.4800	[0.1442]
CSeasonal_2	-0.195843	0.08323	-2.3500	[0.0225]**
DUM1993Q1	0.196055	0.10100	1.9400	[0.0578]*
DUM1993Q2	-0.0114967	0.10840	-0.1060	[0.9159]
DUM1994Q1	-0.061945	0.10730	-0.5780	[0.5661]
DUM1994Q2	-0.749931	0.11160	-6.7200	[0.0000]***
DUM1998Q3	-0.143743	0.09848	-1.4600	[0.1505]
DUM2001Q1	-0.266958	0.10030	-2.6600	[0.0104]**
DUM2001Q2	-0.299835	0.11830	-2.5300	[0.0144]**

Sigma (σ) = 0.0908213

Table 4.32: Final Conditional Vector Error Correction Model (continued)

ΔDEPTSVFX	Coefficient	Std.Error	t-value	[Prob.]
CointEq. (-1)	-0.263475	0.12460	-2.1100	[0.0394]**
ΔGCDR (-1)	0.005886	0.09083	0.0648	[0.9486]
ΔGCDR (-2)	-0.030454	0.05590	-0.5450	[0.5883]
ΔGYD (-1)	0.155000	0.09920	1.5600	[0.1244]
ΔGYD (-2)	-0.148807	0.08711	-1.7100	[0.0937]*
ΔWHO (-1)	0.187407	0.11980	1.5600	[0.1241]
ΔWHO (-2)	0.176449	0.11600	1.5200	[0.1345]
ΔDEPTSVFX (-1)	-0.083801	0.13330	-0.6290	[0.5323]
ΔDEPTSVFX (-2)	0.310289	0.13020	2.3800	[0.0209]**
ΔISEMCAP (-1)	-0.061466	0.02360	-2.6000	[0.012]**
ΔISEMCAP (-2)	0.025762	0.02494	1.0300	[0.3064]
ΔBNKCRED (-1)	0.282047	0.09593	2.9400	[0.0049]***
ΔBNKCRED (-2)	-0.093789	0.09632	-0.9740	[0.3348]
ΔRER (-1)	0.118212	0.10630	1.1100	[0.2714]
ΔRER (-2)	0.164944	0.09744	1.6900	[0.0966]*
Constant	0.286114	0.13150	2.1800	[0.0343]**
CSeasonal	0.000524	0.02885	0.0182	[0.9856]
CSeasonal_1	0.019561	0.05586	0.3500	[0.7276]
CSeasonal_2	-0.020862	0.04006	-0.5210	[0.6048]
DUM1993Q1	0.007597	0.04863	0.1560	[0.8765]
DUM1993Q2	-0.079530	0.05216	-1.5200	[0.1335]
DUM1994Q1	0.183121	0.05163	3.5500	[0.0008]***
DUM1994Q2	0.018920	0.05373	0.3520	[0.7262]
DUM1998Q3	0.101605	0.04740	2.1400	[0.0369]**
DUM2001Q1	0.172583	0.04827	3.5800	[0.0008]***
DUM2001Q2	-0.064100	0.05696	-1.1300	[0.2657]
Sigma (σ) = 0.0437151				

Notes: *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.33-a: F Tests on Regressors

F test on Regressors except Unrestricted:			F(32,100) = 5.98686 [0.0000]***		
F Tests on Retained Regressors:			F(2,50) =		
ΔGCDR (-1)	0.55970	[0.575]	ΔGYD (-1)	3.61346	[0.034]**
ΔGCDR (-2)	0.22615	[0.798]	ΔGYD (-2)	6.10575	[0.004]***
ΔWHO (-1)	1.23925	[0.298]	ΔDEPTSVFX (-1)	2.41829	[0.099]*
ΔWHO (-2)	1.19446	[0.311]	ΔDEPTSVFX (-2)	3.24260	[0.047]**
ΔISEMCAP (-1)	5.55074	[0.007]***	ΔBNKCRED (-1)	12.1835	[0.000]***
ΔISEMCAP (-2)	1.64253	[0.204]	ΔBNKCRED (-2)	2.13949	[0.128]
ΔRER (-1)	0.87963	[0.421]	CointEq. (-1)	15.4406	[0.000]***
ΔRER (-2)	1.57587	[0.217]	Constant	15.8199	[0.000]***
CSeasonal	9.21108	[0.000]***	DUM1993Q1	1.91077	[0.159]
CSeasonal_1	1.09667	[0.342]	DUM1993Q2	1.17501	[0.317]
CSeasonal_2	3.00741	[0.058]*	DUM1994Q1	6.18808	[0.004]***
DUM2001Q1	8.85174	[0.001]***	DUM1994Q2	22.1864	[0.000]***
DUM2001Q2	4.10830	[0.022]**	DUM1998Q3	3.00599	[0.059]*

Table 4.33-b: Tests on Significance of Each Variable

ΔGCDR	F(4,100) = 0.4892	[0.7436]
ΔGYD	F(4,100) = 4.6090	[0.0019]***
ΔWHO	F(4,100) = 0.7703	[0.5471]
ΔDEPTSVFX	F(4,100) = 2.8542	[0.0275]**
ΔISEMCAP	F(4,100) = 3.5330	[0.0097]***
ΔBNKCRED	F(4,100) = 5.5260	[0.0005]***
ΔRER	F(4,100) = 1.0423	[0.3893]
CointEq. (-1)	F(2,50) = 15.441	[0.0000]***
DUM1993Q1	F(2,50) = 1.9108	[0.1586]
DUM1993Q2	F(2,50) = 1.1750	[0.3172]
DUM1994Q1	F(2,50) = 6.1881	[0.0040]***
DUM1994Q2	F(2,50) = 22.186	[0.0000]***
DUM1998Q3	F(2,50) = 3.0060	[0.0585]*
DUM2001Q1	F(2,50) = 8.8517	[0.0005]***
DUM2001Q2	F(2,50) = 4.1083	[0.0223]**
Constant	F(2,50) = 15.820	[0.0000]***
CSeasonal	F(6,100) = 4.2052	[0.0008]***

Table 4.33-c: Tests on Significance of Each Lag

Tests on Significance of Each Lag		
Lag 1	F(16,100) = 8.2294	[0.0000]***
Lag 2	F(14,100) = 1.7050	[0.0662]*

Tests on the Significance of All Lags up to 2		
Lag 1 - 2	F(30,100) = 6.1202	[0.0000]***
Lag 2 - 2	F(14,100) = 1.7050	[0.0662]*

Notes: Numbers in [ ] are p-values. *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.34-a: Residual Diagnostics for Equations in Final Conditional VEC Model

	ΔGCDR	ΔDEPTSVFX
Portmanteau (12) Test for Autocorrelation	12.4905	9.5235
AR 1-5 Test	F(5,46) = 1.9930 [0.0975]*	F(5,46) = 1.6009 [0.1788]
Normality Test	$\chi 2$ (2) = 2.2232 [0.3290]	$\chi 2$ (2) = 0.6767 [0.7129]
Skewness	-0.31985	-0.059921
Skewness (Transformed)	-1.2151	-0.2318
Excess Kurtosis	3.2064	3.0811
Excess Kurtosis (Transformed)	0.54402	0.76807
ARCH 1-5 Test	F(5,41) = 0.18904 [0.9651]	F(5,41) = 0.2666 [0.9287]
Heteroscedasticity Test	F(30,20) = 0.2947 [0.9987]	F(30,20) = 0.6746 [0.8393]

Table 4.34-b: Residual and Vector Misspecification Tests for Final Conditional VEC Model

Vector Portmanteau Statistics (12)	45.7877
Vector AR 1-5 Test	F(20,80) = 2.0166
Vector Normality Test for Residuals	χ^2 (4) = 2.4161 [0.6597]
Vector Heteroscedasticity Test	F(90,54) = 0.3186 [1.0000]

Table 4.34-c: Correlation of Residuals (Standard Deviations on Diagonal)

	ΔGCDR	ΔDEPTSVFX
ΔGCDR	0.09082	-0.10561
ΔDEPTSVFX	-0.10561	0.04372

Modeling the Wealth Effects on Durables Consumption (GCDR)

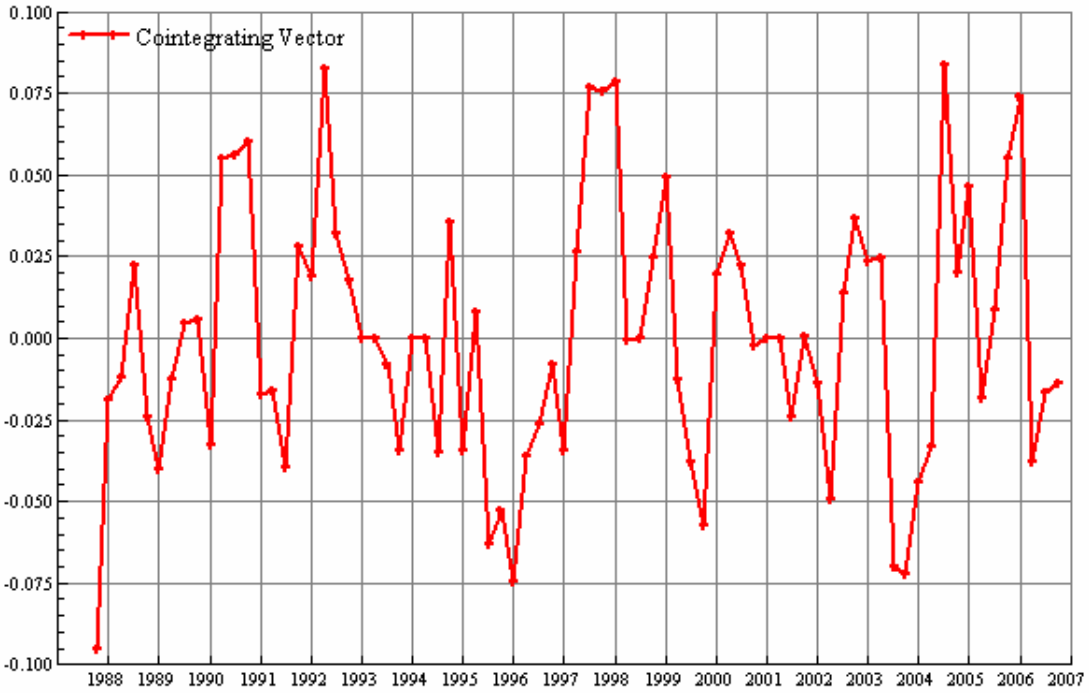
Table 4.35: Parsimonious Conditional Vector Error Correction Model

Restrictions on Coefficients	LR Test of Restrictions	[Prob.]
Ho: $\beta_{WHO} = 0$	$\chi^2(7) = 7.881646$	[0.3432]
$\beta_{GYD} + \beta_{BNKCRED} = -\beta_{DEPTSVFX}$		
$\alpha_{GYD} = \alpha_{WHO} = \alpha_{ISEMCAP} = \alpha_{BNKCRED} = \alpha_{RER} = 0$		

Cointegrating Equation:

GCDR	GYD	DEPTSVFX	ISEMCAP	BNKCRED	RER	TREND
1	-0.16961**	0.62459***	-0.053356***	-0.45499***	-0.50814***	-0.0078592***
	(0.07215)	(0.08718)	(0.016041)	(0.03454)	(0.06604)	(0.001743)
	[-2.35076]	[7.1647]	[-3.3262]	[-13.1713]	[7.6950]	[4.5095]

Graph of Cointegrating Vector for Durables Consumption



Notes: Lagged Δy and unrestricted regressors removed.

Modeling the Wealth Effects on Durables Consumption (GCDR)

Table 4.35: Parsimonious Conditional Vector Error Correction Model (continued)

ΔGCDR	Coefficient	Std.Error	t-value	[Prob.]
CointEq. (-1)	-1.030390	0.11270	-9.1400	[0.0000]***
ΔGYD (-1)	-0.470737	0.16940	-2.7800	[0.0076]***
ΔGYD (-2)	-0.646132	0.12970	-4.9800	[0.0000]***
ΔDEPTSVFX (-1)	0.558900	0.22770	2.4500	[0.0176]**
ΔDEPTSVFX (-2)	0.315833	0.19730	1.6000	[0.1156]
ΔISEMCAP (-1)	0.127224	0.04023	3.1600	[0.0026]***
ΔISEMCAP (-2)	0.096918	0.04264	2.2700	[0.0273]**
ΔBNKCRED (-1)	0.774851	0.16500	4.7000	[0.0000]***
ΔBNKCRED (-2)	-0.491498	0.15050	-3.2700	[0.002]***
Constant	1.093470	0.11810	9.2600	[0.0000]***
CSeasonal	-0.264153	0.05193	-5.0900	[0.0000]***
CSeasonal_1	-0.200308	0.09855	-2.0300	[0.0473]**
CSeasonal_2	-0.251229	0.06707	-3.7500	[0.0005]***
DUM1993Q1	0.201546	0.08994	2.2400	[0.0294]**
DUM1994Q2	-0.744689	0.09760	-7.6300	[0.0000]***
DUM2001Q1	-0.270351	0.09151	-2.9500	[0.0047]***
DUM2001Q2	-0.296225	0.10500	-2.8200	[0.0068]***
Sigma (σ) = 0.0841358				

ΔDEPTSVFX	Coefficient	Std.Error	t-value	[Prob.]
CointEq. (-1)	-0.266743	0.05203	-5.1300	[0.0000]***
ΔGYD (-1)	0.080312	0.02895	2.7700	[0.0077]***
ΔGYD (-2)	-0.162698	0.02625	-6.2000	[0.0000]***
ΔDEPTSVFX (-2)	0.157686	0.0862	1.8300	[0.0732]*
ΔISEMCAP (-1)	-0.067648	0.01997	-3.3900	[0.0014]***
ΔBNKCRED (-1)	0.324787	0.07373	4.4100	[0.0001]***
Constant	0.292205	0.05514	5.3000	[0.0000]***
DUM1994Q1	0.204718	0.04432	4.6200	[0.0000]***
DUM2001Q1	0.166231	0.04513	3.6800	[0.0006]***
DUM2001Q2	-0.104028	0.04742	-2.1900	[0.0328]**
Sigma (σ) = 0.0438956				

LR Test of Overidentifying Restrictions: $\chi 2\ (25) = 22.829\ [0.5875]$

	(T, p)	Log Likelihood	SC	HQ	AIC
Conditional VECM	(77, 52)	239.36485	-3.2838	-4.2335	-4.8666
Parsimonious VECM	(77, 27)	227.95018	-4.3976*	-4.8908*	-5.2195*

Notes: *, **, *** denote 10 percent, 5 percent and 1 percent significance levels respectively.

Table 4.36-a: Residual Diagnostics for Equations in Parsimonious Conditional VEC Model

	ΔGCDR	ΔDEPTSVFX
Portmanteau (12) Test for Autocorrelation	9.83471	10.7771
AR 1-5 Test	F(5,46) = 2.1711 [0.0737]*	F(5,46) = 4.5148 [0.002]***
Normality Test	χ2(2) = 1.2543 [0.5341]	χ2(2) = 1.9045 [0.3859]
Skewness	-0.18982	-0.34888
Skewness (Transformed)	-0.72981	-1.3209
Excess Kurtosis	2.9969	3.0784
Excess Kurtosis (Transformed)	0.4269	0.17394
ARCH 1-5 Test	F(5,54) = 0.0679 [0.9966]	F(5,54) = 0.5273 [0.7546]
Heteroscedasticity Test	F(40,23) = 0.3569 [0.9979]	F(40,23) = 0.6939 [0.8477]

Table 4.36-b: Residual Diagnostics and Vector Misspecification Tests for VEC System

Vector Portmanteau Statistics (12)	41.0953	
Vector AR 1-5 Test	F(20,106) = 0.8060	[0.7014]
Vector Normality Test for Residual	χ^2(4) = 2.4899	[0.6464]
Vector Heteroscedasticity Test	F(120,63) = 0.4130	[1.0000]

Table 4.36-c: Correlation of Residuals (Standard Deviations on Diagonal)

	ΔGCDR	ΔDEPTSVFX
ΔGCDR	0.08414	-0.15452
ΔDEPTSVFX	-0.15452	0.04390

Figure 4.1-a: IMKB-100 Index and Market Value of Stock Units Held by Foreign Banks, Brokerage Houses or Individuals in Istanbul Stock Exchange

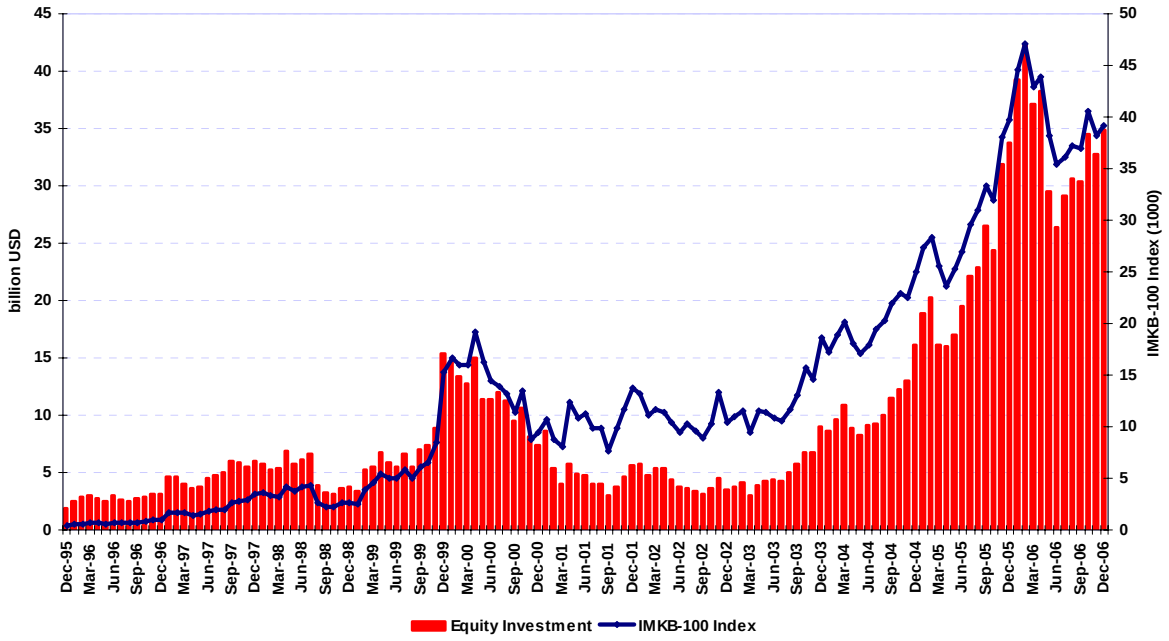
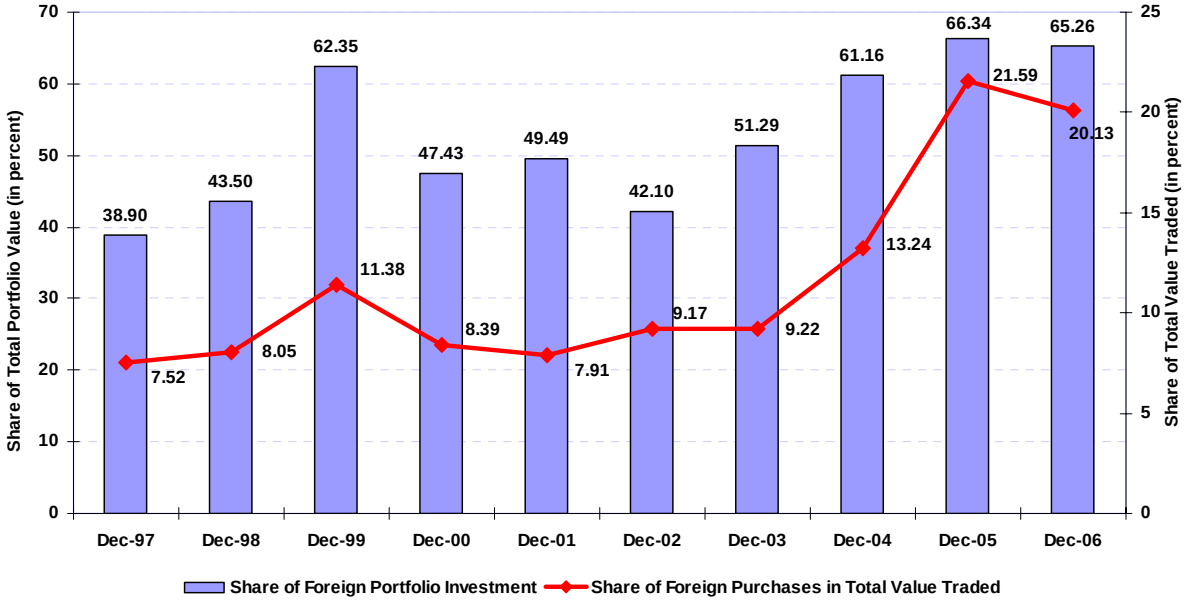
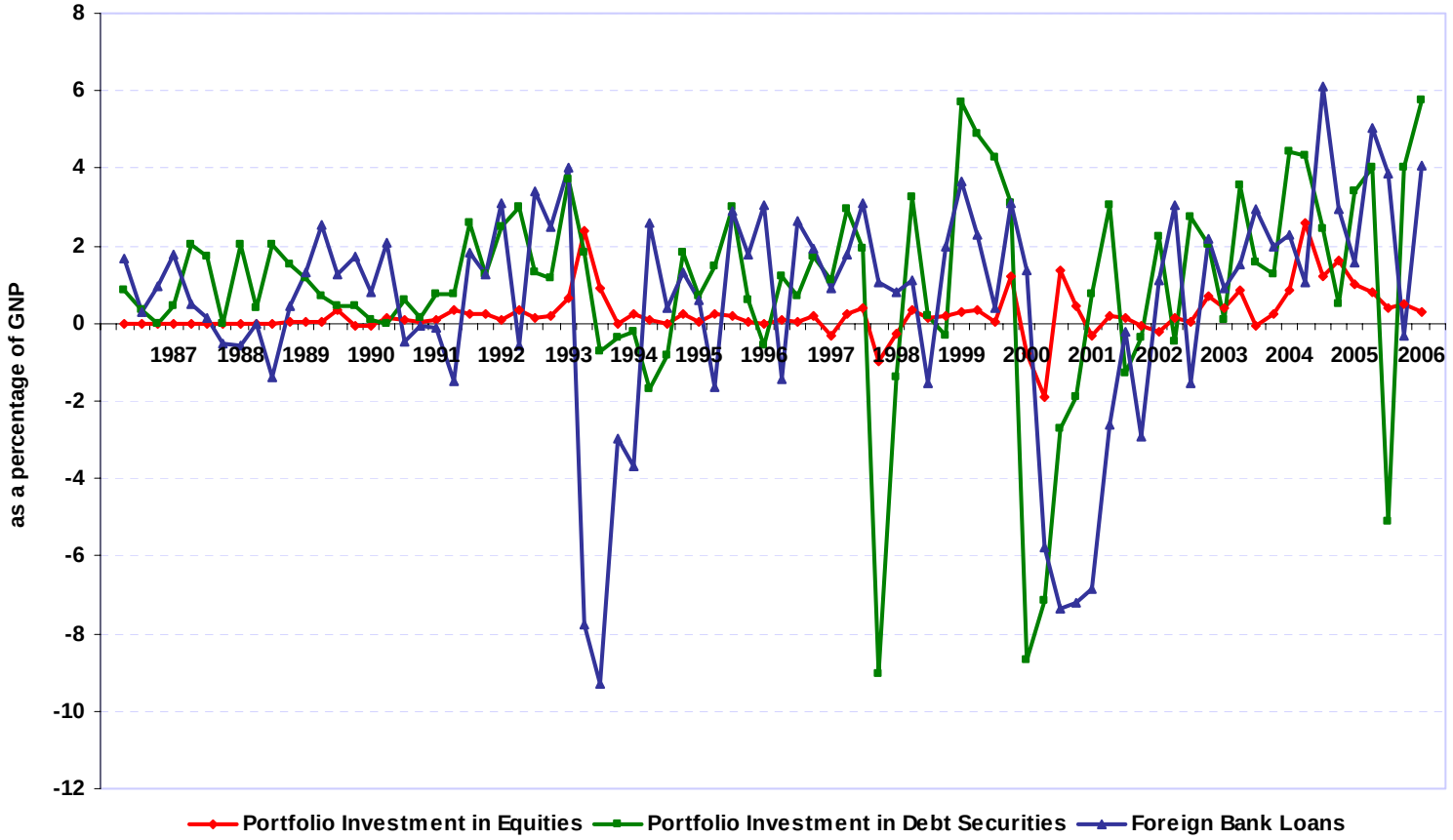


Figure 4.1-b: Annual Share of Foreign Investors in Total Market Value and Share of Foreign Purchases in Total Value Traded in Istanbul Stock Exchange



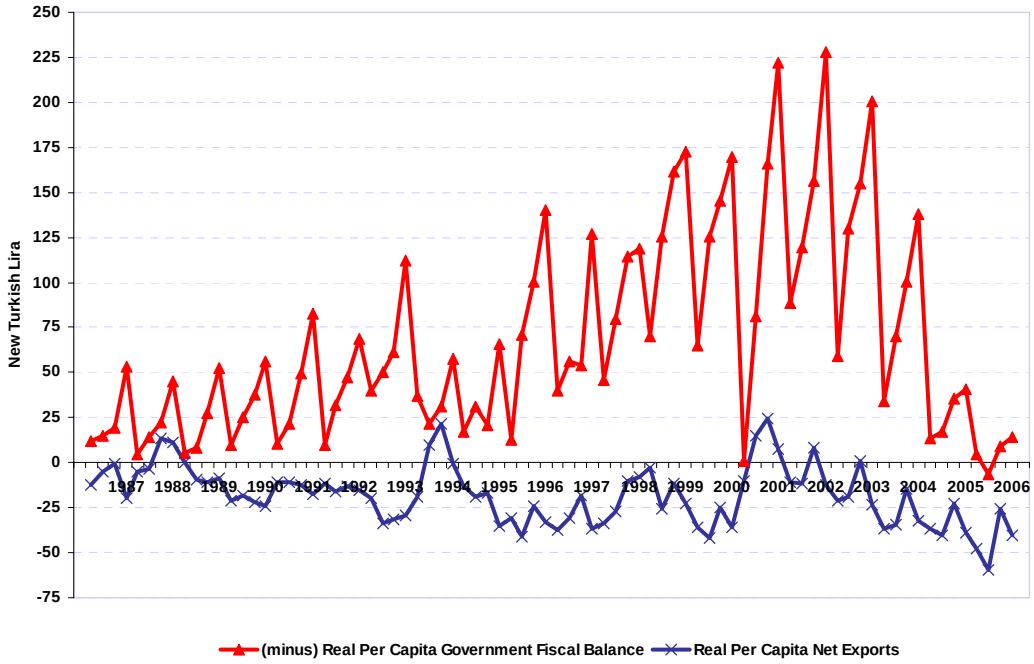
Notes: Data on the value of stock transactions realized on behalf and account of foreign banks, brokerage houses or individuals and total value traded are obtained from the IMKB. The market value of stock units held by foreign banks, brokerage houses and individuals under the custody of the Clearing and Settlement Center of Istanbul Stock Exchange is calculated using data obtained from the Clearing and Settlement Center (Takasbank), Central Registry Agency (MKK), Association of Capital Market Intermediary Institutions of Turkey (TSPAKB) Investor Profile Reports (2001-2006) and TSPAKB Sermaye Piyasasında Gündem, September 2007.

Figure 4.2: Capital Inflows to Turkey



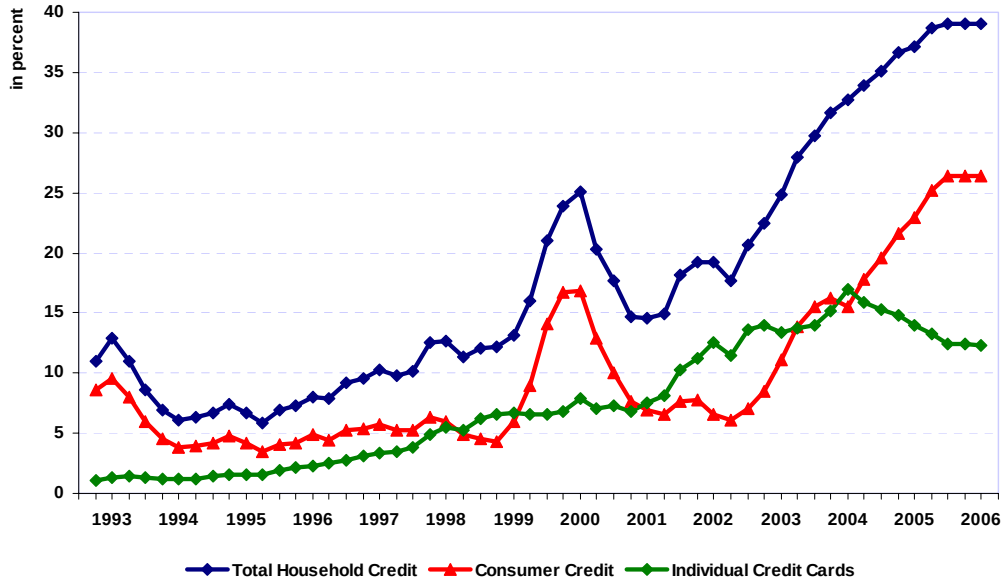
Notes: This graph displays the liabilities of portfolio investment in equities, portfolio investment in debt securities and foreign bank loans as a percentage of the GNP in each quarter.

Figure 4.3: Components of the Net Private Disposable Income



Notes: This graph displays the movement of the (minus) real per capita government fiscal balance and the real per capita net export series that are used in the calculation of real per capita net private disposable income.

Figure 4.4: Share of Household Credit in Total Credit Given by Deposit Banks in Turkey



Notes: This graph displays the quarterly share of consumer credit, individual credit cards and total household credit in total private sector credit given by deposit banks.

Figure 4.5: Graphical Analysis of the Variables

Figure 4.5-a: Real Per Capita Final Consumption Excluding Durables (GCFINEXLDR)

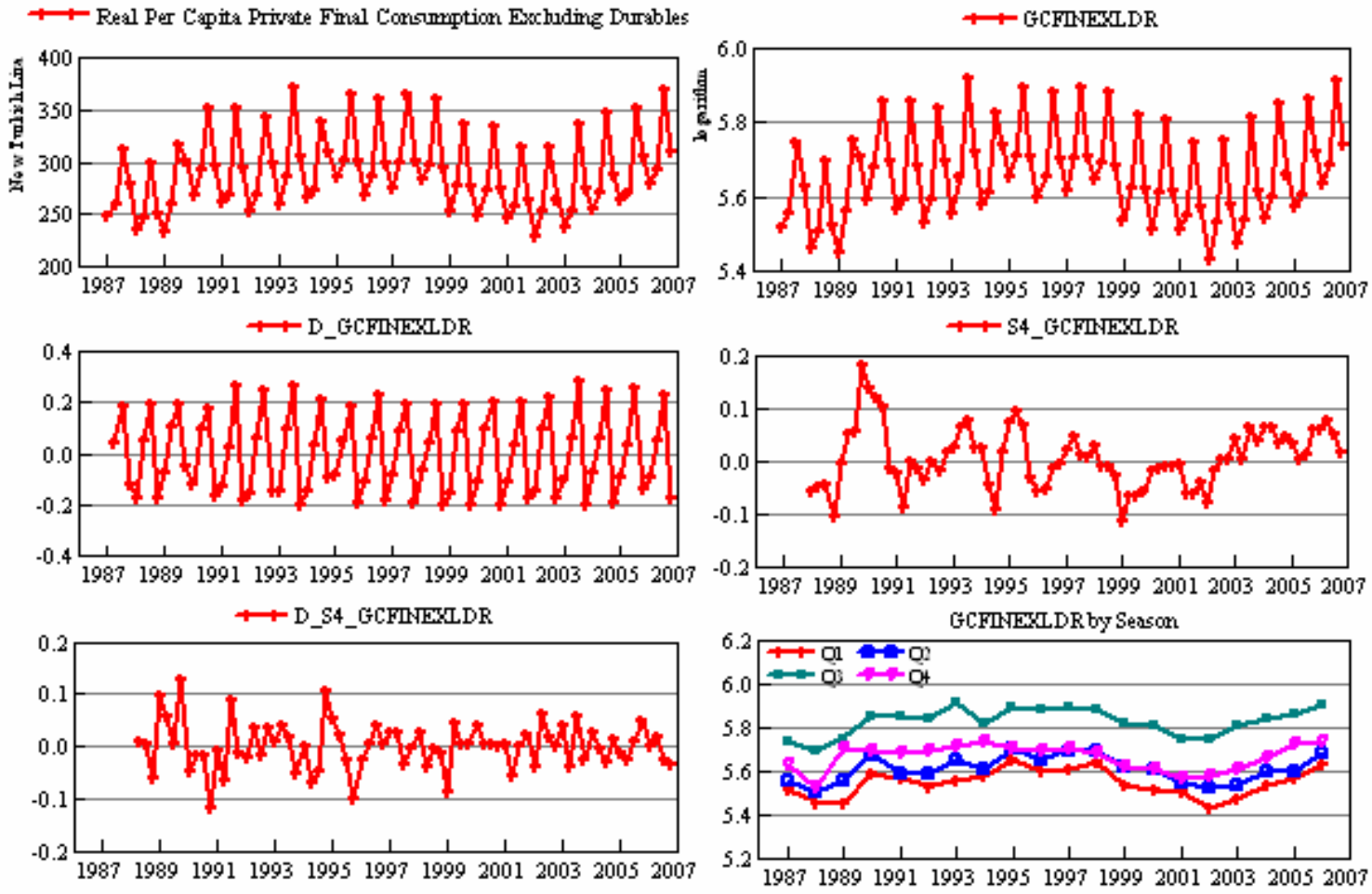


Figure 4.5-b: Real Per Capita Consumption of Durables (GCDR)

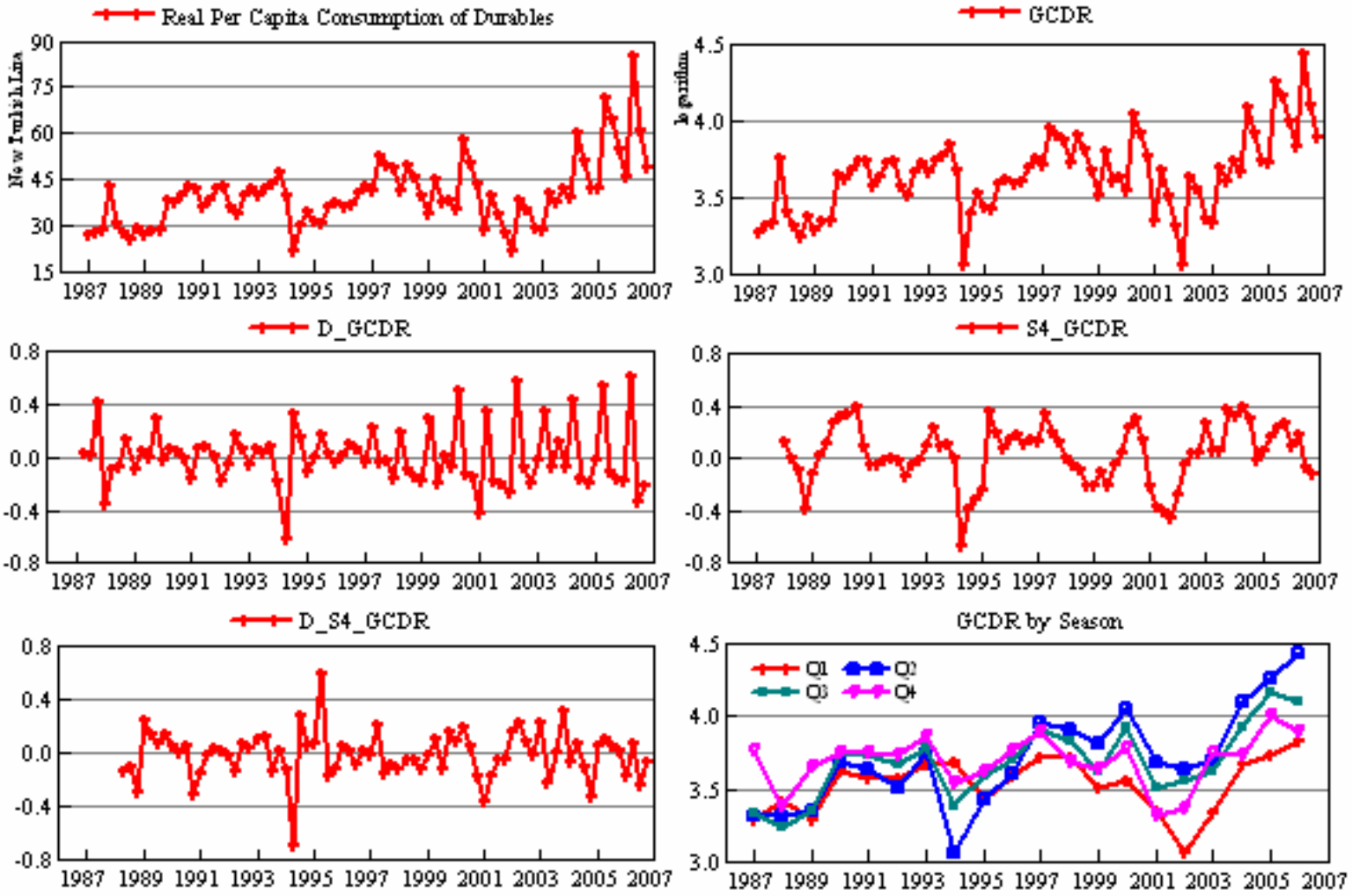


Figure 4.5-c: Real Per Capita Net Private Disposable Income (GYD)

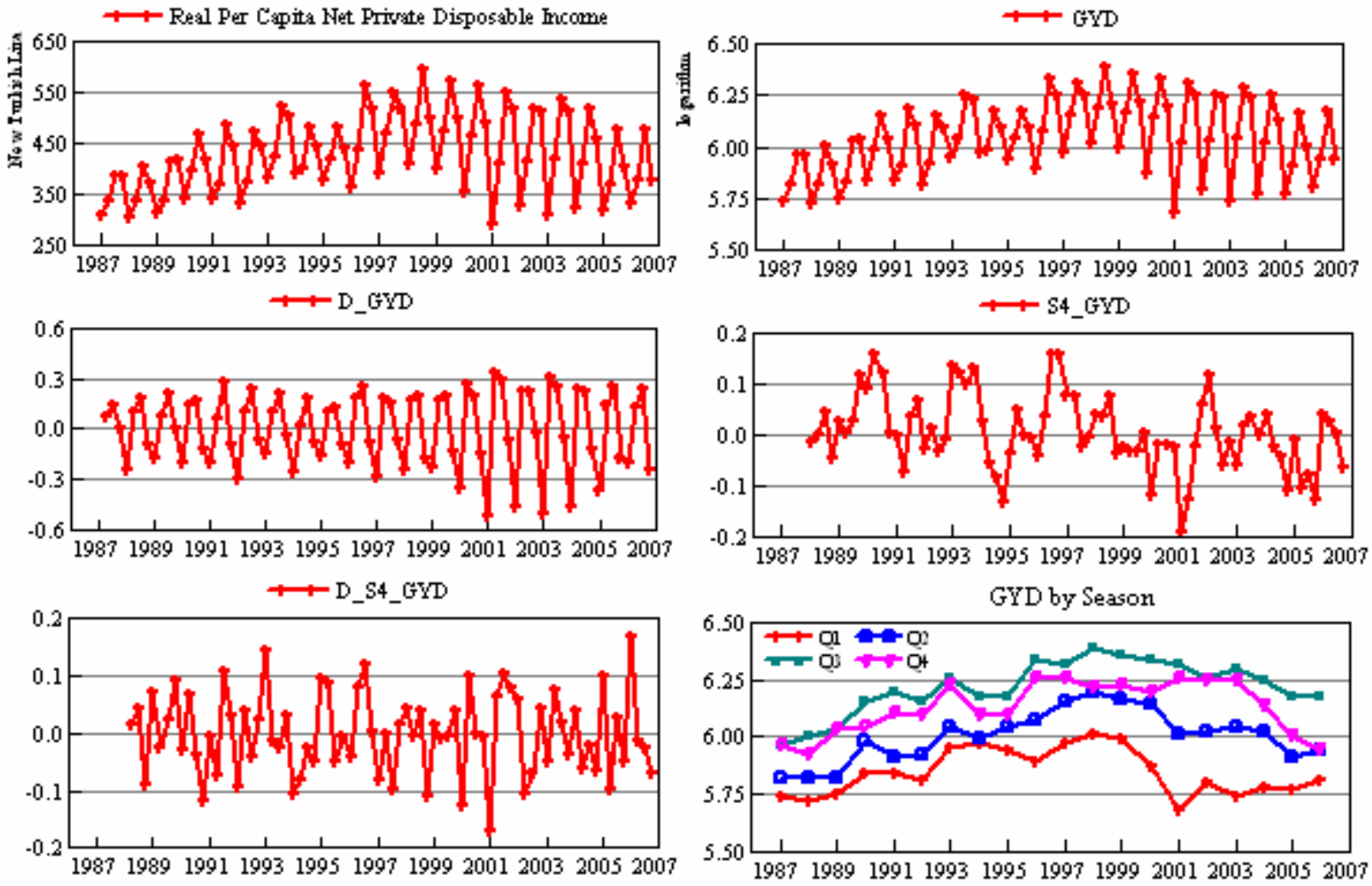


Figure 4.5-d: Real Per Capita Housing Wealth (WHO)

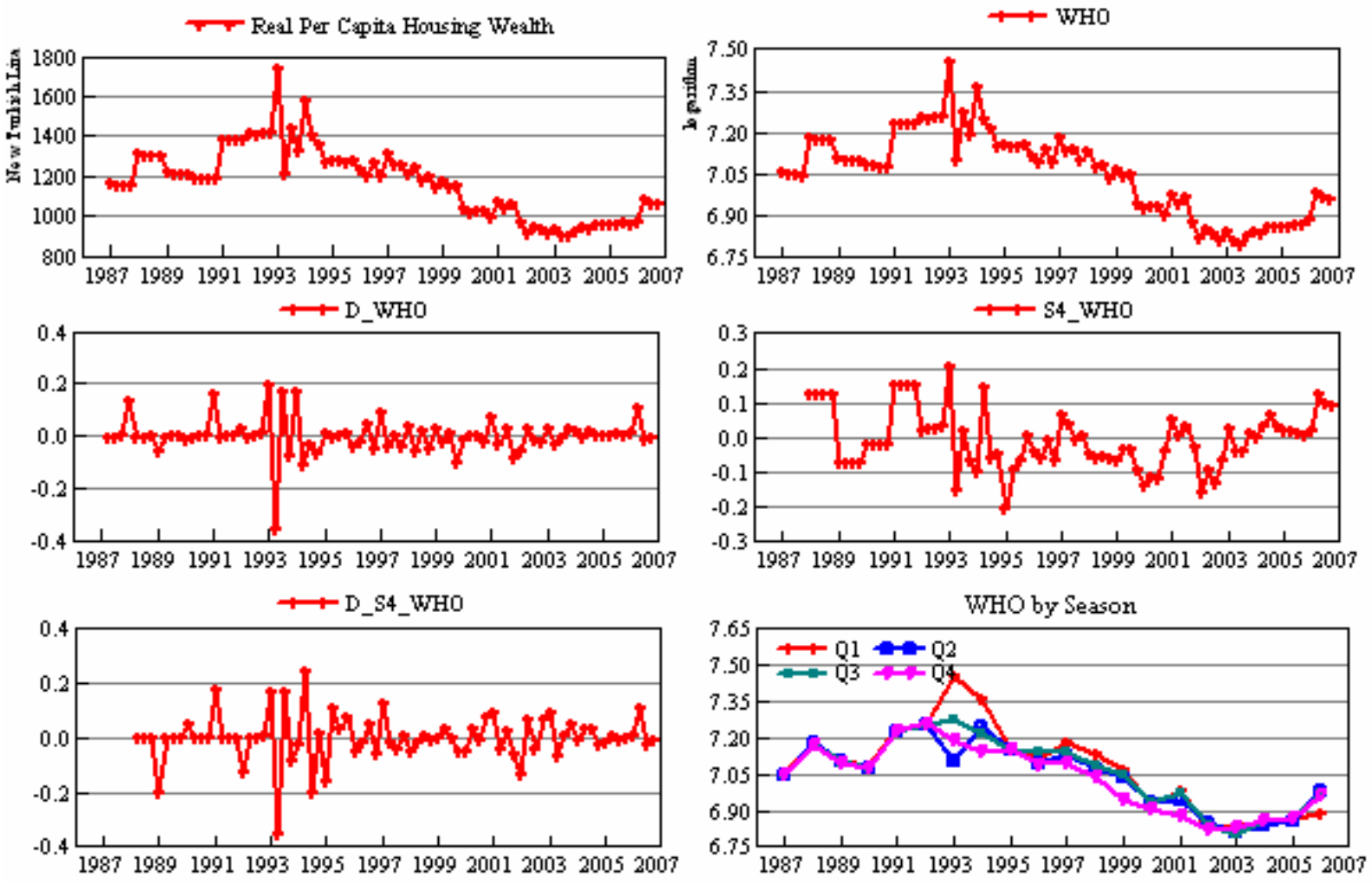


Figure 4.5-e: Real Per Capita Time, Savings, and Foreign Currency Deposits (DEPTSVFX)

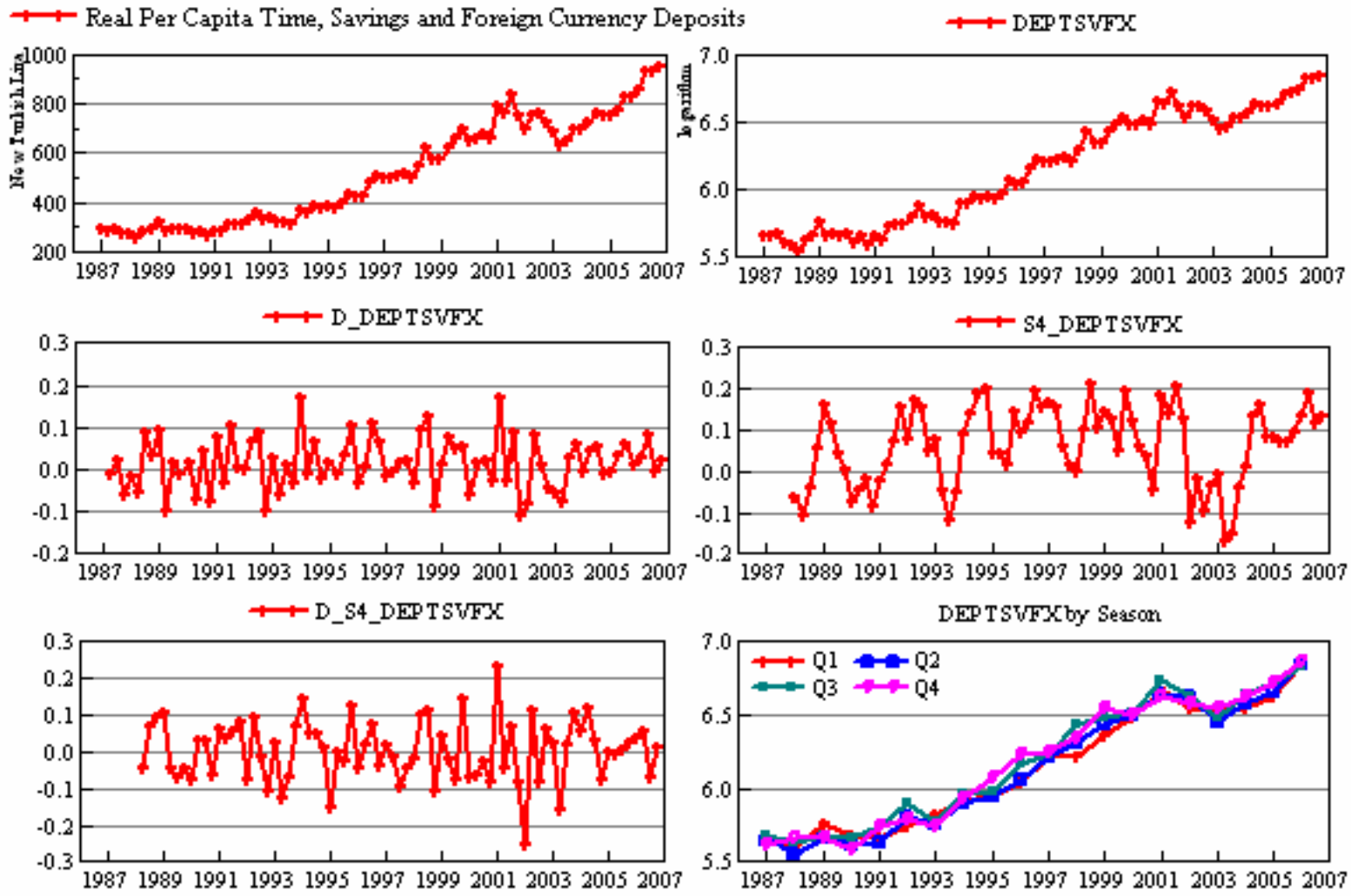


Figure 4.5-f: Real Per Capita Istanbul Stock Exchange Market Capitalization (ISEMCAP)

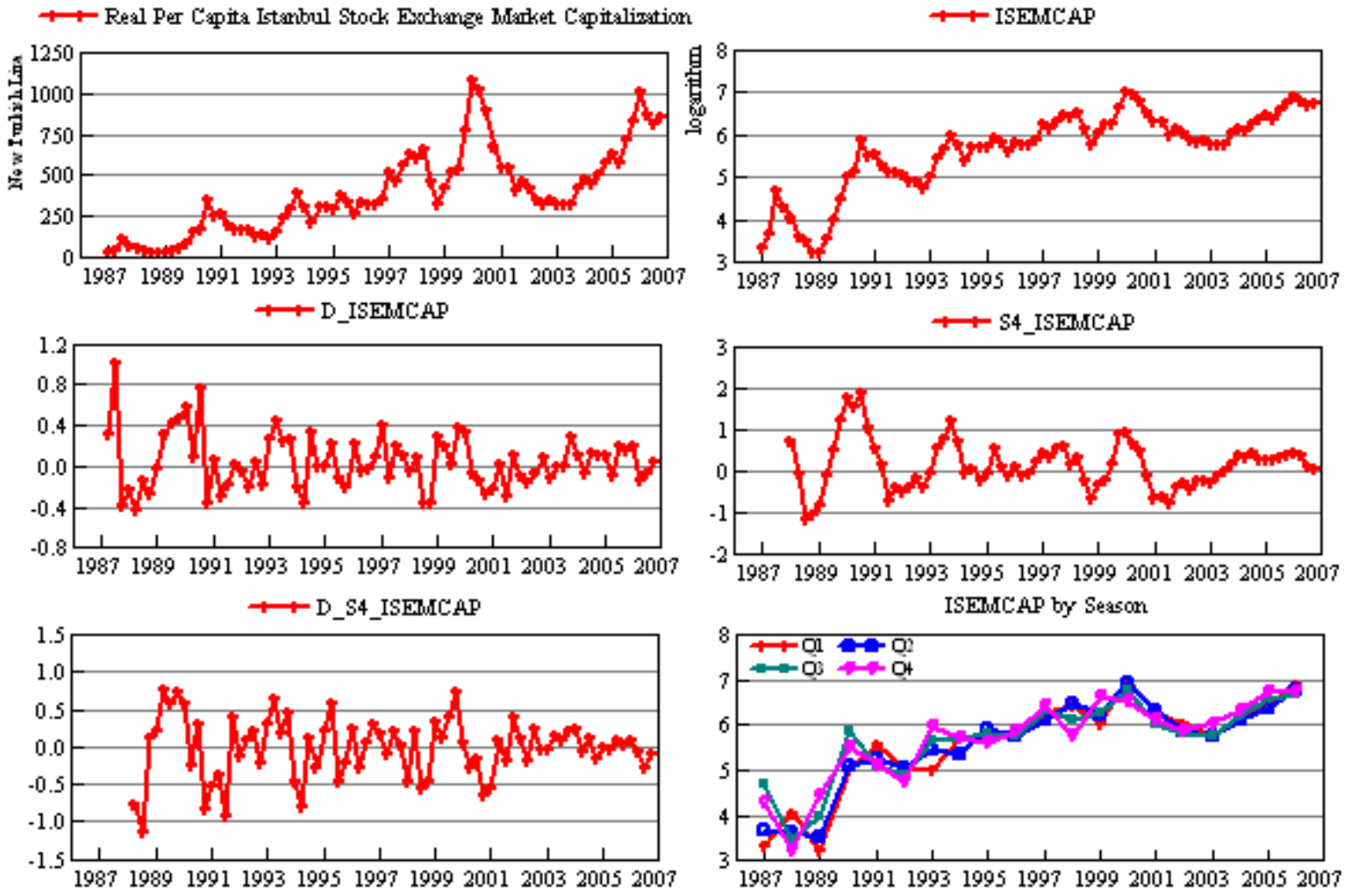


Figure 4.5-g: Real Per Capita Bank Credit to Private Sector (BNKCRED)

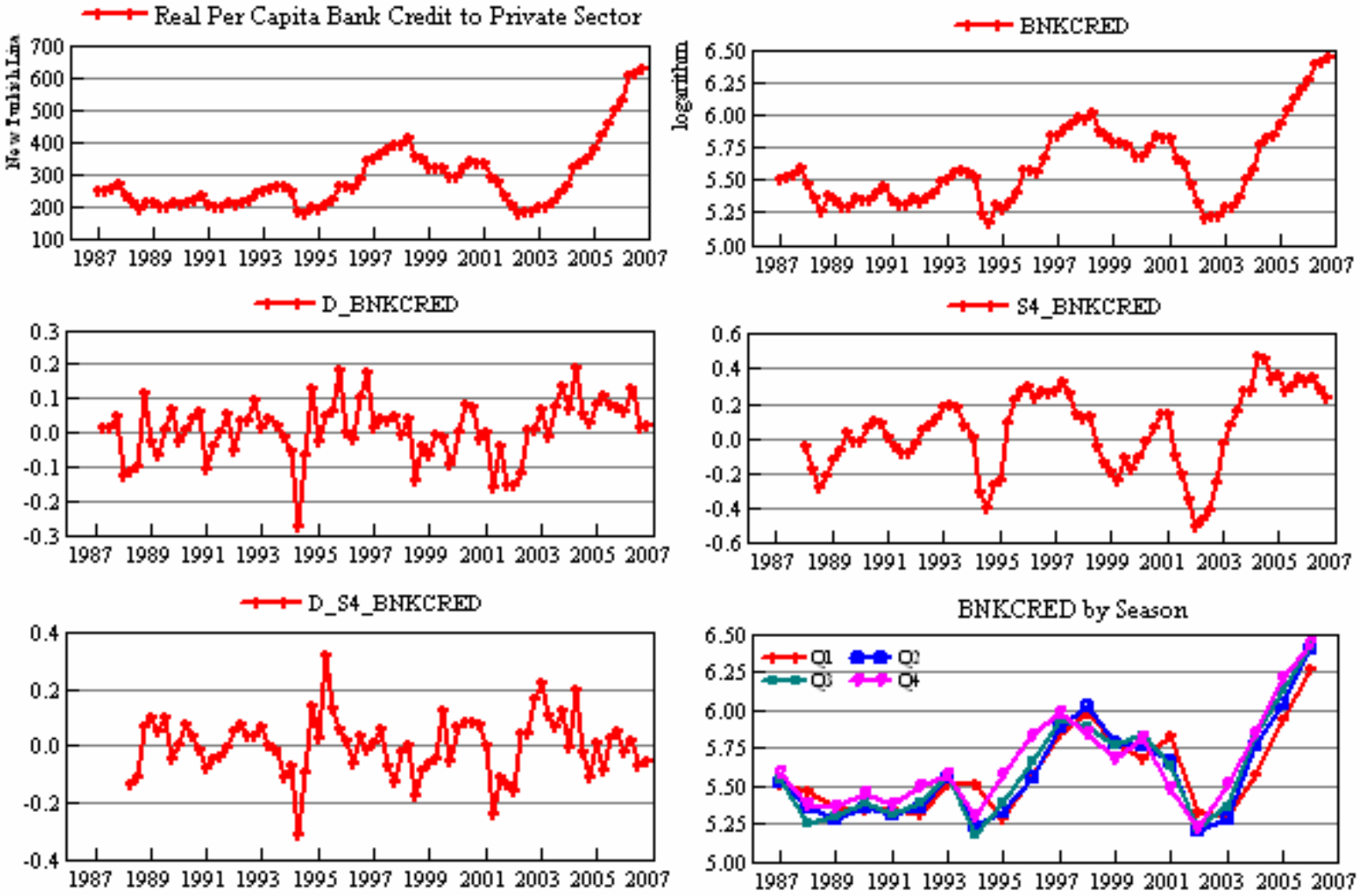
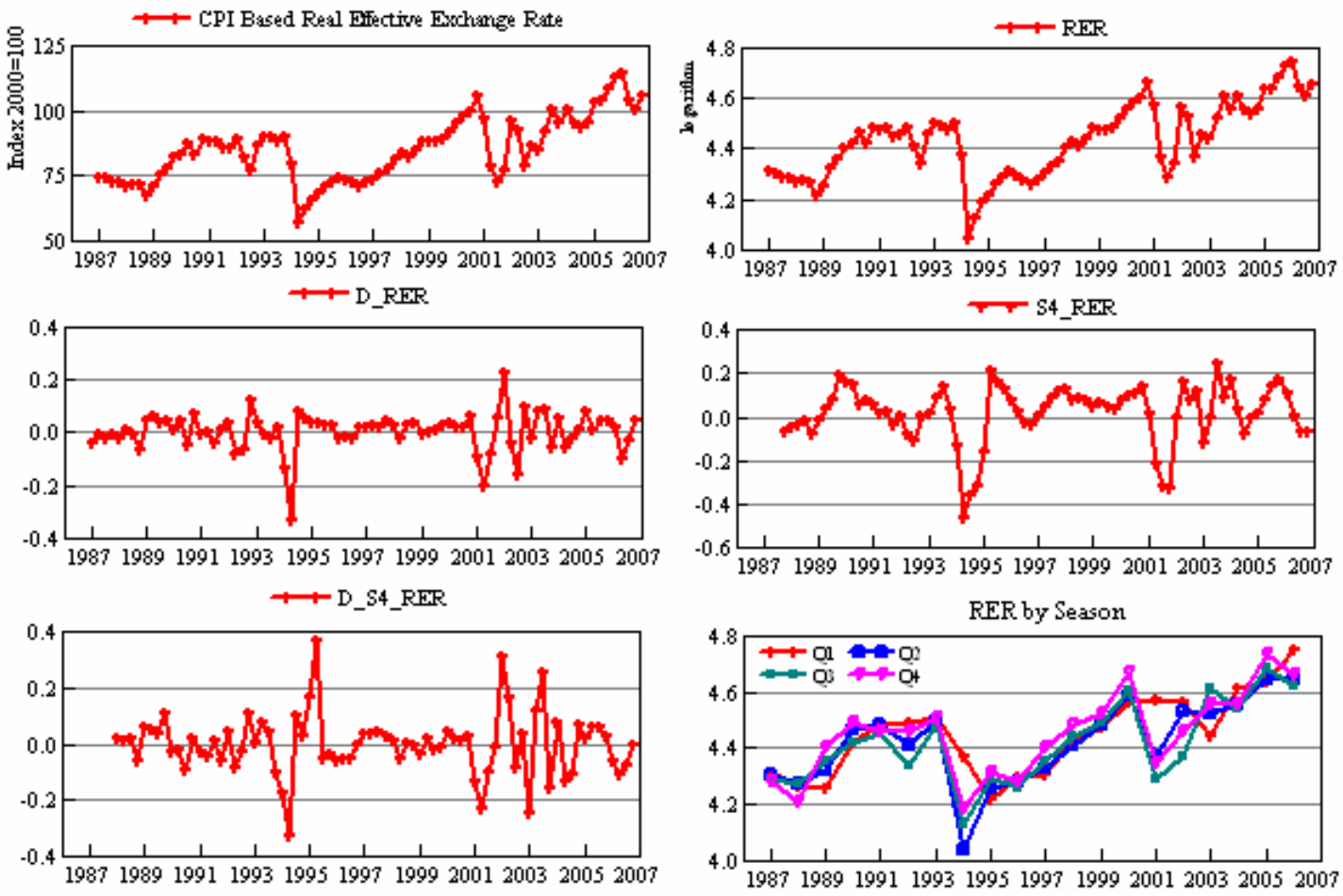


Figure 4.5-h: CPI Based Real Effective Exchange Rate (RER)



Notes: The second panels in the figures show the dependent variables (*gcfinexldr* and *gcdr*) and independent variables (*gyd, who, deptsvfx, isemcap, bnkcred, rer*) used in the econometric model. They are derived by taking the natural logarithm of the variables displayed in the first panels. The other following panels display the first difference, seasonal (quarterly) difference, first difference of the seasonal difference, and season-by-season plot of the variables respectively.

Figure 4.6: Joint Plots of the Explanatory Variables with the Dependent Variable (GCFINEXLDR)

Figure 4.6-a: Real Per Capita Net Private Disposable Income (GYD) and Real Per Capita Final Consumption Excluding Durables (GCFINEXLDR)

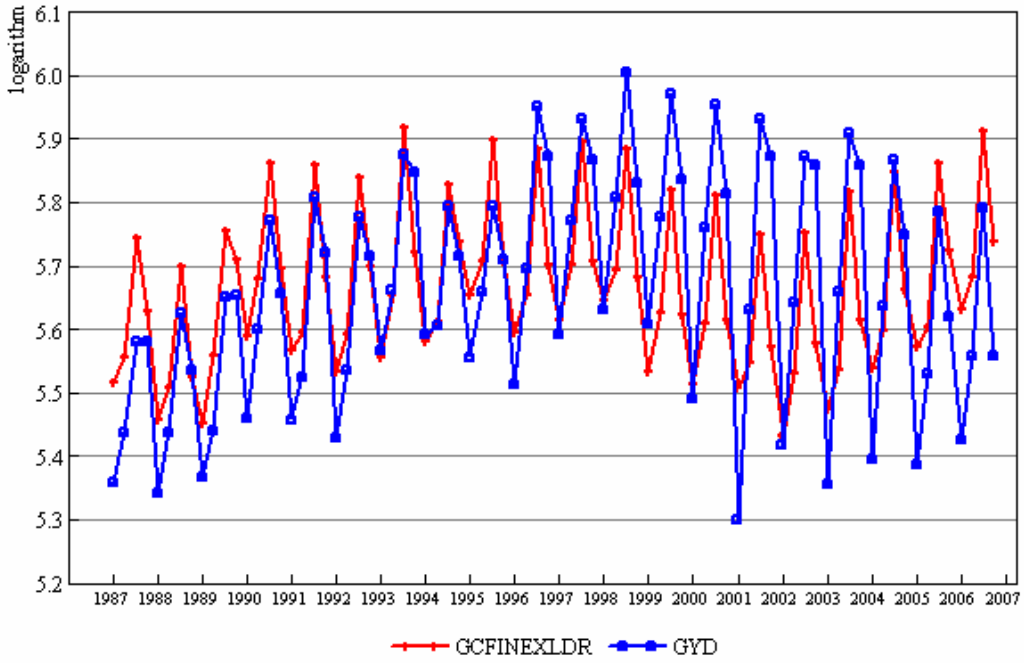


Figure 4.6-b: Real Per Capita Housing Wealth (WHO) and Real Per Capita Final Consumption Excluding Durables (GCFINEXLDR)

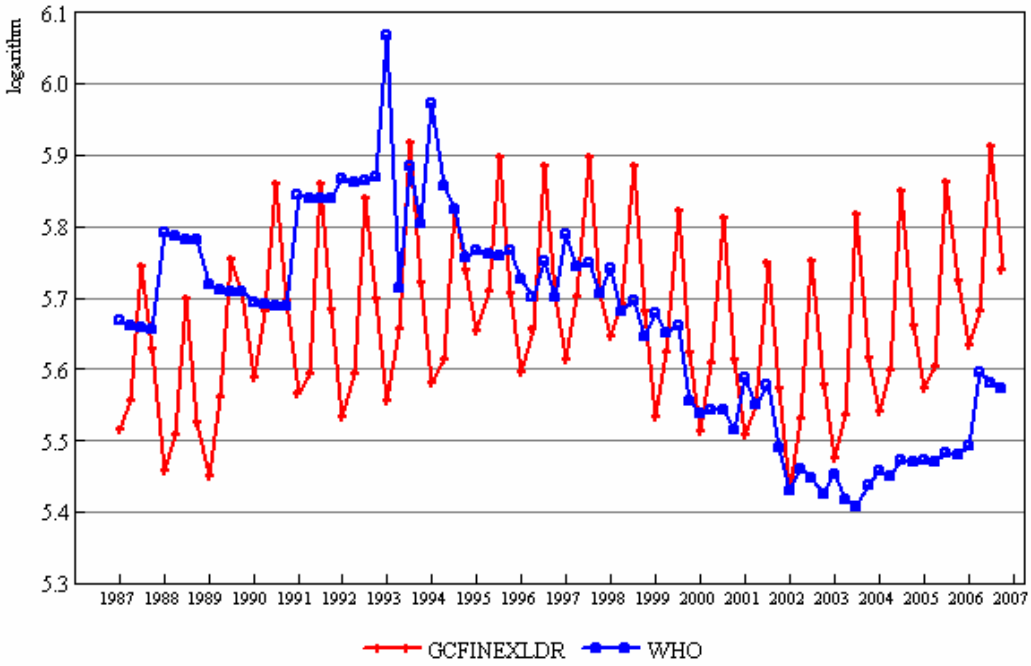


Figure 4.6-c: Real Per Capita Time, Savings, and Foreign Currency Deposits (DEPTSVFX) and Real Per Capita Final Consumption Excluding Durables (GCFINEXLDR)

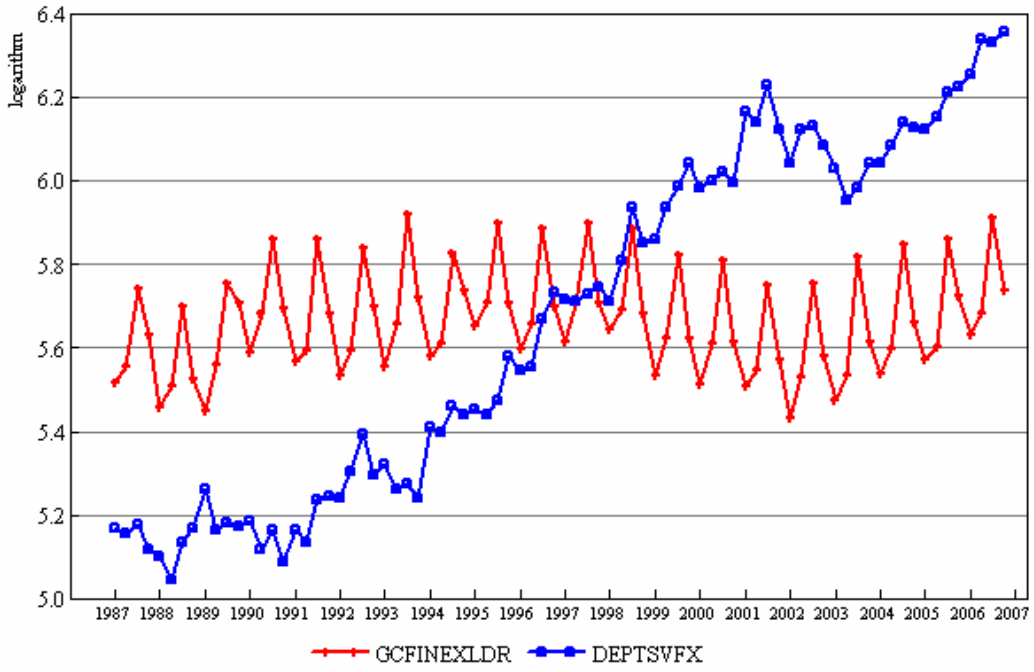


Figure 4.6-d: Real Per Capita Istanbul Stock Exchange Market Capitalization (ISEMCAP) and Real Per Capita Final Consumption Excluding Durables (GCFINEXLDR)

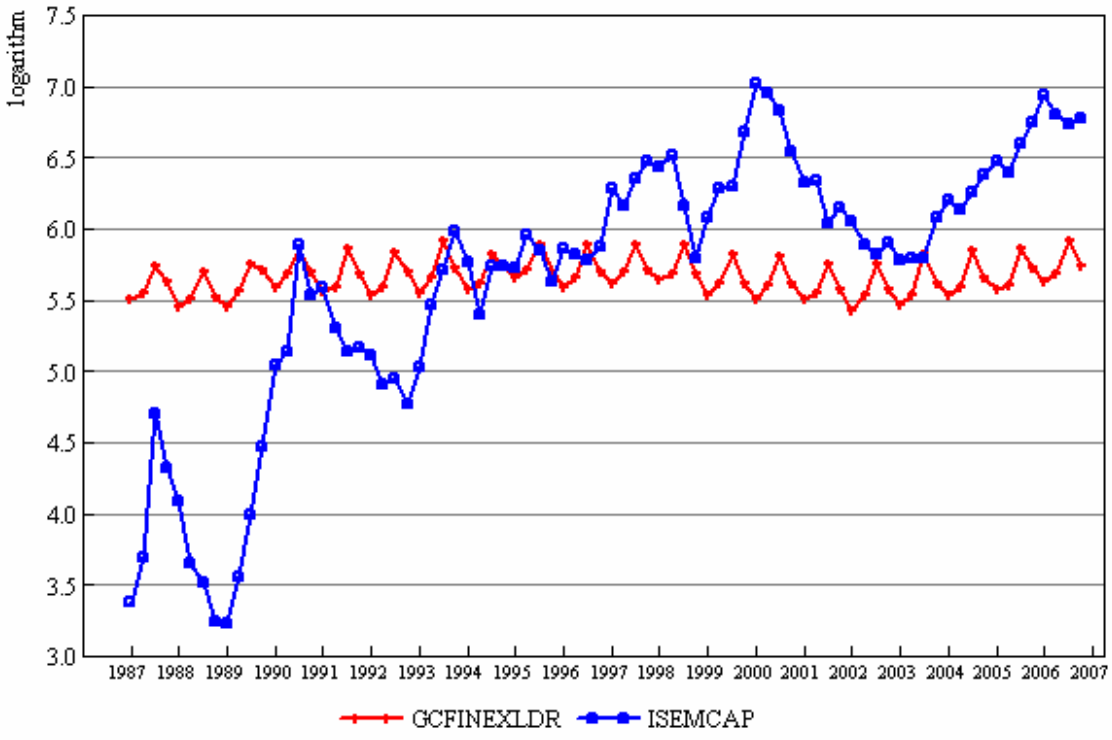


Figure 4.6-e: Real Per Capita Bank Credit to Private Sector (BNKCRED) and Real Per Capita Final Consumption Excluding Durables (GCFINEXLDR)

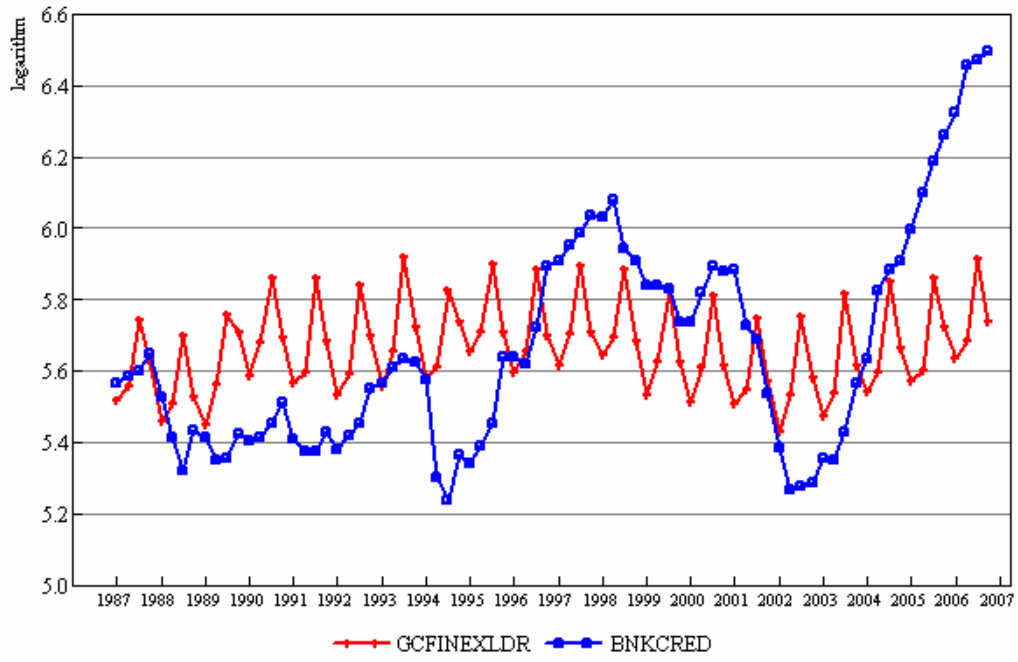
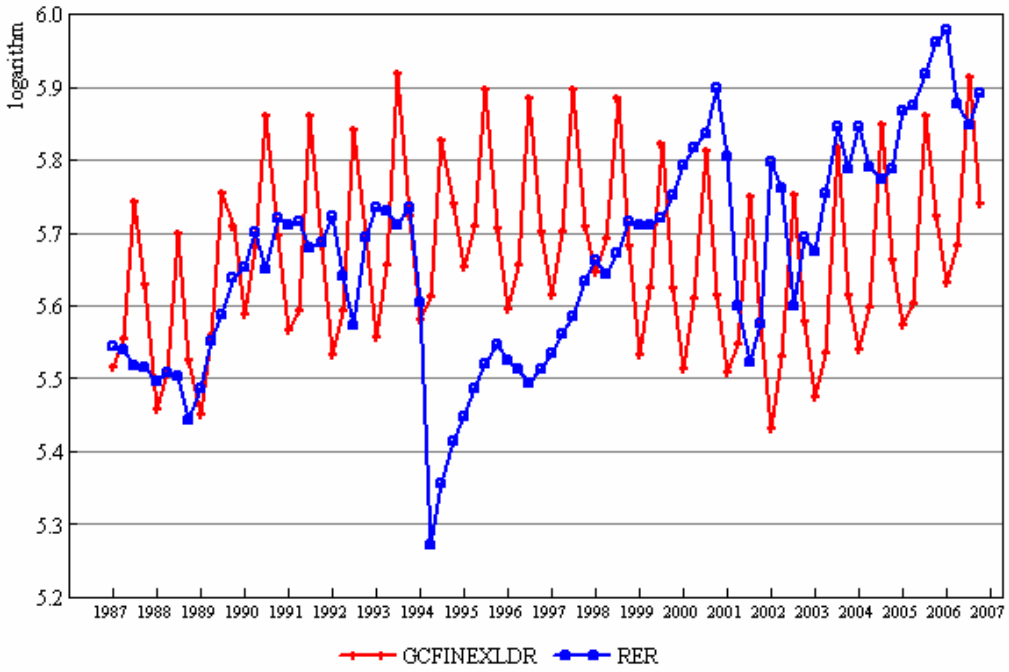


Figure 4.6-f: CPI Based Real Effective Exchange Rate (RER) and Real Per Capita Final Consumption Excluding Durables (GCFINEXLDR)



Notes: These figures show the plot of the dependent variable (*gcfinexldr*) with the independent variables (*gyd, who, deptsvfx, isemcap, bnkcred, rer*). The means of the independent variables are scaled to the mean of the dependent variable, gcfinexldr in order to compare the movements in the series. The shift factor is set to make the means of the variables equal. All of the variables are in logarithmic scale.

Figure 4.7: Joint Plots of the Explanatory Variables with the Dependent Variable (GCDR)

Figure 4.7-a: Real Per Capita Net Private Disposable Income (GYD) and Real Per Capita Consumption of Durables (GCDR)

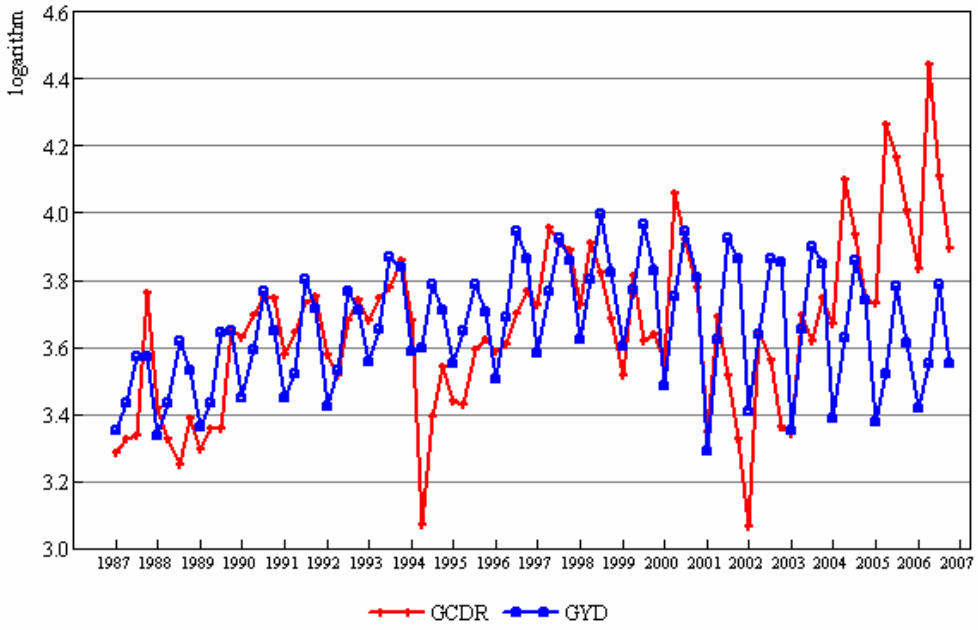


Figure 4.7-b: Real Per Capita Housing Wealth (WHO) and Real Per Capita Consumption of Durables (GCDR)

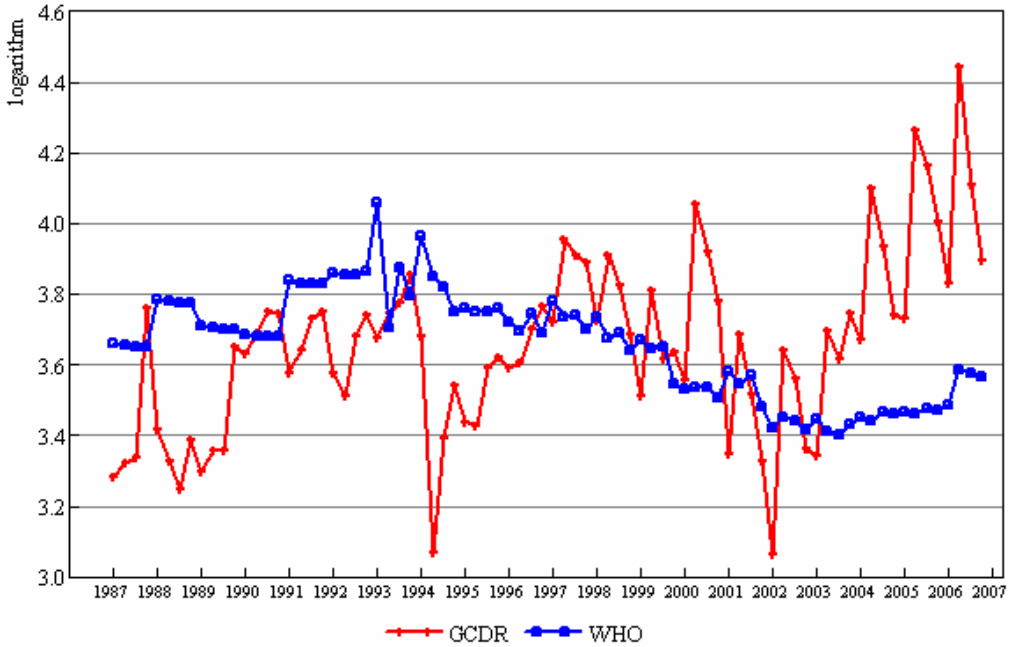


Figure 4.7-c: Real Per Capita Time, Savings, and Foreign Currency Deposits (DEPTSVFX) and Real Per Capita Consumption of Durables (GCDR)

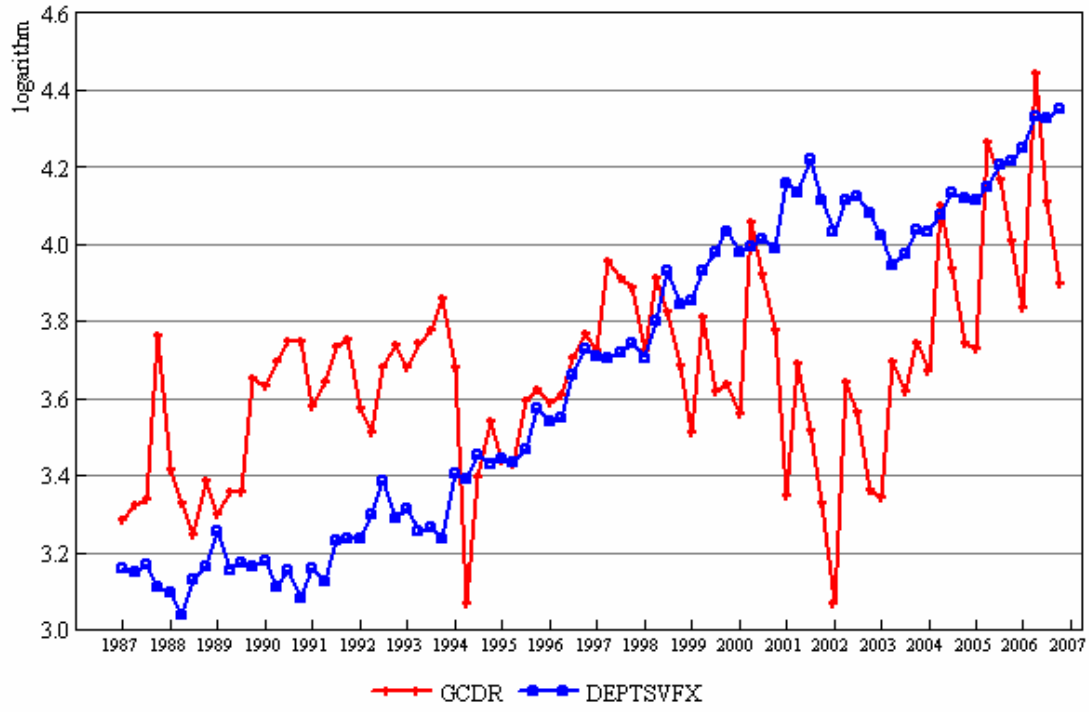


Figure 4.7-d: Real Per Capita Istanbul Stock Exchange Market Capitalization (ISEMCAP) and Real Per Capita Consumption of Durables (GCDR)

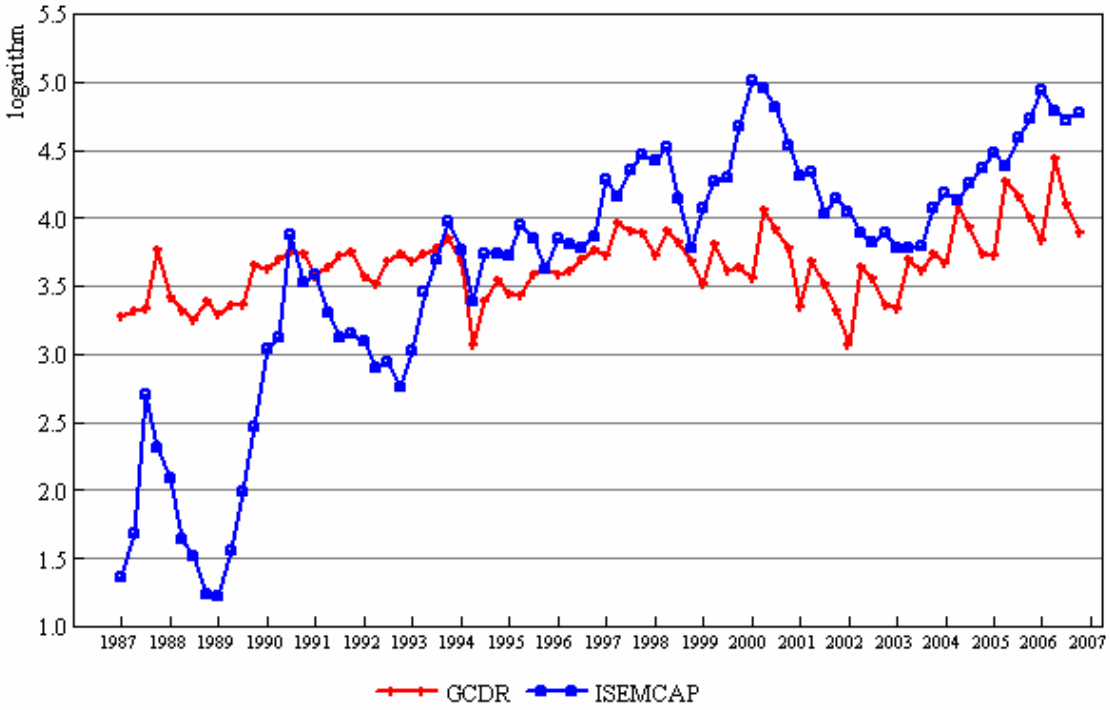


Figure 4.7-e: Real Per Capita Bank Credit to Private Sector (BNKCRED) and Real Per Capita Consumption of Durables (GCDR)

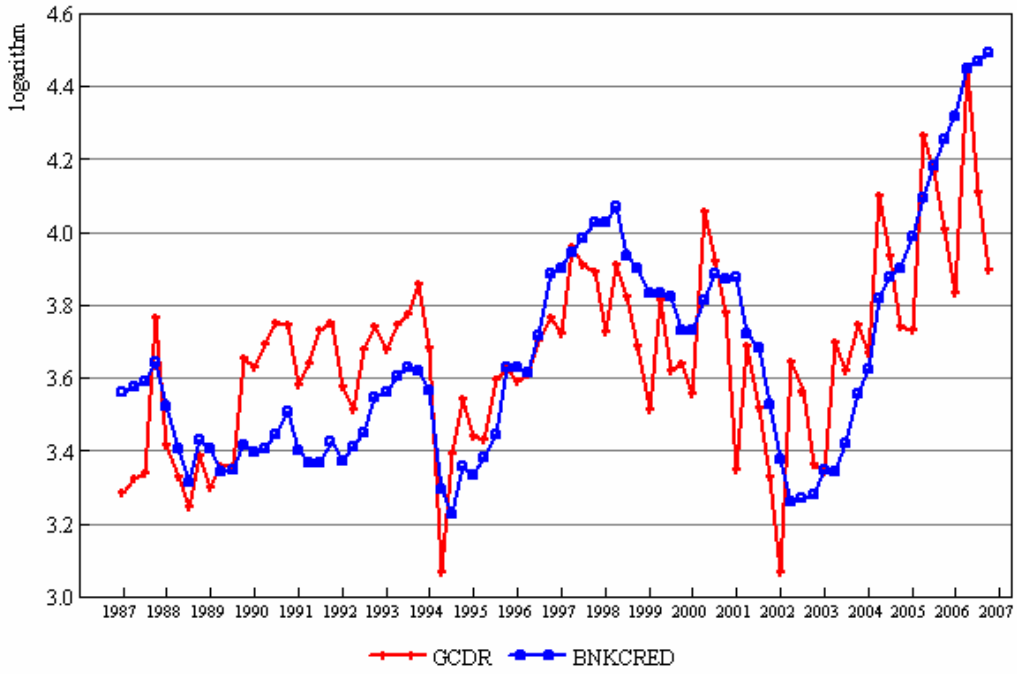
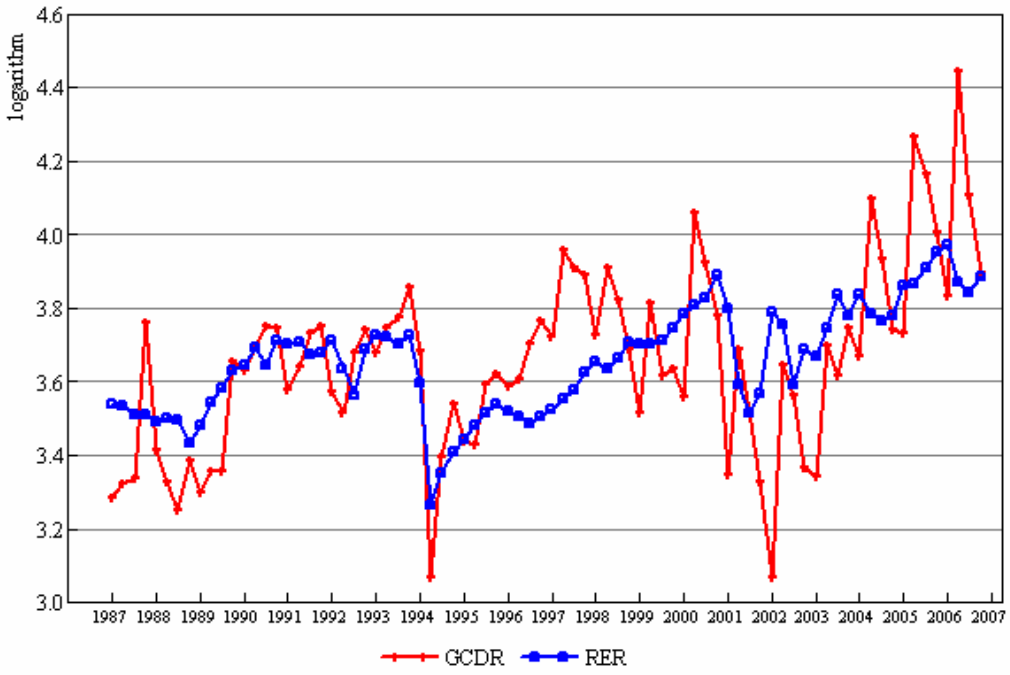


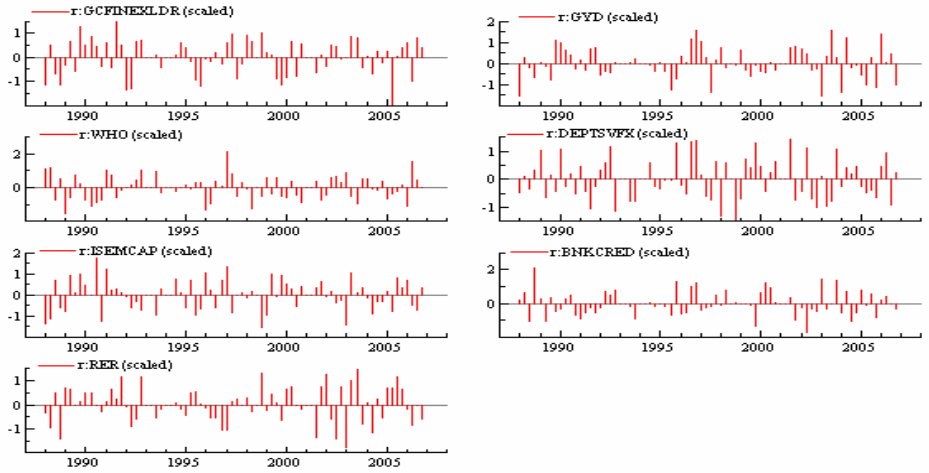
Figure 4.7-f: CPI Based Real Effective Exchange Rate (RER) and Real Per Capita Consumption of Durables (GCDR)



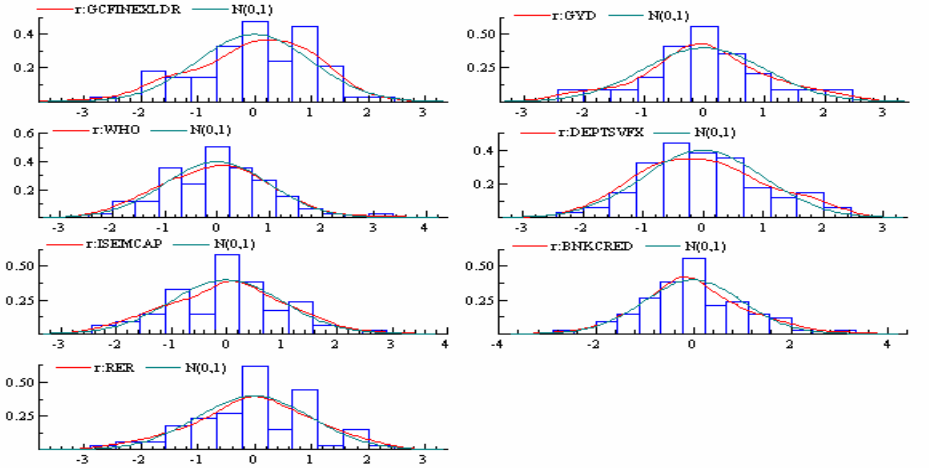
Notes: These figures show the plot of the dependent variable (*gcdr*) with the independent variables (*gyd, who, deptsvfx, isemcap, bnkcred, rer*). The means of the independent variables are scaled to the mean of the dependent variable, *gcdr* in order to compare the movements in the series. The shift factor is set to make the means of the variables equal. All of the variables are in logarithmic scale.

Figure 4.8: Misspecification and Stability Tests for VAR System in Levels for Non-Durables Consumption

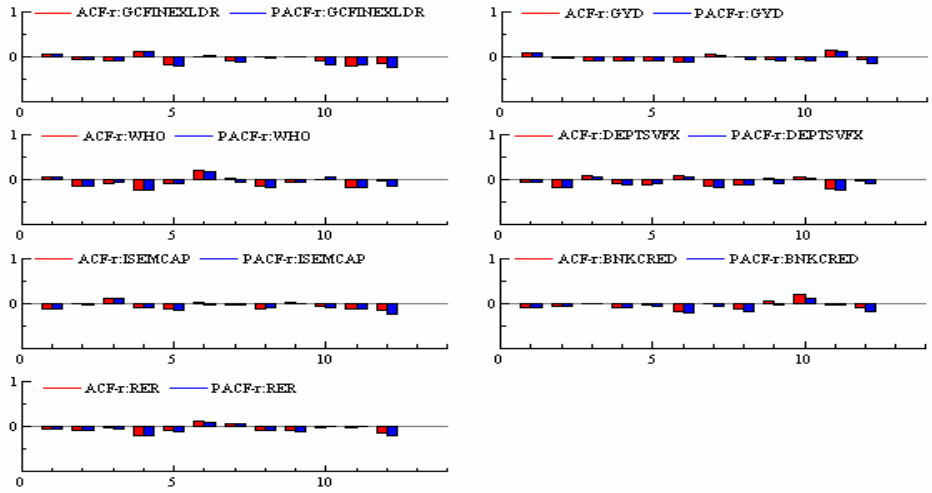
A. Scaled Residuals



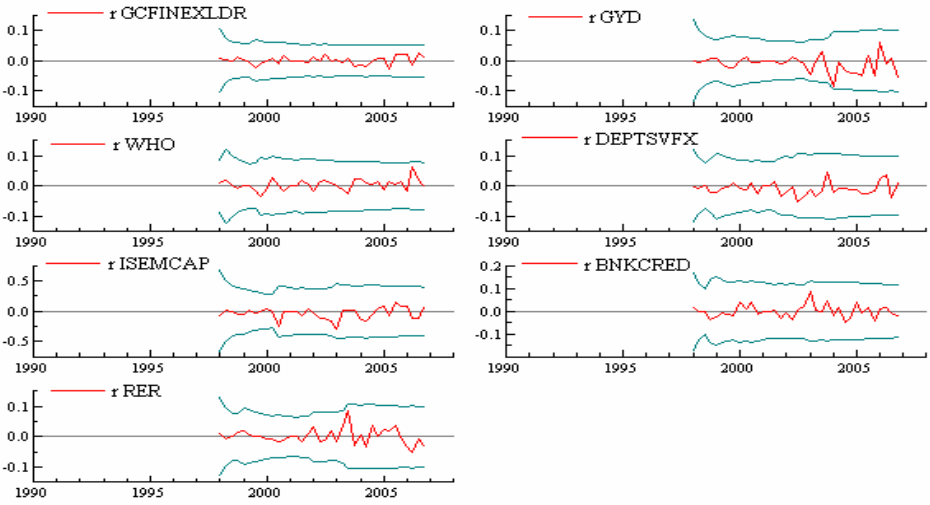
B. Residual Density and Histogram



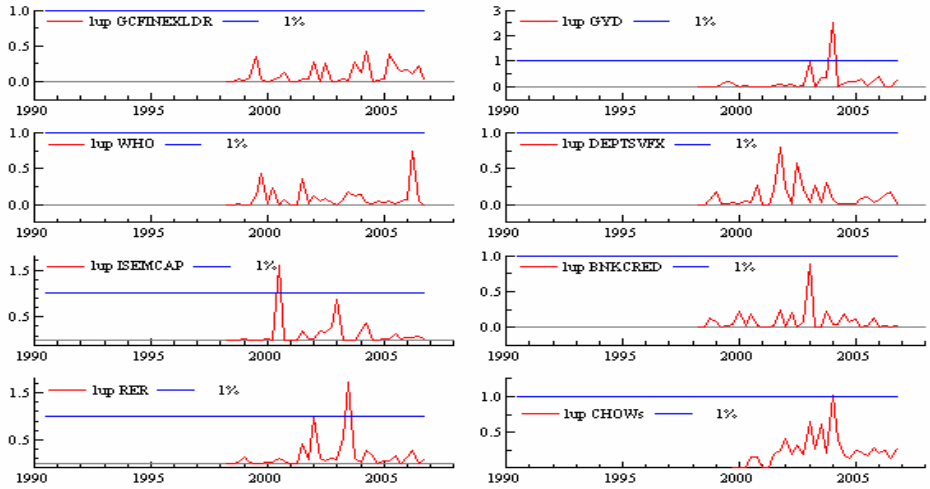
C. Residual Autocorrelation and Partial Autocorrelation



D. Recursive Graphs for One-Step Ahead Residuals within 2+/- Standard Errors



E. One-Step Chow Test



F. Break Point Chow Test

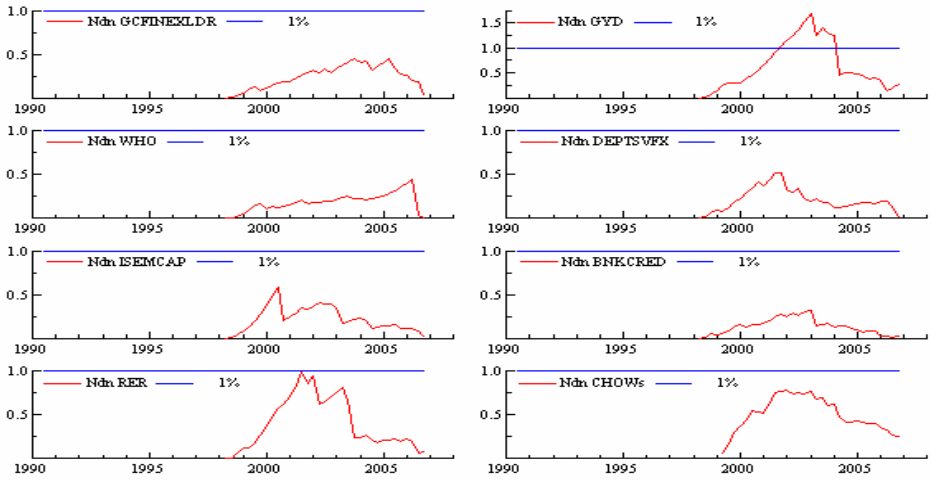
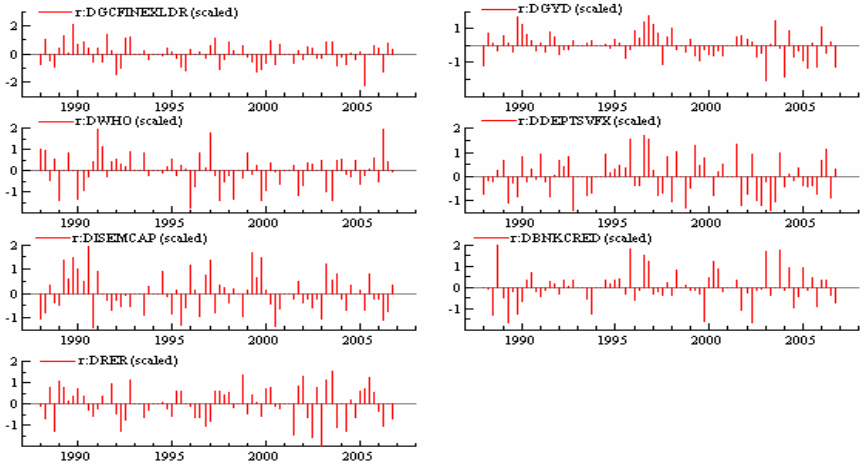
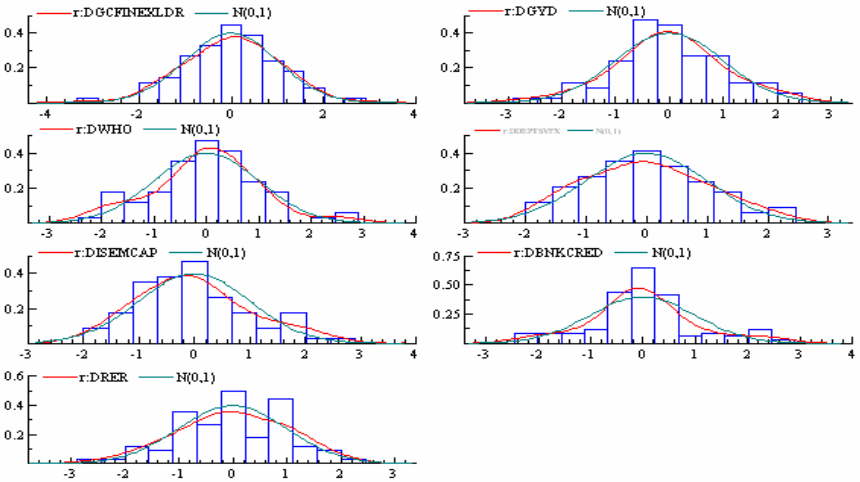


Figure 4.9: Misspecification and Stability Tests for Unconditional Vector Error Correction Model for Non-Durables Consumption

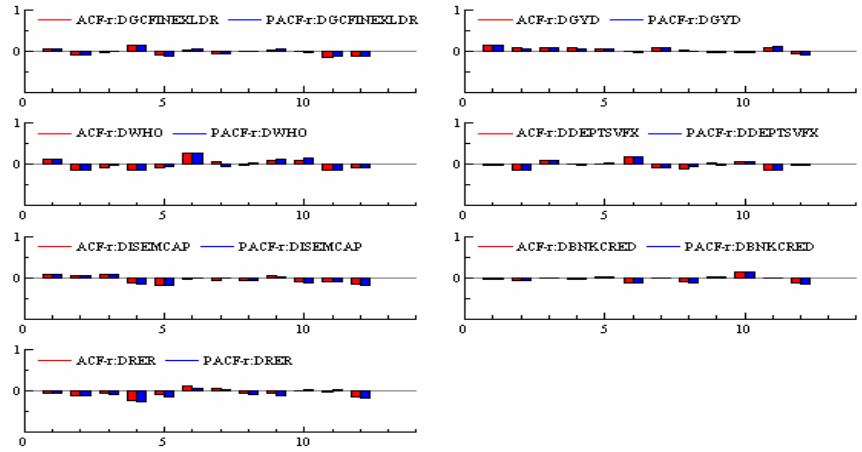
A. Scaled Residuals



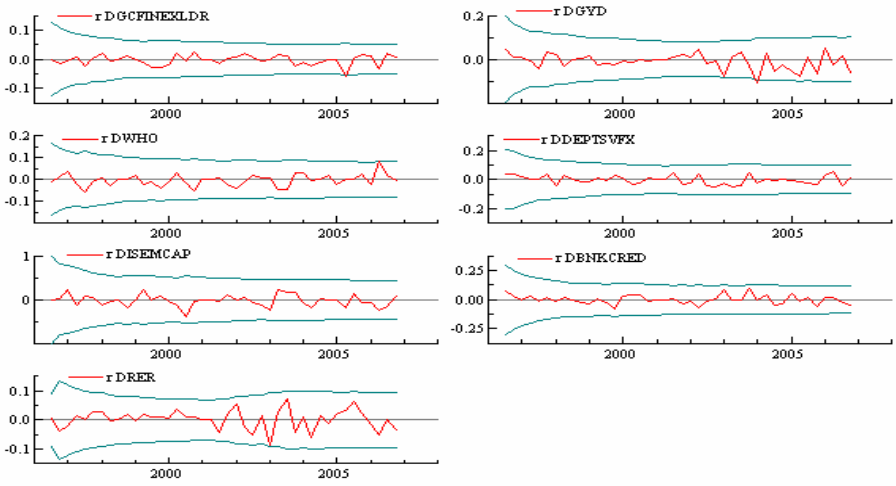
B. Residual Density and Histogram



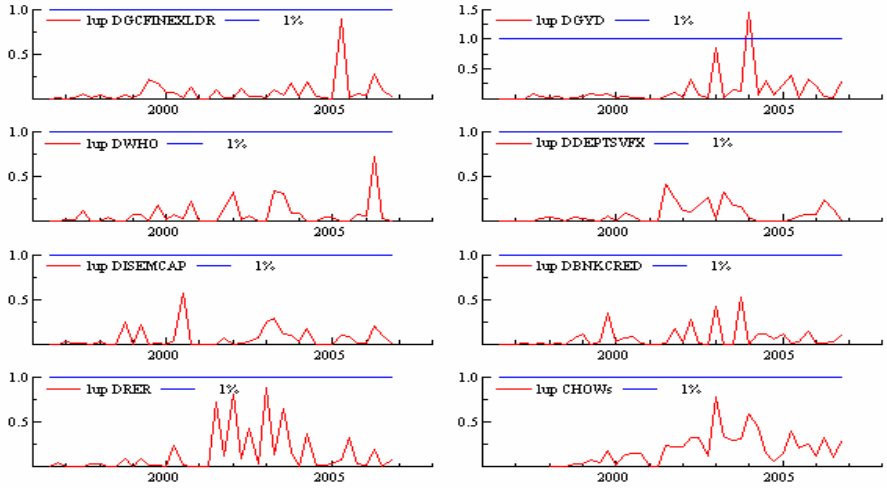
C. Residual Autocorrelation and Partial Autocorrelation



D. Recursive Graphs for One-Step Ahead Residuals within 2+/- Standard Errors



E. One-Step Chow Test



F. Break Point Chow Test

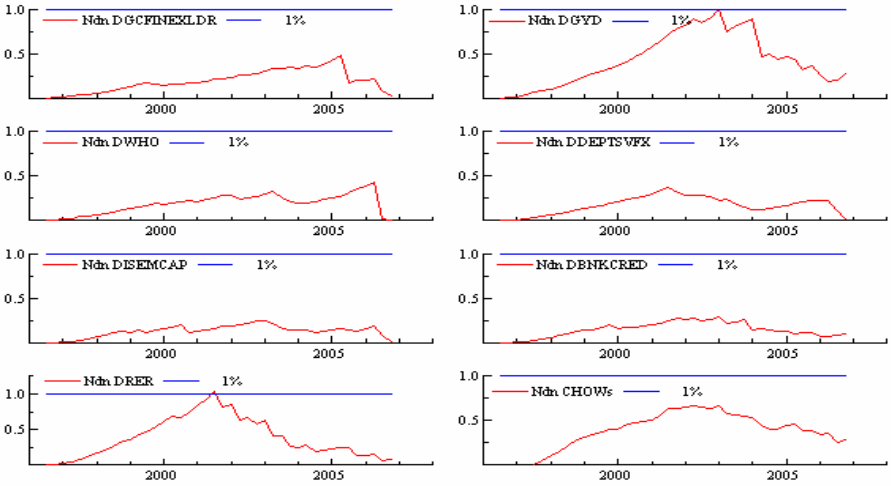
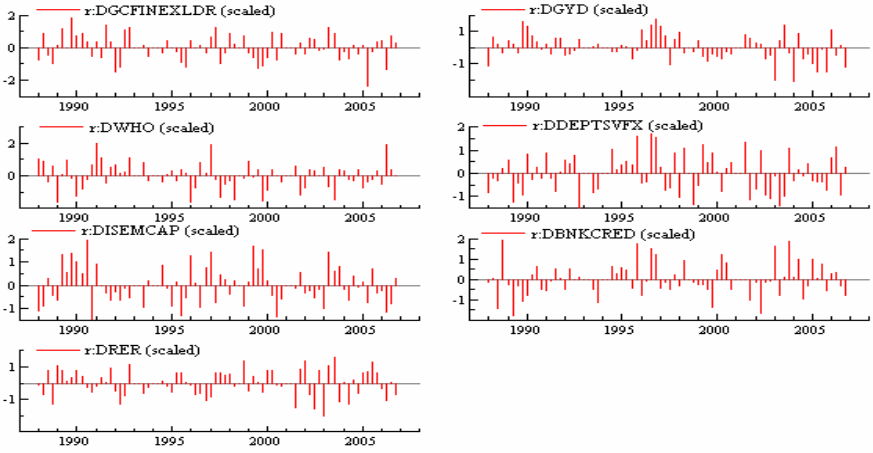
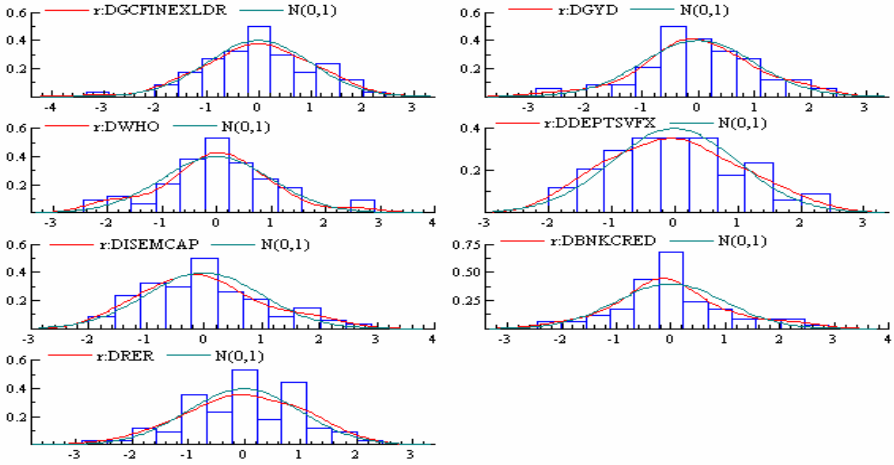


Figure 4.10: Misspecification and Stability Tests for Conditional Vector Error Correction Model for Non-Durables Consumption

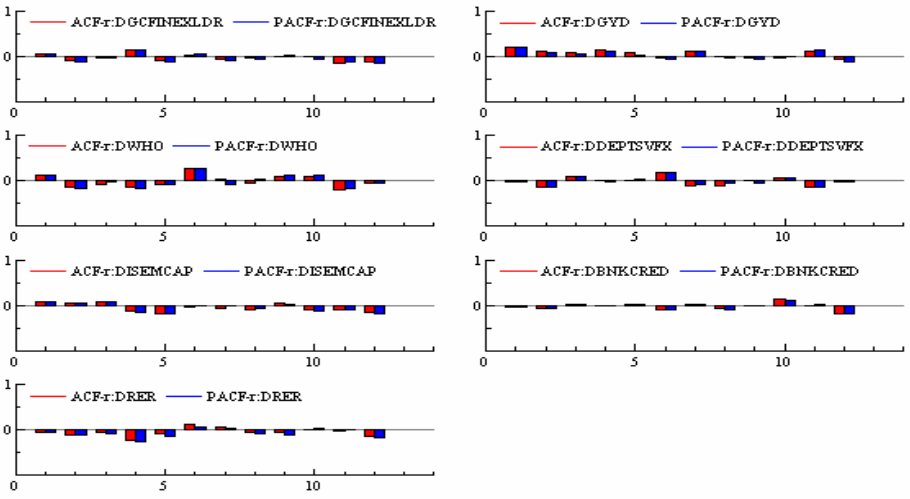
A. Scaled Residuals



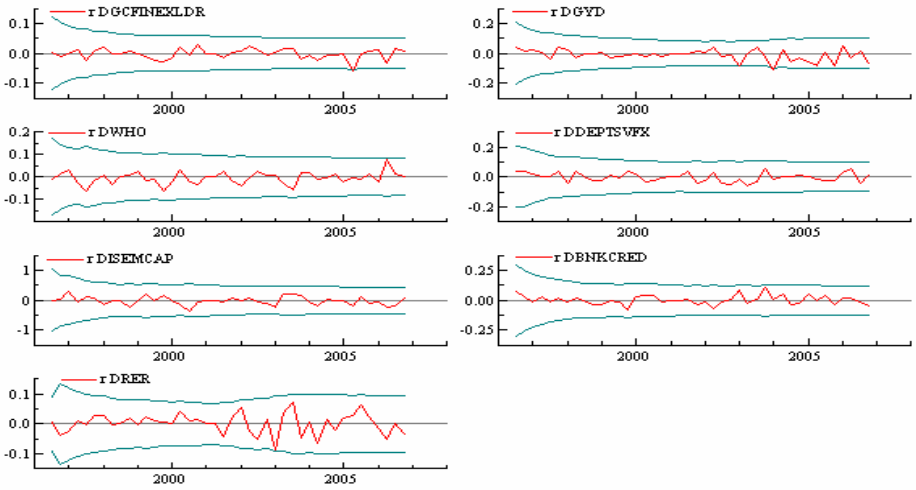
B. Residual Density and Histogram



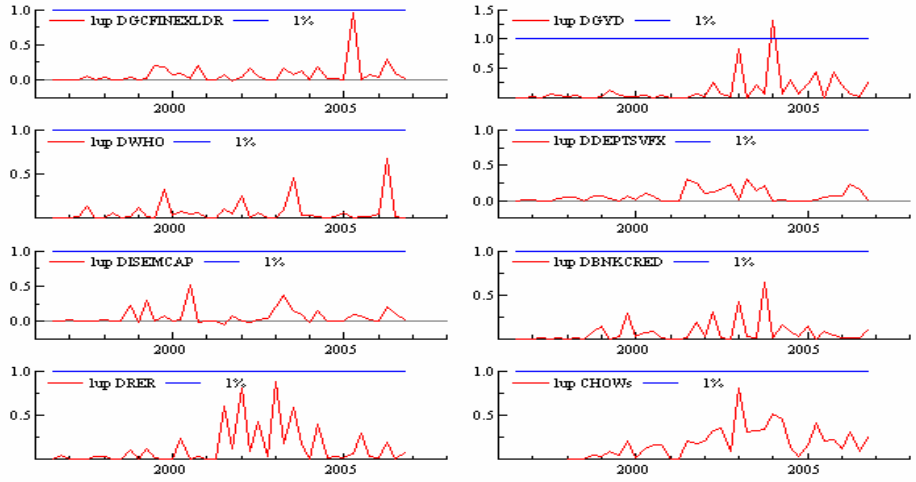
C. Residual Autocorrelation and Partial Autocorrelation



D. Recursive Graphs for One-Step Ahead Residuals within 2+/- Standard Errors



E. One-Step Chow Test



F. Break Point Chow Test

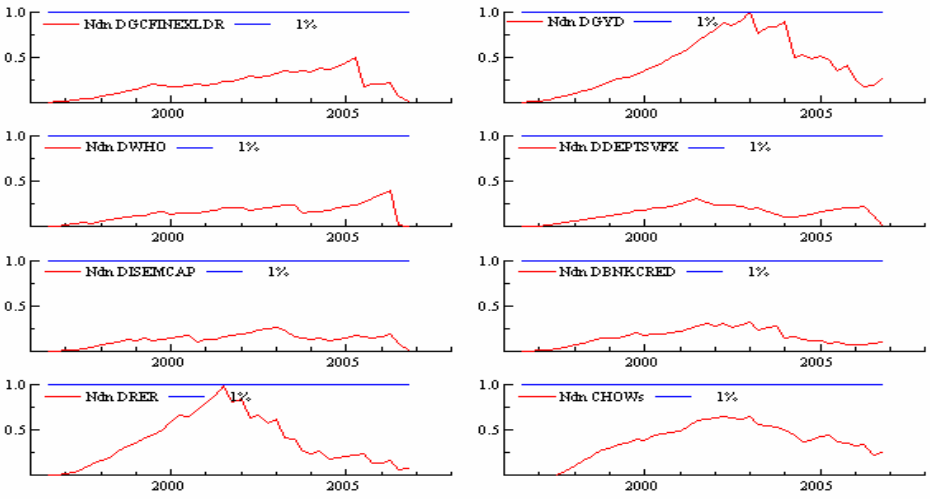
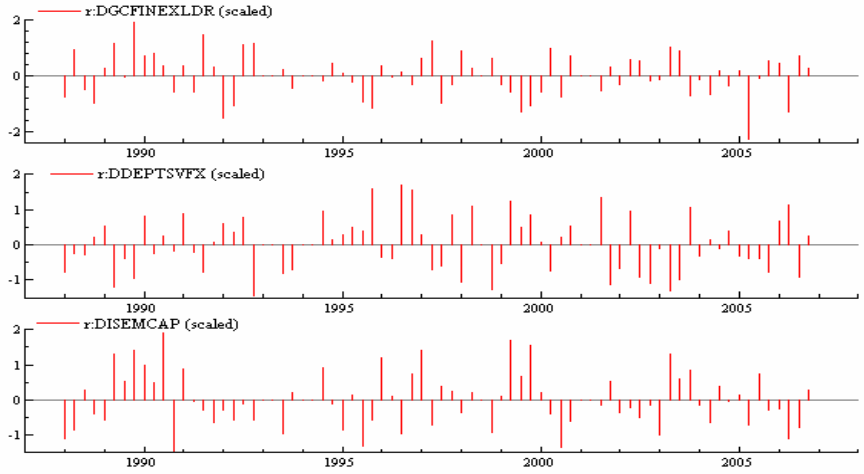
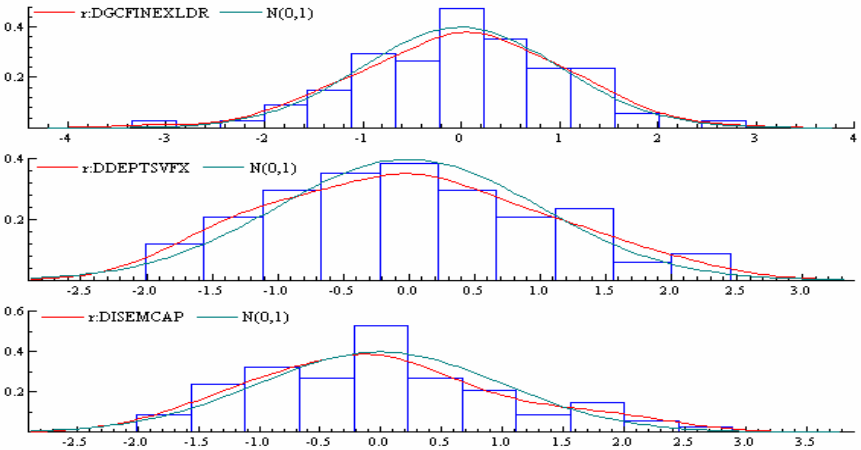


Figure 4.11: Misspecification and Stability Tests for Final Conditional Vector Error Correction Model for Non-Durables Consumption

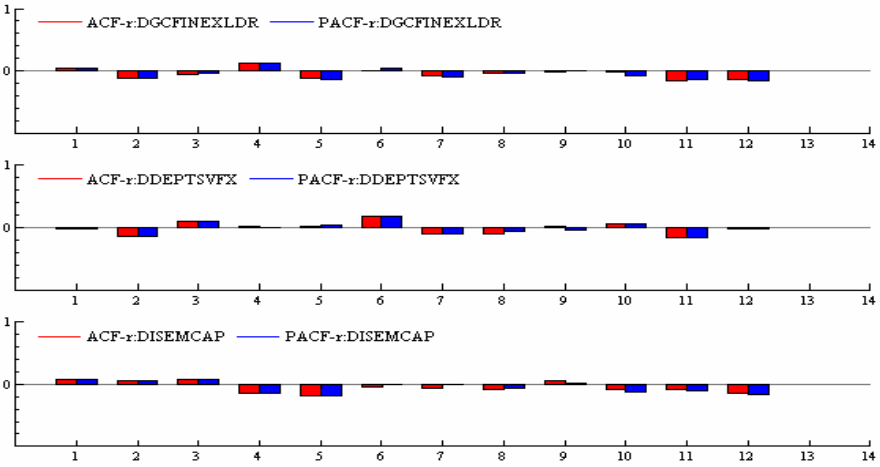
A. Scaled Residuals



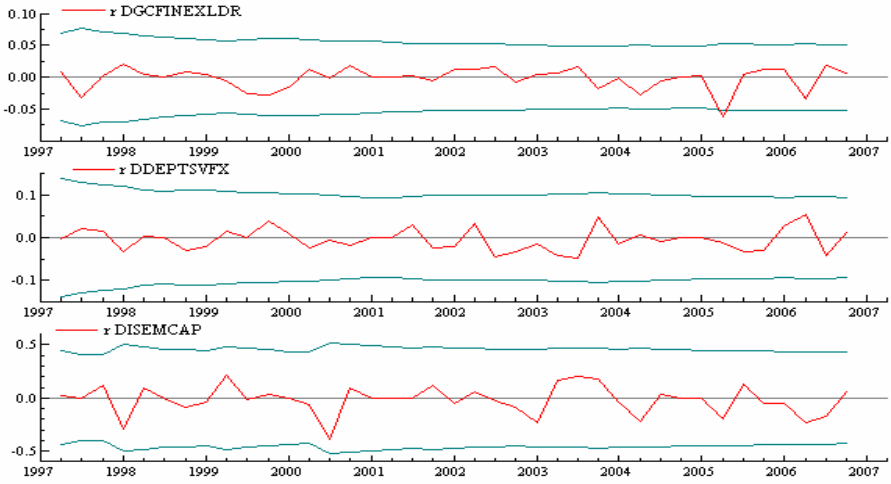
B. Residual Density and Histogram



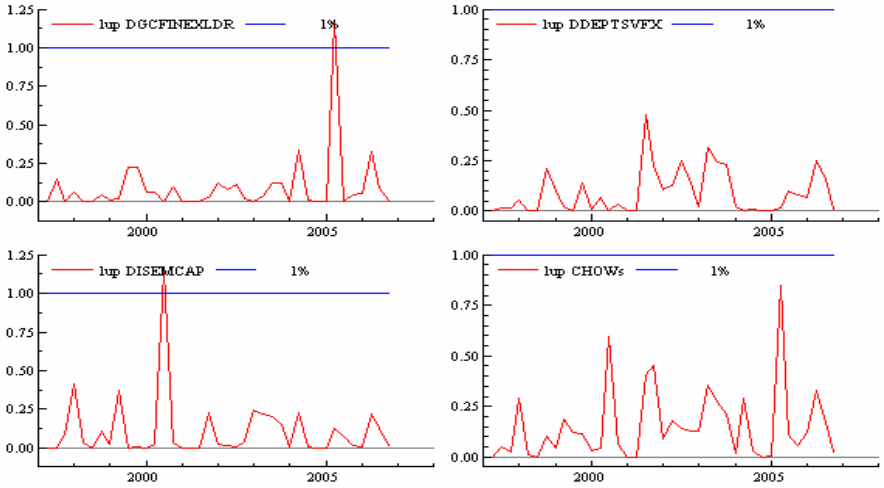
C. Residual Autocorrelation and Partial Autocorrelation



D. Recursive Graphs for One-Step Ahead Residuals within 2+/- Standard Errors



E. One-Step Chow Test



F. Break Point Chow Test

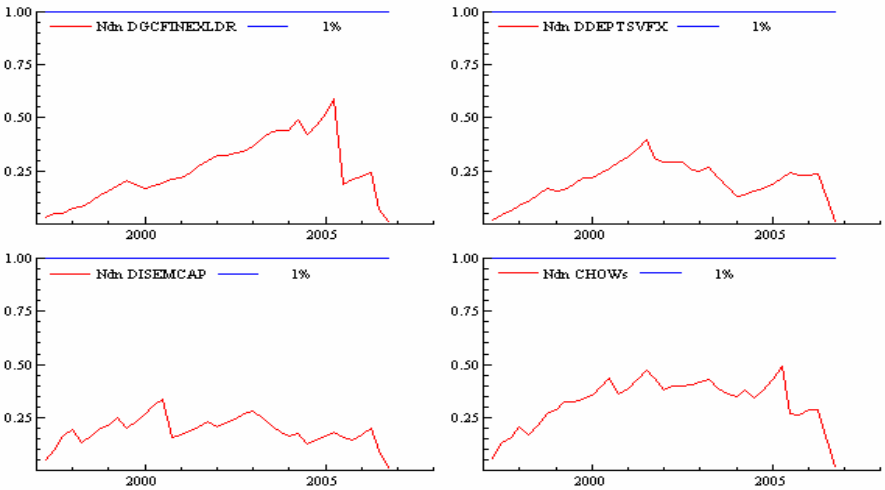
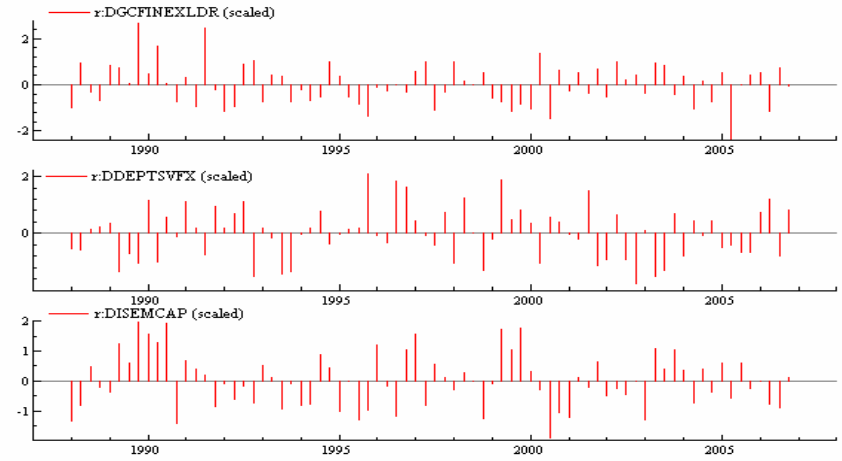
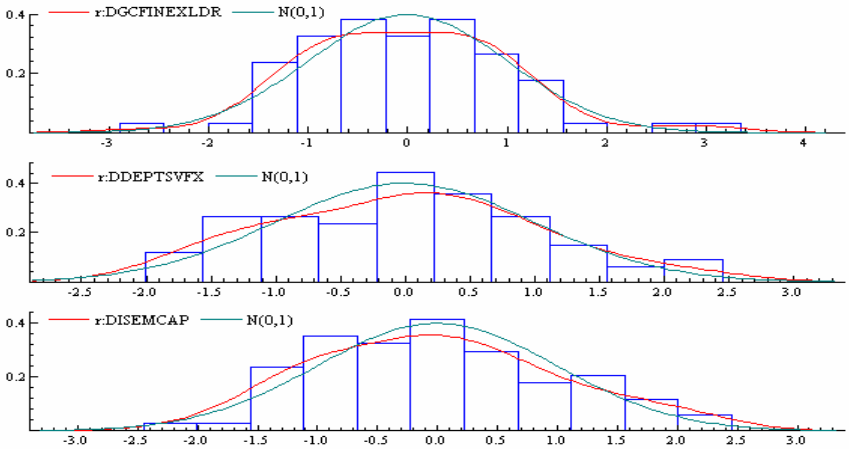


Figure 4.12: Misspecification and Stability Tests for Parsimonious Conditional Vector Error Correction Model for Non-Durables Consumption

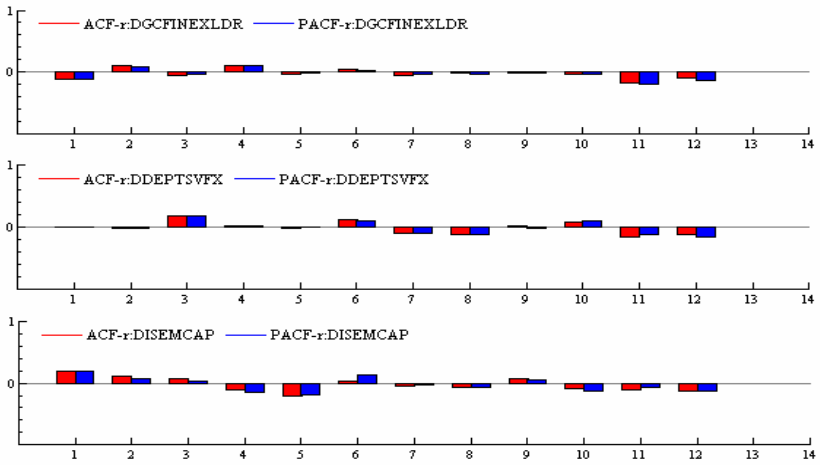
A. Scaled Residuals



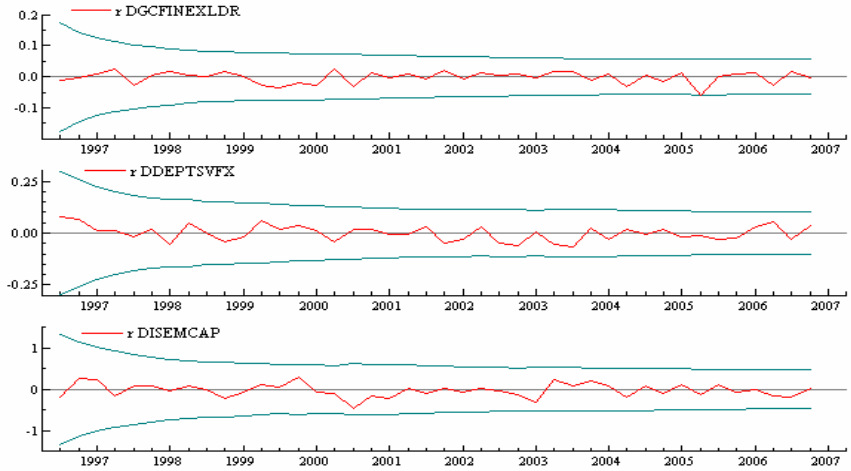
B. Residual Density and Histogram



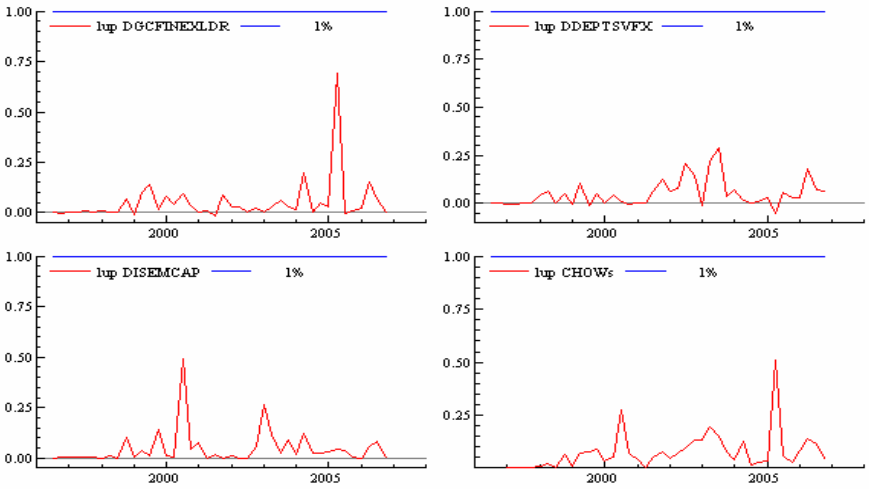
C. Residual Autocorrelation and Partial Autocorrelation



D. Recursive Graphs for One-Step Ahead Residuals within 2+/- Standard Errors



E. One-Step Chow Test



F. Break Point Chow Test

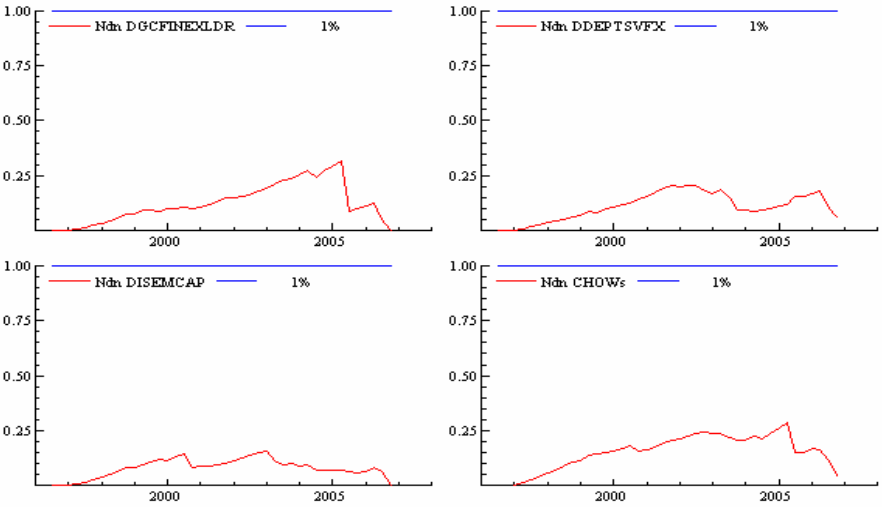
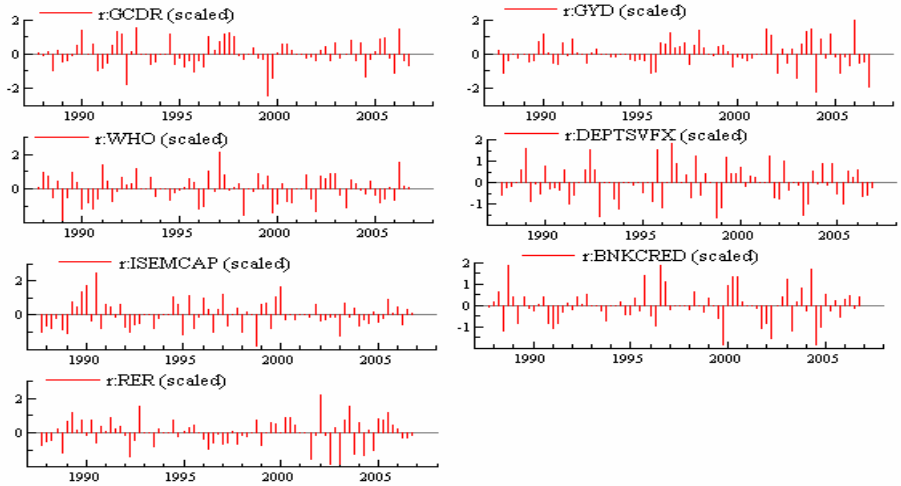
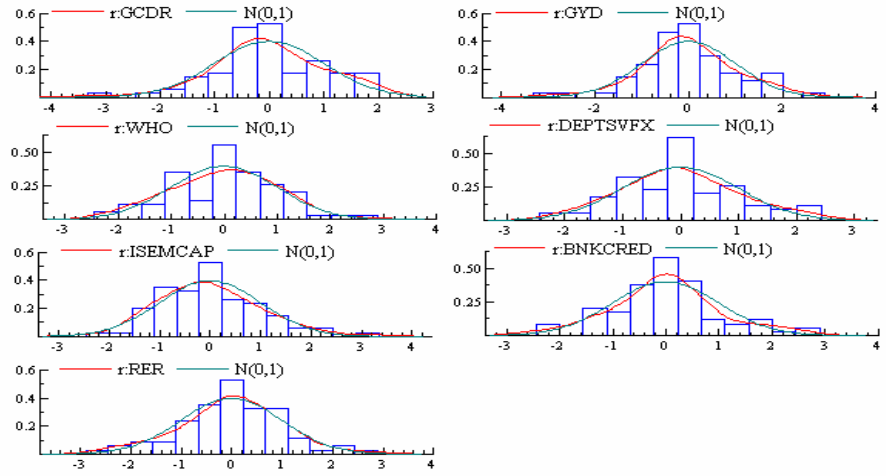


Figure 4.13: Misspecification and Stability Tests for VAR System in Levels for Durables Consumption

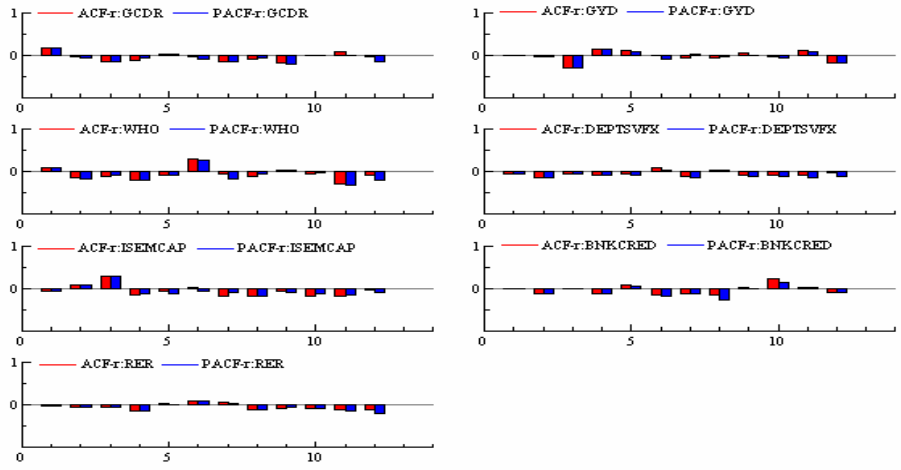
A. Scaled Residuals



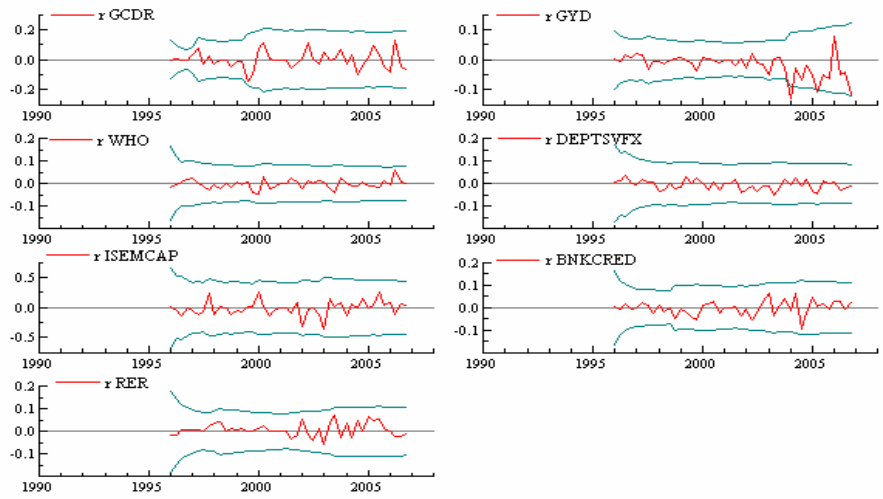
B. Residual Density and Histogram



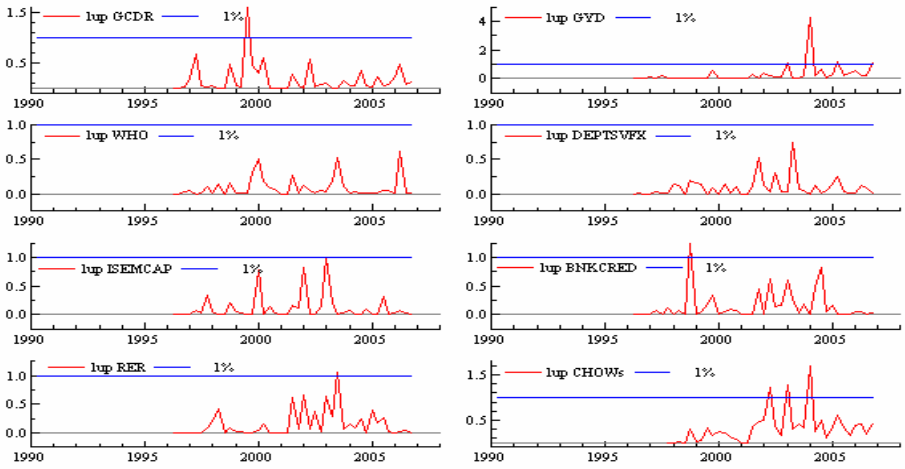
C. Residual Autocorrelation and Partial Autocorrelation



D. Recursive Graphs for One-Step Ahead Residuals within 2+/- Standard Errors



E. One-Step Chow Test



F. Break Point Chow Test

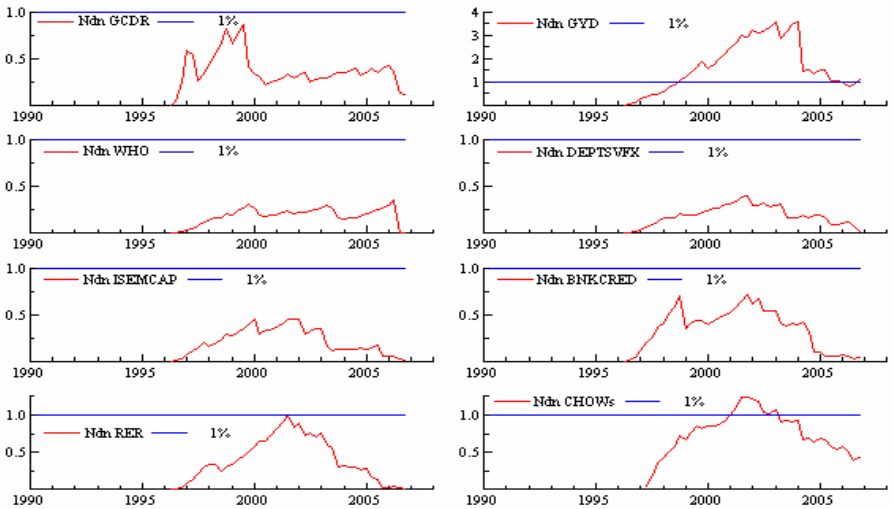
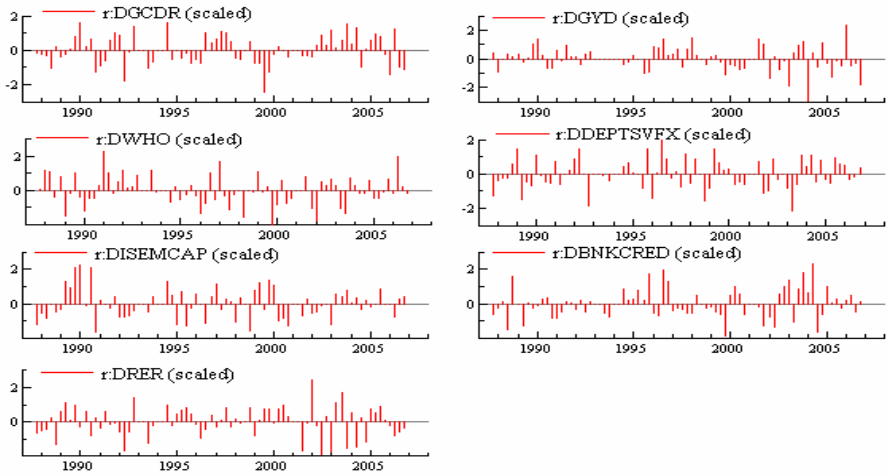
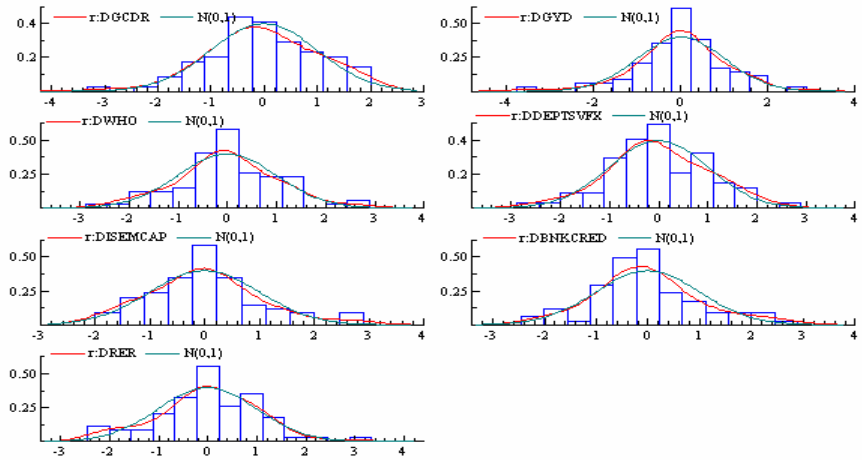


Figure 4.14: Misspecification and Stability Tests for Unconditional Vector Error Correction Model for Durables Consumption

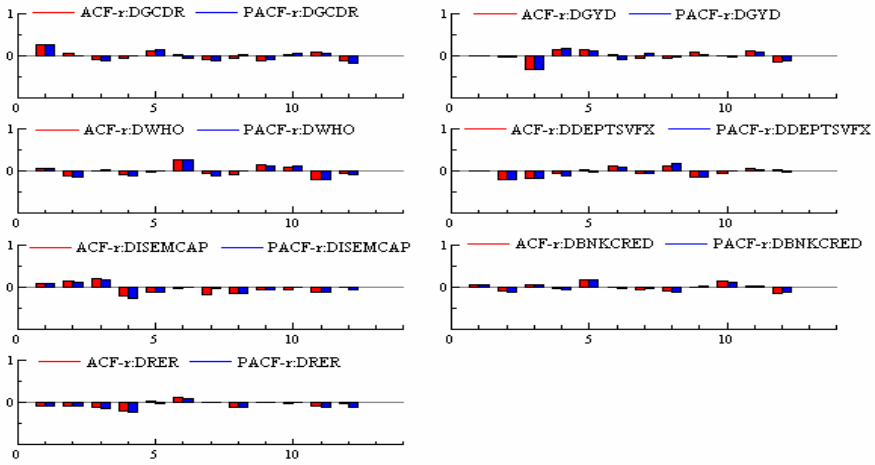
A. Scaled Residuals



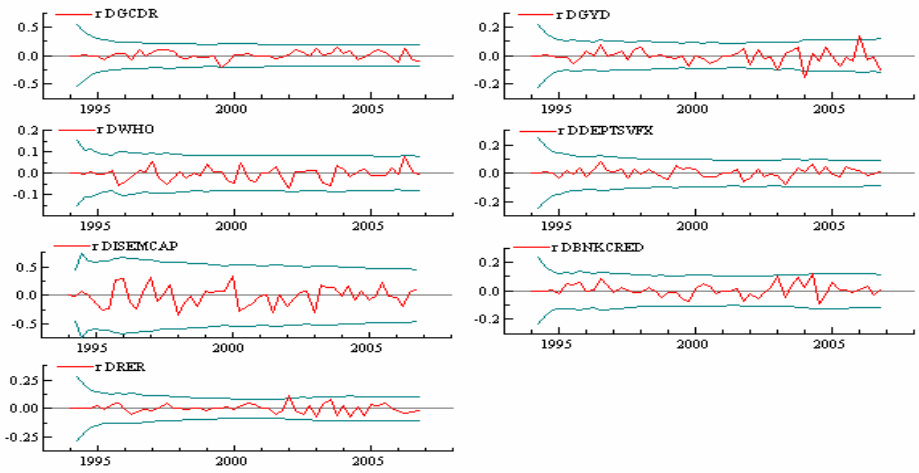
B. Residual Density and Histogram



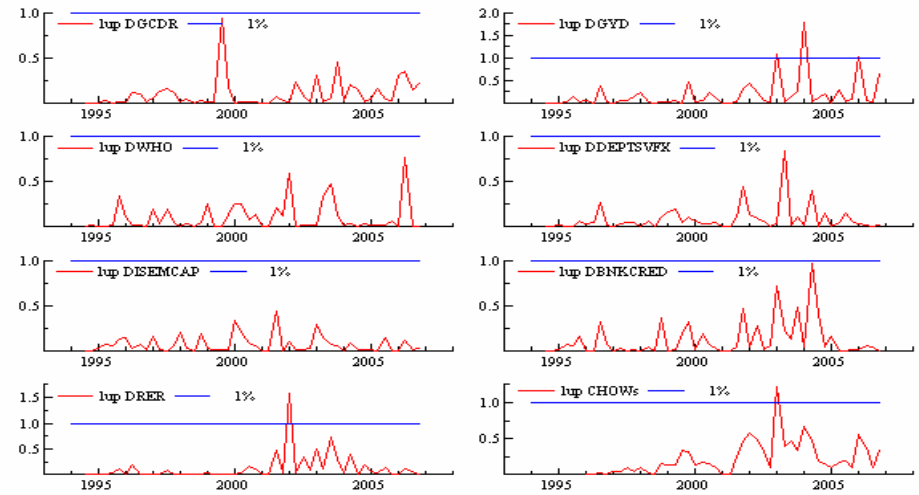
C. Residual Autocorrelation and Partial Autocorrelation



D. Recursive Graphs for One-Step Ahead Residuals within 2+/- Standard Errors



E. One-Step Chow Test



F. Break Point Chow Test

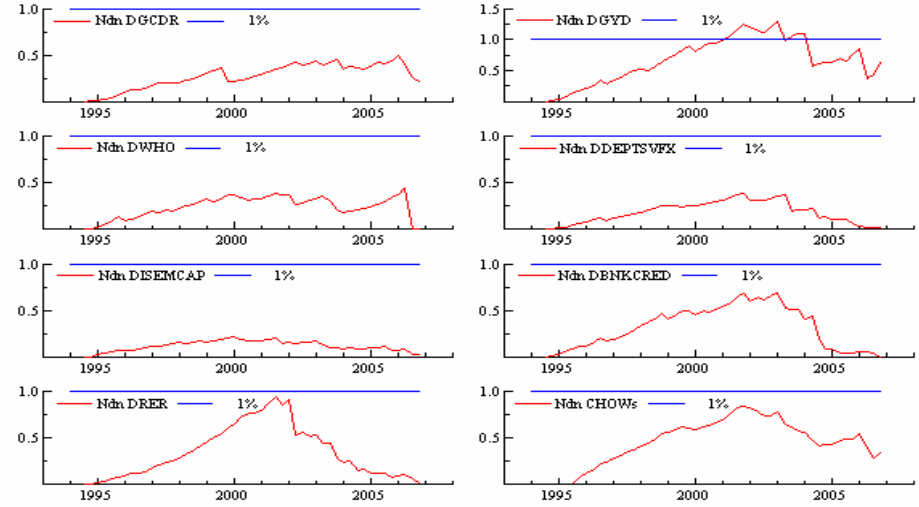
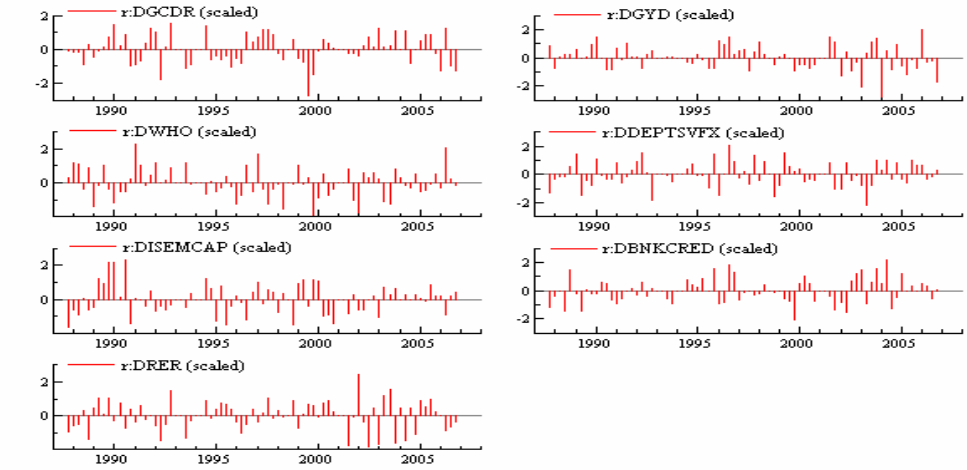
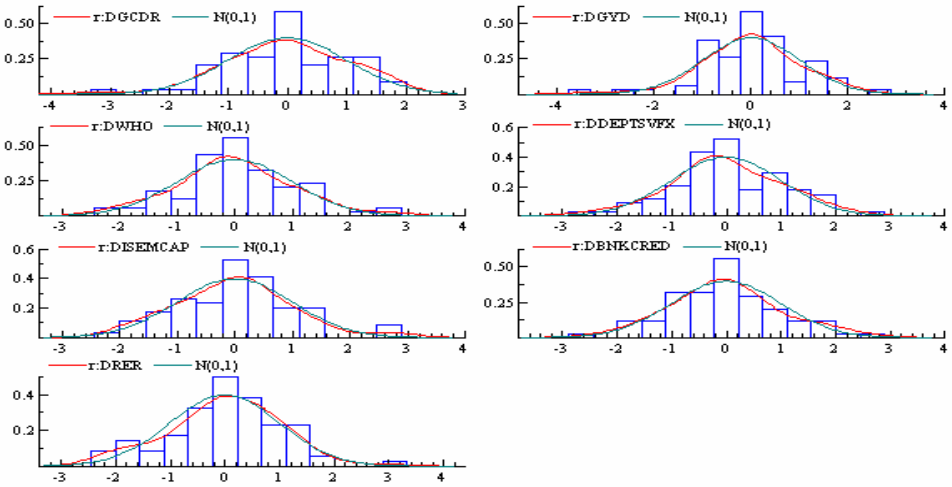


Figure 4.15: Misspecification and Stability Tests for Conditional Vector Error Correction Model for Durables Consumption

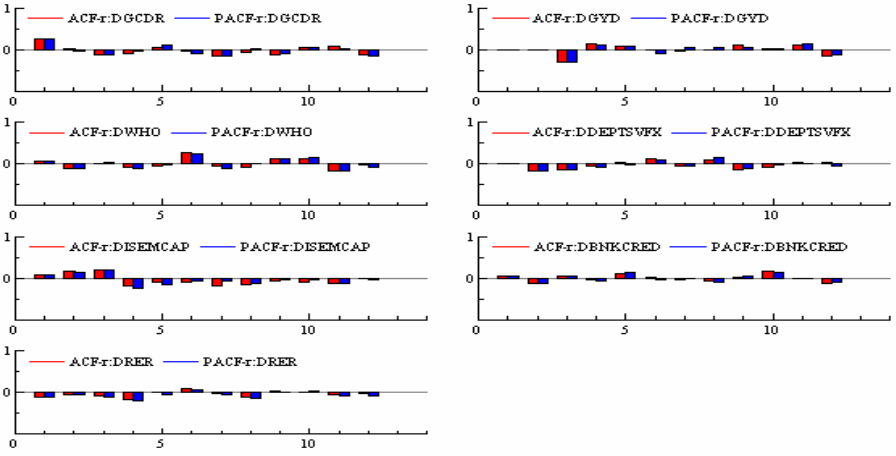
A. Scaled Residuals



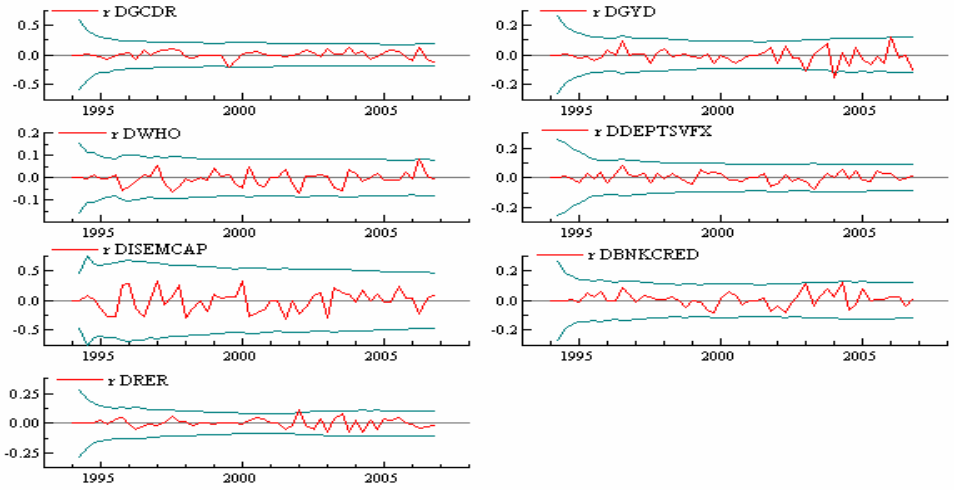
B. Residual Density and Histogram



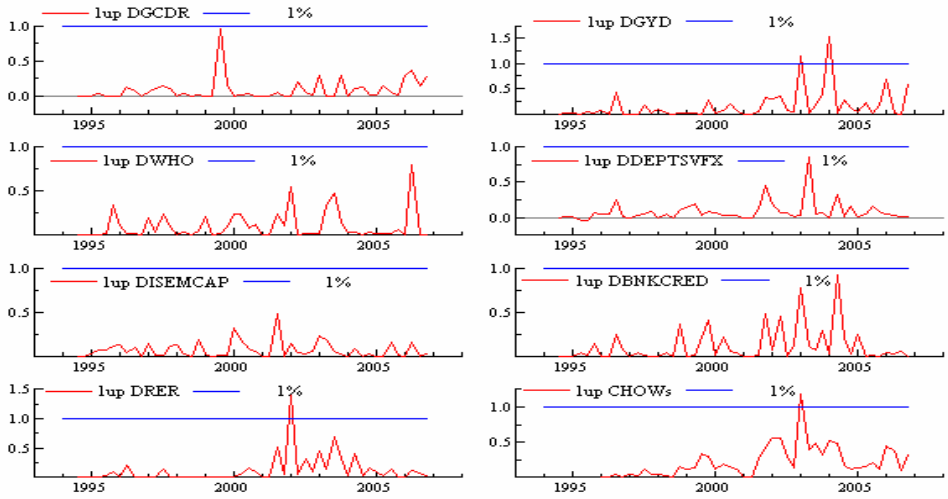
C. Residual Autocorrelation and Partial Autocorrelation



D. Recursive Graphs for One-Step Ahead Residuals within 2+/- Standard Errors



E. One-Step Chow Test



F. Break Point Chow Test

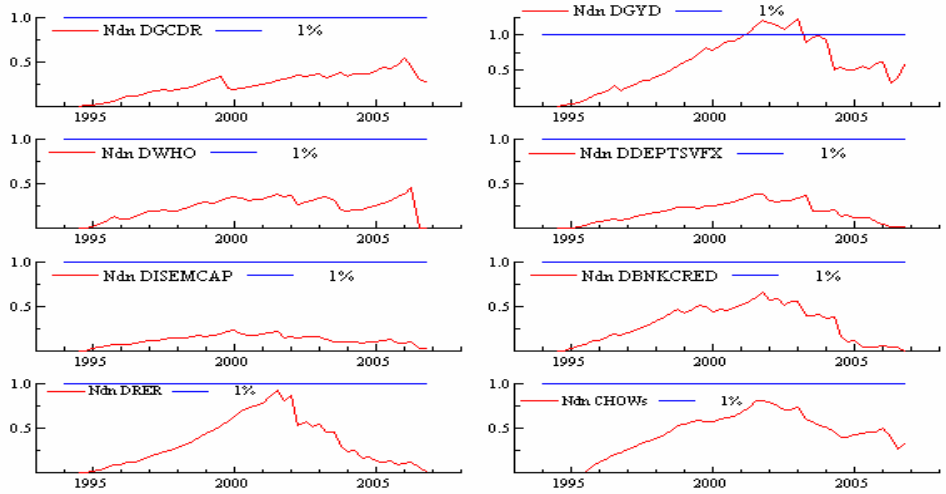
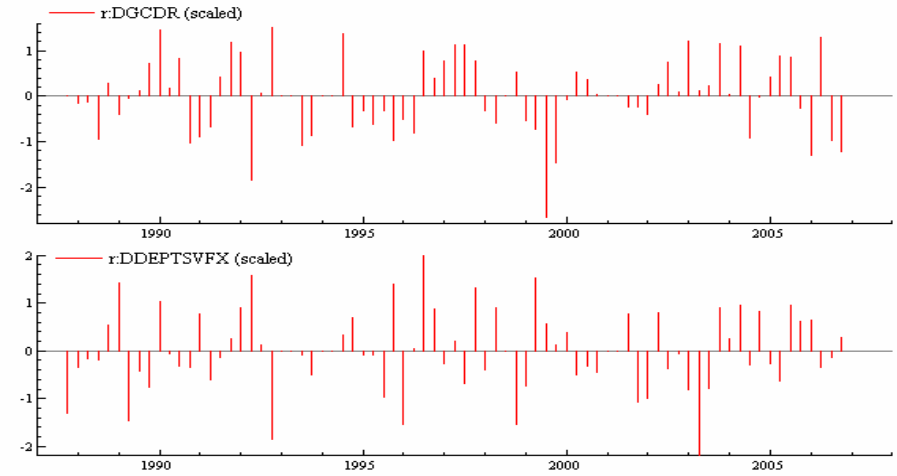
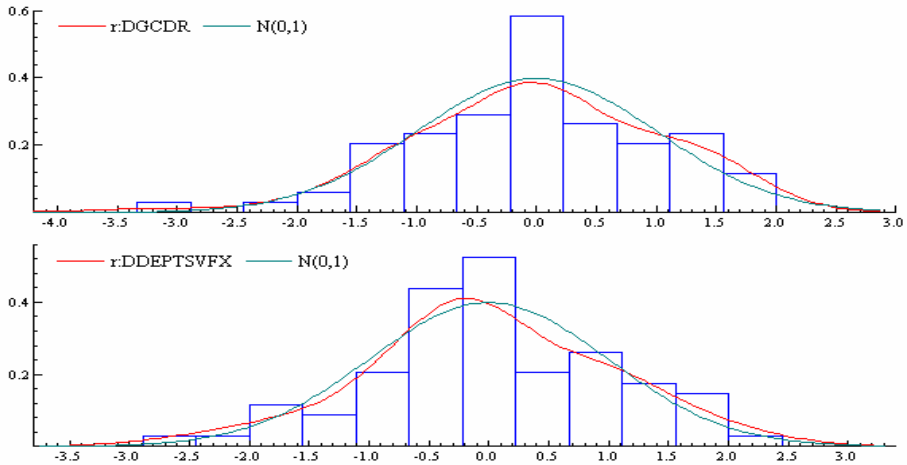


Figure 4.16: Misspecification and Stability Tests for Final Conditional Vector Error Correction Model for Durables Consumption

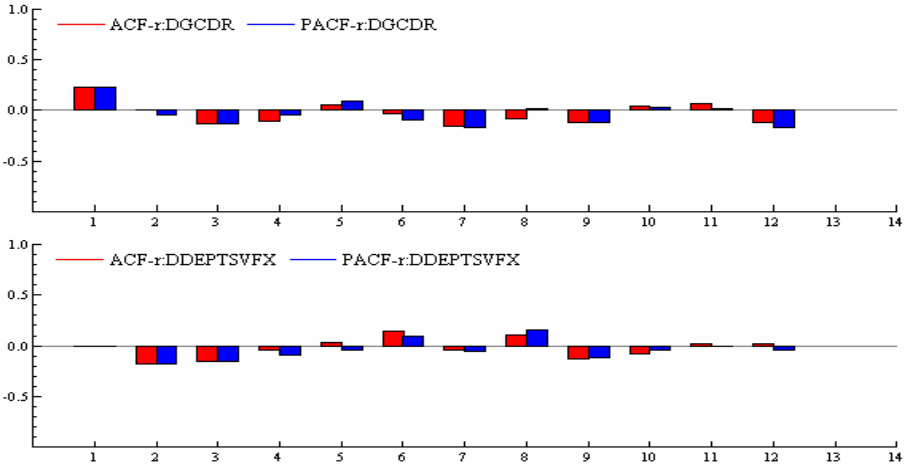
A. Scaled Residuals



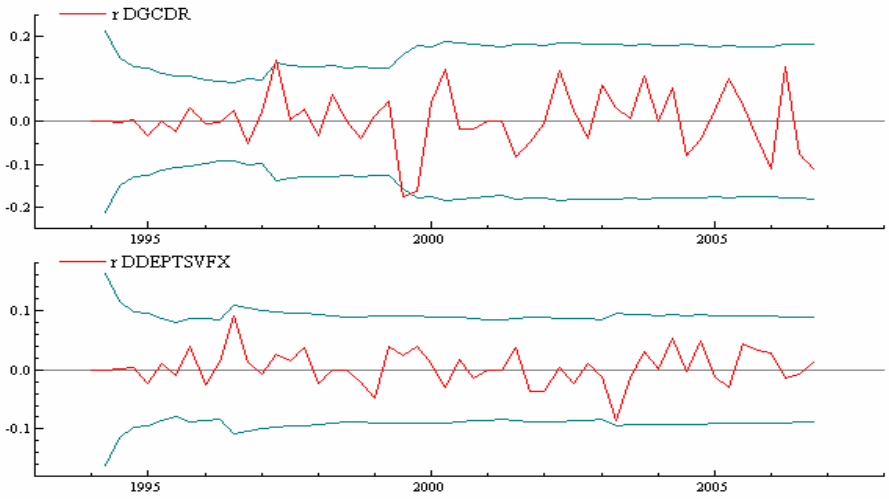
B. Residual Density and Histogram



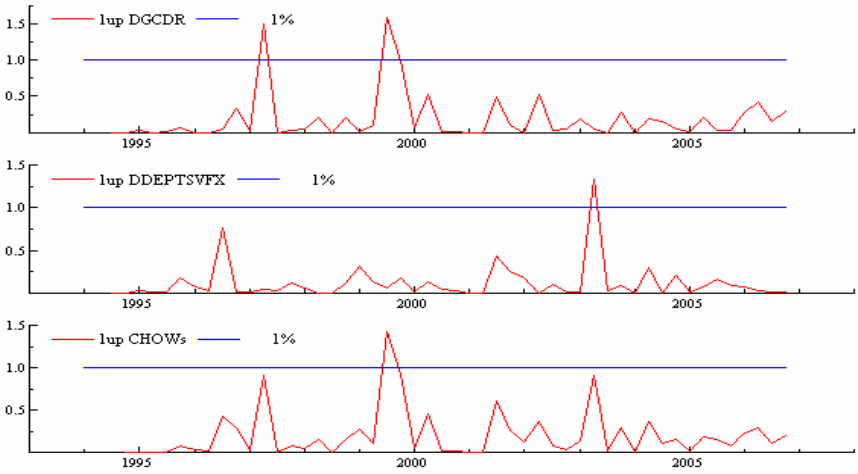
C. Residual Autocorrelation and Partial Autocorrelation



D. Recursive Graphs for One-Step Ahead Residuals within 2+/- Standard Errors



E. One-Step Chow Test



F. Break Point Chow Test

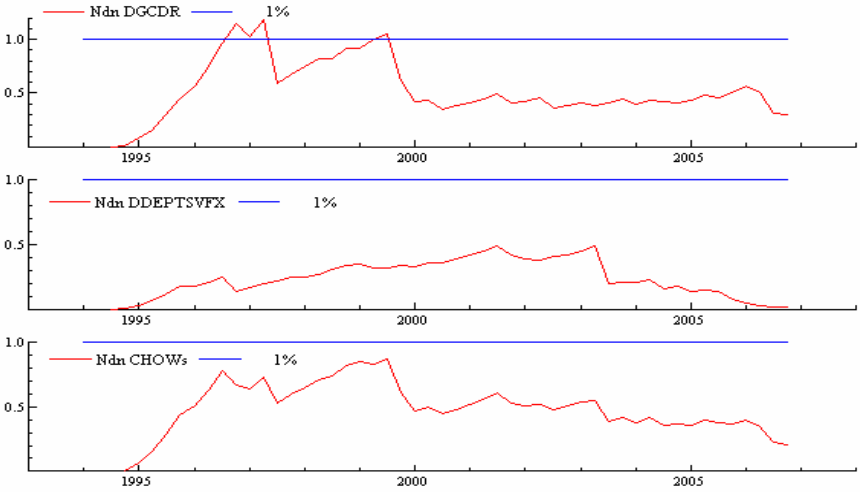
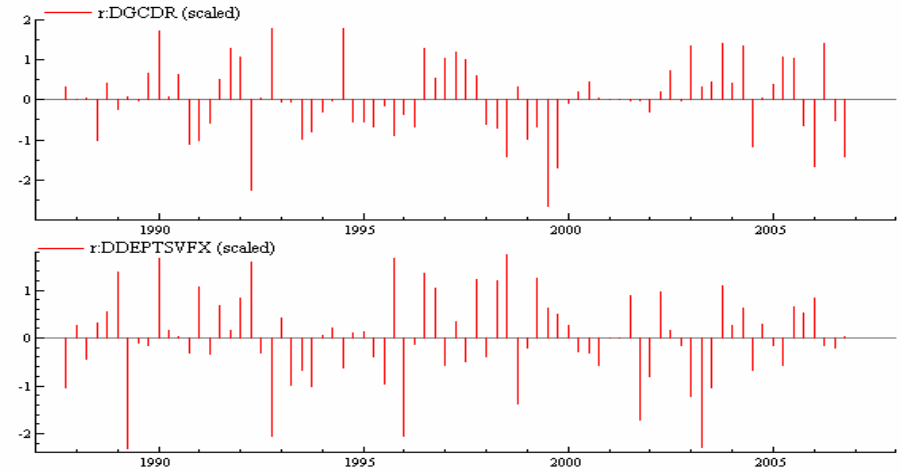
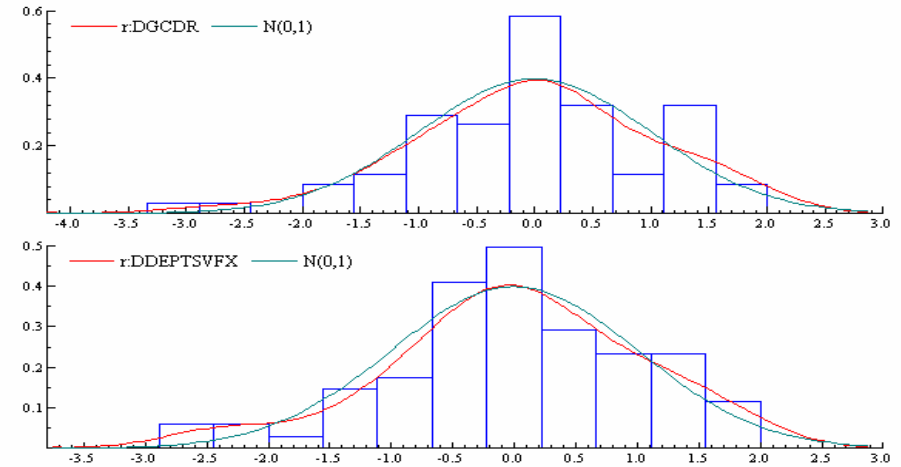


Figure 4.17: Misspecification and Stability Tests for Parsimonious Conditional Vector Error Correction Model for Durables Consumption

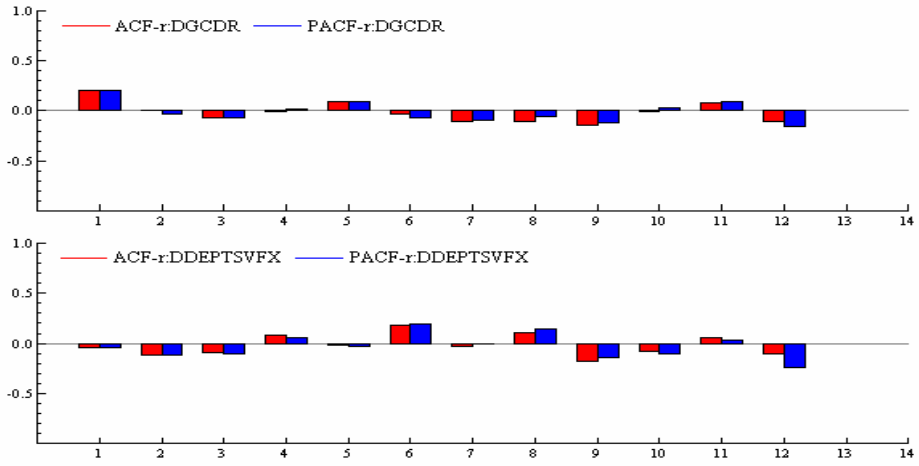
A. Scaled Residuals



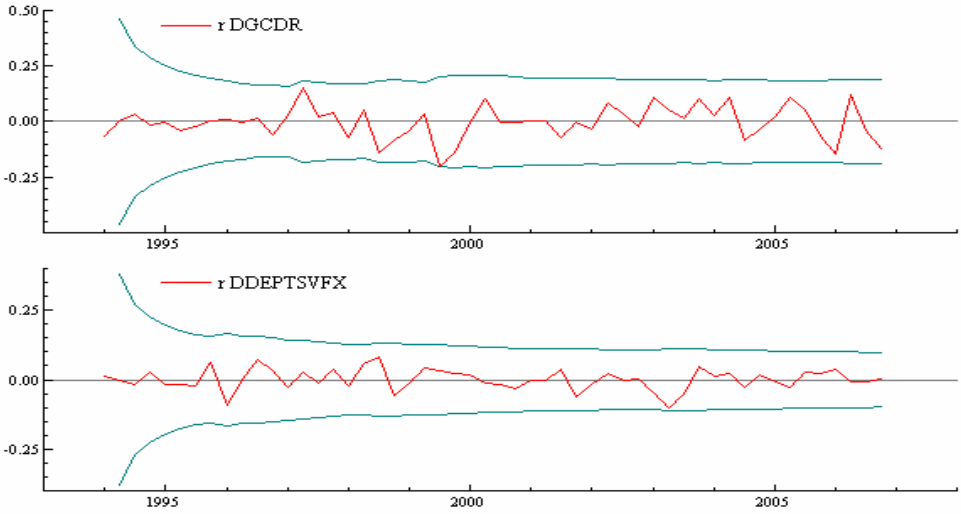
B. Residual Density and Histogram



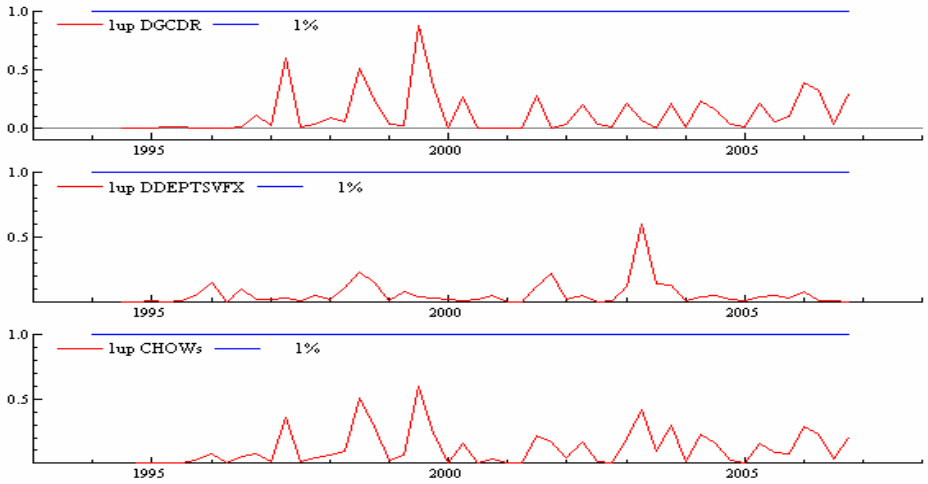
C. Residual Autocorrelation and Partial Autocorrelation



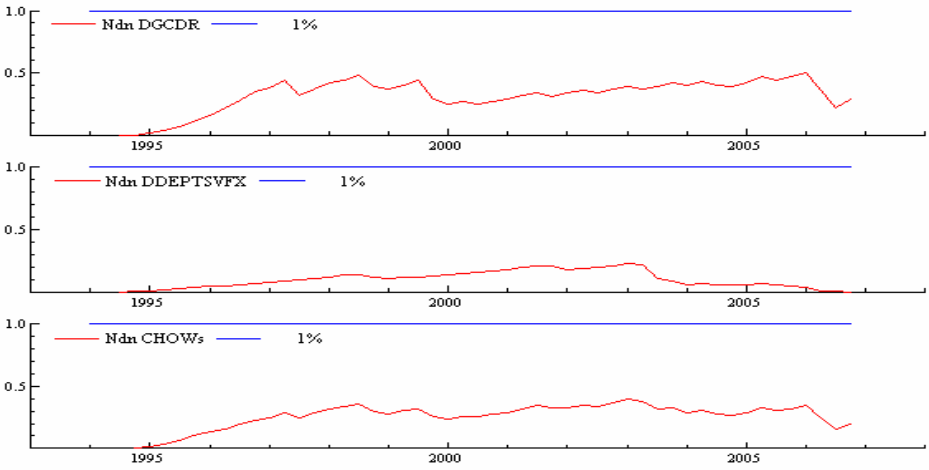
D. Recursive Graphs for One-Step Ahead Residuals within 2+/- Standard Errors



E. One-Step Chow Test



F. Break Point Chow Test



Chapter 5: Housing Market Characteristics and Estimation of Housing Wealth in Turkey

5.1 Introduction

Home ownership is one of the most preferred forms of wealth accumulation for households in Turkey. Ownership of house not only provides a service in the form of accommodation, but also households can earn actual as well as imputed rental incomes from the consumption of housing services. Households often have a bequest motive that favor holding the appreciated real estate assets until death and may view the accumulation of housing wealth as a hedge against life's uncertainties as well as a means for long-term savings and investment. This type of perception differentiates the housing asset from many other forms of financial wealth (see Case, Quigley, and Shiller, 2005).

One important channel, through which the accumulated housing wealth may affect households, is the increase in borrowing capacity in financial markets. Housing asset constitutes the most important form of collateral because they are often less concentrated among certain segments of the population compared to other financial assets. Because of the widespread distribution, a change in the housing wealth may potentially have strong effects on consumption behaviour of liquidity constrained households, which may otherwise not have access to uncollateralized consumer credit.

Given the important functions performed by the housing asset, this paper provides a comprehensive look at the housing market characteristics in Turkey. The analysis in this paper shows that home ownership rate in Turkey is very high although the existing housing stock is unevenly distributed across income groups. Furthermore, as a consequence of high population growth, declining household sizes, massive urbanization, and internal migration

from rural to metropolitan areas, the rate of housing construction has not been able to match the rate of household formation, and this has created an excessive demand for affordable housing in Turkey.

Residential construction is an important driver of the gross fixed capital formation and is highly sensitive to the cyclical conditions of the Turkish economy. Private sector is the dominant player in the residential construction. Home ownership is predominantly financed through household savings. Because the public sector and financial institutions such as mortgage markets have been unable to facilitate affordable housing due to unfavorable macroeconomic climate resulting from high inflation and high interest rates, and lack of institutional infrastructure, the demand for housing in Turkey has been met by the construction of unauthorized dwellings in squatter settlements. The supply of high quality and licensed housing for middle and low income households, and the rehabilitation as well as legalization of these squatter settlements are the major issues shaping the housing policies in Turkey.

On the basis of these characteristics, this paper develops an estimation of the housing wealth in Turkey using primary sources on housing stock, residential construction figures and average floor area prices obtained from the building census, construction and occupancy permit statistics. Unlike the previous literature approximating the housing wealth using total number of households in the population, this paper estimates the urban and legal housing wealth associated with the dwellings with occupancy permits. The main reason for concentrating on authorized housing is that the constructed housing wealth series will be used in the estimation of the housing wealth effect on consumption of durables and non-durables in Turkey.

The housing wealth can affect consumption through the collateral channel, which allows the home owners to borrow from the financial institutions using their homes as collateral. However for this to be effective, the property ownership must be legally documented and the real estate must possess all the necessary construction and occupancy permits as well as technical standards to be eligible for real estate transactions in the financial system. Since there is a substantial undocumented and unauthorized dwelling stock in Turkey, using the total number of households to estimate the housing wealth would include the illegal housing, which is not recognized as an asset in the formal economic system.

The movements of the estimated housing wealth series are consistent with the developments in the construction sector during the late 1990s. The decline in the housing wealth coincides with the slump in the housing sector after 1997. On the other hand, consistent with the general improvement in the macroeconomic outlook and the revitalization of residential construction sector after 2003, the housing wealth has started to increase. In conclusion it can be said that this measure successfully captures the housing wealth movements in Turkey.

The rest of the chapter is organized as follows: Section 2 will discuss the home ownership patterns in Turkey. Section 3 will highlight the main determinants of the housing demand in Turkey in reference to the characteristics of the housing stock. Section 4 will discuss the importance of the residential construction sector in GDP and highlight the role of private sector in the provision of housing. This section will also discuss the important macroeconomic events that have affected the construction industry by using data on construction and occupancy permits. Section 5 will look at the existing forms of housing

finance through the governmental institutions and financial markets. This section will elaborate on the macroeconomic and institutional environment, in which mortgage markets operate in Turkey. Section 6 will discuss the prevalence of squatter settlements and the reasons behind commercialization of the squatter housing. Section 7 finally discusses the data sources and the methodology that are used in the housing wealth estimation. The final section concludes.

5.2 Home Ownership Patterns in Turkey

Home ownership in Turkey is historically very high. Table 5.1 shows that the households not paying rent as a percentage of total urban households have increased from 61 percent in 1965 to 68 percent in 2000. The study on homeownership patterns conducted by the Undersecretariat of Housing (2003) reveals that in 2000, 59.8 percent of the total urban households (10,373,863) are homeowners, 2.2 percent live in housing provided by the employer, and 5.5 percent are not homeowners but pay no rent. 31.6 percent of the urban households (3,282,853) pay rent.

One of the main benefits derived from the housing investment is that home owners gain real and imputed rental incomes. Data from expenditures on the gross domestic product (GDP) reveals in Figure 5.1 that income from ownership of dwellings or expenditure for housing services account for 6 percent of GDP until 2001 and has declined to slightly more than 4 percent of GDP in 2006. Overall income from or expenditures for housing services constitute 7-8 percent of private final consumption expenditures.

Another way to analyze the benefits of home ownership is to look at the results of the Households' Income and Consumption Expenditures Surveys in Table 5.2. When the incomes derived from the property holdings are examined, it can be seen that the real estate income in the form of actual rent constitutes 5 percent while the imputed rent of home owners constitutes 6.6 percent of the disposable income in 1994. In the following surveys, the actual rental income declined to 3-4 percent of the household disposable income. This trend is consistent with the movement of the share of expenditures for the ownership of dwellings in GDP as displayed in Figure 5.1. Nevertheless, the income from real estate property has a significant share within the household disposable income and exceeds the income from financial assets.

As can be seen in Table 5.3, income is distributed relatively unequally in Turkey where the wealthiest 20 percent of households receive over 40 percent of the income generated. Although the rate of homeownership is very high, the existing housing stock is not shared evenly.

According to the 1994 household income and consumption survey, Kayıket (2003) shows that the distribution of property wealth income between income groups is highly skewed assuming that the households' total property wealth includes both the value of the housing owned and settled, and the rental income earned from the property ownership. In Figure 5.2, while the highest income group owns 56 percent of all property wealth, the lowest income group owns only 5 percent. Since, the property wealth is unevenly distributed between the income groups, it can be concluded that the property wealth is one of the factors causing social inequality in the urban areas.

A skewed distribution in the share of rental income in total household income is also observed when income groups are analyzed separately. Kayıket (2003) finds that according to the survey in 1994, rental income constitutes 35 percent of the total income of the households in the highest 20th percentile. The share of rental income in the total income of 3rd and 4th percentile is roughly 26 percent. The percentage is 22.3 percent in the lowest 20th percentile.

Additionally, distribution of property wealth by age groups shows that the household heads that are 50 and above hold 73 percent of the housing wealth. Kayıket (2003) finds that every year about one percent of the households (30,000 people) pass their property wealth to 102,000 successors i.e. surviving spouse and/or children after death. Increases in the number of people at retirement age indicate that there will be a substantial property transfer via inheritance in the future. Moreover, decreases in the household size over the years imply that the inherited property will be concentrated in the hands of fewer people and this shift of wealth will likely to cause an increase in the social divide based on wealth.

5.3 Housing Demand Characteristics in Turkey

During the past half century, the population of Turkey has almost tripled and reached 72 million in 2005. As can be seen in Table 5.4, the population growth stayed over 2 percent per annum during the 1960-1990 period although it gradually declined to 1.29 percent in 2005. There has been a dramatic increase in the total number of households in Turkey since 1960 from about 5 million to 15 million with the average size of the household declining from 5.7 persons to 4.5 persons. From 1960-1980, population with 15-64 years of age constituted over 50 percent of the population. Due to the

declining population growth rates over time, share of the population younger than 14 years of age gradually declined to less than 30 percent of the total population by 2005, while the share of population with 15-64 years of age has increased to 66 percent. This growing segment also corresponds to the labor force of the economy. Increasing number of married couples and a large percentage of young population willing to live apart from their families in this cohort increased the number of household formation over time.

Another important phenomenon occurring in Turkey has been the rapid pace of urbanization and the declining share of rural population in the country. The urbanization process has been accompanied by immigration from rural to urban areas at unprecedented rates. Table 5.5 shows that the share of urban population increased from 31.5 percent in 1960 to over 67 percent by 2005. The urban population growth reached a peak of 5.8 percent in 1985 and gradually declined to 2 percent by year 2005. However as a consequence of this rapid urban expansion and net migration from rural areas to cities, the population in urban agglomerations greater than one million people increased from 11 percent of the population in 1960 to over 25 percent of the population by 2005. In particular, Istanbul received the highest migration from the rest of the country with the size of the city increasing from 1.5 million in 1960 to 9.7 million in 2005.

As a consequence of the multitude of factors such as young population, high rates of household formation and rapid urbanization, demand for housing in Turkey has been very high. Several studies attempted to estimate the current demand for housing in Turkey. According to the research conducted for the 8th Five Year Development Plan by the State Planning Organization (2004), between 2000 and 2005, housing demand

stemming from urbanization, population growth, renewal and natural disasters was estimated to be 3,075,000 dwellings in settlements with a population of 20,000 or more.

A recent study on housing demand in Turkey between 2000-2010 shows interesting results regarding the characteristics of the existing housing stock and the demand for housing in Turkey (see Çanga and others, 2002).

According to the 2000 building census results displayed in Table 5.6, there are 3,212 municipalities in Turkey in 2000 and the total number of buildings in those municipalities has reached to 7,838,675. The same figure was 4,387,971 buildings in 1,699 municipalities according to the last building census in year 1984. Census results show that the total number of dwellings increased dramatically within 15 years from 7,096,277 units to 16,235,830 units in 2000. Out of this total, 13,597,676 dwelling units exist in cities and towns in 2000. This dwelling stock consists of all available dwelling units regardless of the quality and technical standards as well as the existence of proper construction and occupancy permits.

Around 11 percent of the total building stock (869,444) and 21 percent of the dwelling stock (3,393,077) is in Istanbul according to Table 5.7. Dwellings in other metropolitan areas like Izmir, Ankara, Bursa and Adana combined constitute around 20 percent of the total dwelling stock. When average age of the buildings are examined in five big cities, it can be observed that it is less than 25 years with Istanbul having a relatively younger building stock of 18 years of age in comparison to Izmir and Ankara with 23 and 22 years of age respectively. When the distribution of total dwelling stock in cities are examined by the date of construction in Figure 5.3, as of 2000, 30 percent of the dwellings are constructed after 1990, 28 percent between 1980 and 1989, and 20 percent between

1970 and 1979. In other words, 78 percent of the dwelling stock is less that 30 years of age in Turkey.

According to the Turkish Construction Law No.3194, in order to start the housing construction on a legally owned land, the owners of the construction needs to obtain construction permits from the municipalities in compliance with the urban zoning restrictions. In order to start residence in the completed and partially completed new dwellings, an occupancy permit needs to be obtained as an indication that the dwelling unit has the satisfactory technical quality standards for residential use.

When the permits of the existing urban residential dwelling stock in 2000 are analyzed, out of the total dwellings in cities and towns, only 61.5 percent (8,366,428) have the required construction permits while only 33.27 percent (4,524,170) have the occupancy permits. In other words, 67 out of 100 dwellings are unlicensed and unauthorized for residential use in Turkey.

Although obtaining the construction permit is a necessary requirement, it is a known fact that many newly constructed dwelling units are resided by households without obtaining the required occupancy permits. When the share of occupancy permits are examined within the total dwelling stock with construction permits, only 54 percent has obtained the occupancy permits.

The present condition put forward by this analysis has important implications for the estimation of housing need in Turkey. Çanga and others (2002) estimated that by taking into account the growth of population and the declining trend in household size, the housing need is calculated as 10,906,368 in 2000. Given the available 13,597,676 dwelling units, there is a housing excess of 2,691,308 units in Turkey. However when the dwelling

units that have at least the construction permit are considered, the housing deficit becomes 2,539,939 units, and when dwelling units with occupancy permits are considered, the deficit reaches to 6,382,197 units. These results evidently imply that the housing need in Turkey is met by unauthorized housing provision. In other words, the housing problem in Turkey is not related with the quantity but quality of the housing production.

Çanga and others (2002) calculate that the housing need in Turkey by 2010 will reach to 13,766,711 dwelling units, which indicates that 2,869,343 additional housing units will be needed. The way the future housing supply can satisfy this need depends entirely on how the authorized and unauthorized housing stock will develop until 2010.

According to the assumption that there will be no further unauthorized housing construction and the existing authorized and unauthorized housing stock in 2000 is increased by the average trend growth rate of the construction permits during 2000-2010, there will be an excess housing supply of 6,126,971 dwelling units. On the other hand, according to the assumption that the housing need will be met by only authorized housing, the housing deficit reaches to 1,577,663 in 2010 if the authorized housing provision evolves according to the trend growth rate. These two findings clearly show that, when unauthorized housing stock is excluded from the total housing stock, the supply of quality and licensed housing becomes an important problem in shaping the housing policy in Turkey.

5.4 Residential Construction Sector in the Economy

Given the continuous economic growth and increasing demand for housing, the construction activity has been one of the locomotive sectors of the Turkish economy over the last decades. When building construction is examined in Figure 5.4, it can be seen that during the 1986-1995 period, the share of private sector construction was 9-11 percent of GDP. During the 1996-2003 period however, it continuously declined from 11 percent to 4.8 percent. Since 2003, share of private sector construction has started to increase and reached 7.3 percent in 2006. The public sector construction however constitutes only 1-2 percent of GDP during the 1987-2006 period.

The building construction is also an important driver of the gross fixed capital formation in Turkey. During the 1987-1994 period, both public and private building construction constituted 40-50 percent of the total gross fixed capital formation while private sector constituted 50-65 percent of the private gross fixed capital formation. The share of building construction in total capital formation has started to decline following the 1994 financial crisis and dropped to 25 percent after the 2001 economic crisis. Since 2003, there has been an improvement in investment in the construction sector.

Table 5.8 and Table 5.9 give a clear picture on the dominant role of the private sector in building construction in Turkey.[93] When the number of new buildings according to the construction permits is examined throughout the 1954-2005 period, it can be seen that on the average, the private sector accounts for over 85 percent of the total new building construction. When the completed buildings according to the occupancy permits are examined, the private sector accounts for more than 90 percent from 1964 until the end of

[93] The data presented in these tables can be analyzed graphically in Figures 5.8 and 5.9.

1990s. In particular, private sector plays a dominant role in residential building construction in Turkey. As of 2005, 91 percent of the housing starts with construction permits and 77 percent of the residential buildings with occupancy permits come from the private sector.

The evolution of construction and occupancy permits for residential dwelling units give a clear picture of the state of the construction industry over time. In Figure 5.10, from 1958-1968, the small number of construction permits reflects the low levels of urbanization in the country. After 1966 until 1980, construction permits each year continuously increased. Following the military coup in 1980 until 1984, there was a decline in the housing starts. However following the transition to the democratic rule in 1984, and liberalization of the economy, there was a boom in the housing starts for a decade, which coincided with the rapid urbanization and mass migration from rural areas. From 1984-1994, the cumulative number of construction permits obtained reached to 4,544,907. Except for the recession following the first Gulf War in Iraq during 1990-1991, on average over 400,000 dwelling units obtained construction permits every year during the 1984-1994 period.

Following the 1994 financial crisis until the end of 2002, Turkish economy experienced several negative shocks that adversely affected the construction sector. Table 5.12 shows that the private gross fixed capital formation in building construction declined from 1996 until 2003. The 1994 financial crisis followed by a sharp devaluation of the currency led to a contraction in GDP by 5.5 percent. In 1998 Russian default had a contagious effect on the Turkish financial markets and led to a capital outflow, which in turn increased the overall interest rates in the economy. The 1999 earthquake severely hit

the industrial areas of İzmit and İstanbul. In that year, GDP decreased by 4.7 percent and the private investment in construction sector declined by 8.8 percent. In 2000 and 2001, Turkish economy experienced a severe economic crisis. The construction sector went into a slump afterwards until 2003.

As displayed in Figure 5.6 and Figure 5.7, following the IMF based disinflation program, with the fall of the interest rates to around 15 percent and decline in inflation to 10 percent, the demand for housing started to improve again after 2003.[94] The number of construction permits increased from 161,431 in 2002 to 510,080 in 2005. Between 2004 and 2006, the investment in construction sector grew by more than 25 percent. Falling interest rates after 2003 have increased the demand for housing and created an increase in house prices that is above the average growth of the consumer price index. [95]

When the evolution of occupancy permits for completed buildings are examined in Figure 5.11, we observe similar tendencies in the number of occupancy permits each year although it is less volatile compared to the construction permits data.

[94] A study by Sarı, Ewing, and Aydın (2007) investigates the relation between the housing starts using construction permits and macroeconomic variables in Turkey from 1961 to 2000. Their results indicate that shocks to interest rates, output and prices have noticeable effects on changes in housing investment in Turkey. In the housing equation, the effects of prices, real national income and interest rates explain more than 22 percent, 14 percent and 12 percent of the variance in housing investment respectively. This paper highlights the discouraging effects of high inflation and interest rates on housing construction during the 1994-2001 period.

[95] Özsan and Karakaş (2005) attribute a significant portion of this increase to decreasing interest rates and more readily available housing loans. According to Oyak Konut market studies they cited, there is a marked rise of around 40 percent in house prices in selective high growth residential areas of Istanbul and Ankara. On the other hand, there are doubts as to whether a house price bubble currently exists. (See Binay and Salman, 2008) House prices have merely reached the pre-crisis levels in real terms.

5.5 Housing Finance in Turkey

Because of the inflationist economy, lack of housing policies on tenants, and the underdeveloped institutional housing finance to foster homeownership for low and middle income families, home ownership in Turkey is financed predominantly through family resources such as financial savings and inheritance. Private sector construction companies are the main providers of the housing. Despite the prevalence of self-financing of home ownership, housing development and finance through quasi-governmental institutions as well as the financial system still exist in Turkey.

5.5.1 Housing Finance by the Government

Housing finance through the quasi-governmental institutions in Turkey started with the provision of credits for low income families through the Ministry of Public Works and Settlement, which helped to construct more than 800,000 dwellings between 1966 and 1988. Between the years 1962-1992, the Social Security Organization (SSK), the Social Insurance Establishment for Tradesmen, Artisans and Other Independent Workers (BAĞ-KUR), and the Armed Forces Pension Fund (OYAK) provided funds for the housing construction and produced more than 300,000 dwellings (see Sarı, Ewing, and Aydın, 2007).

In order to solve the housing problem in a comprehensive manner and to increase the housing production at the national level, Turkish government passed the Housing Development Administration Fund Law No. 2487 in 1981. The basic goal in establishing the Housing Development Fund was to provide public support for housing through public revenues earmarked for this purpose and to achieve orderly urban development. In 1984, Housing Development Administration Law No. 2985 came into force to expand credit

provision for housing and housing production on behalf of the Turkish government. In the same year a new legal entity, the Housing Development and Public Participation Administration, was established. In 1990, the Housing Development Administration (TOKİ) was transformed into a separate entity with the Governmental Decree No. 412.

As reflected in its mandate, Housing Development Administration (TOKİ) can be considered as the biggest housing developer in Turkey working on behalf of the government.

Some of the main duties of the Housing Development Administration (TOKİ) are the establishment of construction companies related with the housing sector or participating in those that have already been established; ensuring the participation of the banks in financing housing; providing banks with credit to this end; and granting individual and mass housing credits.

Turkey is known to have an underdeveloped private housing mortgage market. Public institutions and state-owned banks have been the main providers of housing and mortgage financing. In this regard, Housing Development Administration (TOKİ) manages the provision of mortgage financing on behalf of the government using two main methods:

A. Real Estate Development on Housing Development Administration's Own Land

For mass housing development projects produced on public land, the Housing Development Administration (TOKİ) has the target group of low and middle-income families (20-40 percent of the income distribution) comprised of poor citizens, widows, orphans, handicapped people, and the citizens who work for the public sector with considerably low prices, who are not able to own a housing unit within the existing market

conditions in Turkey.[96] Between the years 1984 and 2003, TOKİ developed 43,145 housing units. From the beginning of 2003 until the end of 2004, projects for 100,000 housing units were initiated on the lands of the Housing Development Administration in 75 cities in Turkey. [97]

B. Credit Applications

The Turkish residential mortgage market has a monopolistic structure with a few dominant players in the housing finance sector. To partially finance the private construction, the Housing Development Administration coordinates with the commercial banks in supplying credit to real estate developers. Initially, the Turkish government established the Mass Housing Fund in 1984 to mobilize resources through taxes, and then lend them through the Housing Development Administration (TOKİ) and its loan originator banks of Emlak Bank and Vakıf Bank to finance housing construction and long-term mortgage loans at low fixed interest rates.[98] However, the Housing Development Administration over time lost its monopoly as a housing finance institution because of the

[96] As a governmental agency, the Housing Development Administration has adopted a model to provide mortgage loans with long maturities and low yield. Through this method, the selling of the housing units takes place before the construction period. 10-40 percent of the cost of the house is initially collected as a down payment, depending on the affordability of the target population and the rest of the cost is spread over a maturity ranging from 75-240 months. The nominal balance of the house is indexed to the nominal interest rate equated to the rate of inflation and the repayments are indexed to the wage increases in the public sector in every six months. Erbaş and Nothaft (2005) mention that Mexico also designed a mortgage indexation scheme similar to Turkey. Among the mass houses provided by TOKİ, 31 percent of the housing credits has been used by workers, 30 percent of the housing credits has been used by civil servants, 7 percent by retired, 13 percent by middle tradesmen.

[97] See Tuhral (2005).

[98] The funds to be distributed as housing credit by the Housing Development Administration were obtained from 26 percent of the fuel oil taxes, 18 percent of the import taxes, 28 percent of the revenues from the state monopoly products, and 6 percent of the taxes taken from the people traveling abroad.

decreasing value of its fund under the weight of interest rate subsidies and its mortgage products with very low loan-to-value ratios. [99]

Currently, according to the protocols with the Housing Development Administration, in the condition that developers delay payment of the credits, banks act as guarantors and pay the loan to TOKİ and claim that from the developer. The repayment time period is between 5 and 10 years. The interest rate is the same as the average increase of the public sector wages.

Table 5.10 displays the total number of new dwelling units produced in each year according to the construction permits and data for the new dwelling units that obtained credit from the Housing Development Administration each year and the share in total number of dwellings. It can be seen from this table that the Housing Development Administration provided credit for a total number of 1,045,968 dwellings during 1984-2002 although the number of dwellings that obtained credit declined since the early 1990s. Table 5.11 shows that during the 1984-1999 period, 940,097 completed dwelling units that obtained occupancy permits were supported by credit from the Housing Development Administration. Among this number, 84 percent have been produced by housing contractors and construction cooperatives.

Although the share of the private sector in building construction has been over 90 percent until the 1980s, this share has declined by 20 percent during the 1980-2000 period

[99] Due to increase in inflation and inability to raise tax revenues earmarked for the Mass Housing Fund, the designated funds became insufficient over time. The ratio of mortgage credits to the cost of house decreased from 15.58 percent in the 1990s to 0.12 percent in the 2000s. The Housing Development Fund ceased to exist in 2001 with the Law No. 4684. Currently, revenues of the Housing Development Administration (TOKİ) are obtained from real estate assets, which are sold and leased by TOKİ through income-sharing projects on valuable lands in especially big cities, to be used in projects for the people with low incomes; repayments of loans which are lent to other real estate developers by TOKİ; shares from land costs of housing and office units that are built on the lands of the Ministry of Treasury. (See Sarı, Ewing, and Aydın , 2007 and Demir, Kurt, and Çağdaş, 2003)

due to the emerging share of construction cooperatives. As can be seen in Table 5.8, in 1989, the share of construction cooperatives constituted 30 percent of the new building construction. Since the 1990s, there has been a declining trend in the new building starts by the construction cooperatives. The share has dropped from 20 percent in 1996 to 6 percent of the new building construction by 2005. However as can be seen in Table 5.9, from 1990-2005, the share of building cooperatives in completed buildings increased to 18 percent on average and private sector share stayed around 80 percent.

Table 5.10 and Table 5.11 give a clear picture about the role of construction cooperatives in the residential dwelling construction. The availability of loans from the Housing Development Administration extended to the members of construction cooperatives created a housing finance solution for the middle-income households that are first-time homeowners. During the 1985-1989 period, the share of construction cooperatives constituted 30 percent of the licensed new building construction. From 1984-1994, the cumulative number of construction permits obtained reached up to 4,544,907, of which 1,258,907 was given to construction cooperatives and of which 910,431 got credit from the Housing Development Administration.

The Emlak Bank dominated the housing finance market since the mid-1980s. According to Erol and Patel (2004), the Emlak Bank in addition to retail banking, had the legal authority to act as a lender and developer institution in the residential construction business. The bank raised funds for mortgage lending through capital markets as well as funds from the sale of its own houses.

In the early 1990s, the long-term mortgages offered by the Emlak Bank were mainly foreign currency loans denominated in the Deutsche Mark and the U.S. Dollars.

Following the devaluation of the Turkish Lira in April 1994, the Emlak Bank, ceased all its mortgage activity and in 1998 the bank introduced index-linked payment mortgages designed to cope with high inflation.

The Emlak Bank offered mortgages for the purchase of three types of housing units: those constructed by the Emlak Bank, those constructed by the joint venture construction businesses, in which Emlak Bank participated with builders or developers, and those constructed by any builder in the market. The market value of mortgages offered for Emlak Bank's own dwellings was 56 percent of its total mortgage loan portfolio. Between 1994 and 2000, the Emlak Bank supported the creation of over 90,000 apartments until the bank ceased its operations in 2001 due to insolvency (see Sarı, Ewing, and Aydın, 2007).

5.5.2 Housing Finance by the Mortgage Markets

The existence of a well-functioning mortgage market can play important roles in the achievement of redistributive and growth-enhancing policy objectives. As Erbaş and Nothaft (2005) argue, the widespread availability of affordable mortgages can enhance the wealth accumulation, promote savings and financial market development, and stimulate the investment and job creation in the housing sector. International experience suggests that widespread availability of home mortgages has a favorable impact on the poverty alleviation, quality of housing, infrastructure, and urbanization.

The mortgage markets can also play a pivotal role in influencing the business cycle through consumer spending by transmitting monetary policy changes to housing price movements. Changes in interest rates can influence household expenditures through associated movements in housing prices. As argued by Catte, Girouard, Price and André (2004), the capacity of the households to adjust their current spending in response to

shifting housing prices is strongly dependent on the functioning of the mortgage markets, the level of mortgage debt in the economy, distribution of the housing wealth, housing transaction costs, and the extent to which homeowners have access to greater liquidity in financial markets through housing equity withdrawal. If mortgage markets allow homeowners to borrow easily against their housing equity, rising property values encourage households to increase their current spending.

Turkey, as a developing country, has a highly volatile inflationary environment, in which low- and middle-income households have had no or limited access to mortgage financing. For the last few years, as Turkey's economic stability increased, there has been an increasing interest in the emergence of a national housing finance mortgage system. For that purpose, the Turkish parliament recently enacted the mortgage market legislation in February 2007.

In summary, the law regulates the mortgage credit contracts with fixed or variable interest rates; authorizes and specifies the conditions governing the issuance of mortgage-backed securities and asset-backed securities; authorizes and specifies the conditions governing housing finance institutions, such as banks, that operate in the primary market to finance the purchase of eligible real estate property, and mortgage finance corporations that operate in the secondary market by buying home loans from housing finance institutions. The law allows only eligible housing units with valid permits to have access to mortgages (see Erdilek, 2007).

Historically, existing mortgage market has been very underdeveloped relative to other OECD countries and some emerging market economies. A comparative study by

Warnock and Warnock (2008) provides information on the average size of the housing finance systems as a share of GDP for 62 countries during the 2001-2005 period.

According to Figure 5.12, emerging market economies generally have smaller housing finance systems than developed countries. Among the 38 emerging markets, housing finance averages 10 percent of GDP, with the largest housing finance system being between 20 and 30 percent of GDP in Malaysia, Taiwan, Korea, South Africa, Estonia, and Israel. In contrast, housing finance in the 24 developed countries averages 55 percent of GDP. Turkey, on the other hand, stays close to the bottom of the list with an average 0.3 percent mortgage debt to GDP ratio during the 2001-2005. Accordingly, only 3 percent of the population or less than 1 percent of the households had an outstanding mortgage balance (see Tuhral, 2005 and Özsan and Karakaş, 2005).

Several comparative international studies on mortgage markets have identified number of reasons behind the successful development of mortgage markets. First, countries with strong legal rights through collateral and bankruptcy laws; a more stable macroeconomic environment and factors that promote the mobilization of funds through stable capital markets are found to have more developed mortgage markets (see Warnock and Warnock, 2008 and Sanders, 2005).

Second, private mortgage markets must have well-functioning credit information systems on the creditworthiness of potential borrowers. If this condition is lacking, as in many developing countries, mortgage markets tend to have an ample supply of loans for high-income households but a shortage for low- and middle-income households (see Erbaş and Nothaft, 2005).

The mortgage finance has been inaccessible to a large portion of the population including low- and middle-income households in Turkey. Although the target market for mortgage lending activities is assumed to be the middle income families, outstanding mortgage loan amount per person suggests that they are mainly upper level income families (see Özsan and Karakaş, 2005). Large down payment, high interest rates and short-term loan repayment requirements have been the norm in available mortgages and consequently, the payment schedule offered by the commercial banks is not affordable for an average household (see Binay and Salman, 2008). This type of lending practices leaves a wide segment of the households underserved. As mentioned above, the middle income households are targeted by governmental agencies to a very limited extent and low income families are either tenants, live in a family-financed housing or in illegal dwellings.

Mortgage lending in Turkey has been mainly limited due to high inflation and interest rates. The high domestic debt requirement of the Turkish Treasury and high interest rates offered by the domestic debt instruments have indirectly affected the cost of funds available for mortgage lending and inhibited the growth of retail banking in general.

Mortgage lending has also been limited because lenders are funding mortgage loans from their deposit base, and have a fundamental mismatch between assets and liabilities. When the average term of savings deposits is less then two months, even mortgages with 5-8 years maturity create an enormous amount of risk load on balance sheets of banks (see Tuhral, 2005).

In addition, banks are limited to providing only fixed-rate mortgages under the Consumer Law (see Özsan and Karakaş, 2005). One consequence of this limitation under

the inflationary environment is that lenders mainly originate short-term mortgages. The longest term for the existing residential loans has been 60 months for loans in Turkish Lira and 180 months for loans in foreign currencies, which makes it impossible to have loan installments as low as the rent.

Finally, since 40 percent of the existing dwelling stock has no construction license, many low income households are not able to apply for residential loans for unlicensed housing.

In the absence of a developed mortgage system, less than 5 percent of housing finance has been provided by commercial banks as part of their consumer lending activity in the 1990s (see Erbaş and Nothaft, 2005). Until the late 1990s banks in Turkey were able to earn high interest income by investing in high-yield government bonds. As can be seen in Figure 5.7, with sovereign borrowing rates going down from over 90 percent to around 15 percent following the IMF-based disinflation program, a primary income source for banks in Turkey declined in early 2000s. Furthermore, improving macroeconomic conditions increased the demand for durables such as automobiles as well as real estate investment. As a result, the mortgage market began to grow as banks started to increase their exposure to corporate and consumer debt.

When the allocation of household credit is examined in Figure 5.13 between the consumer credit for housing, automobiles as well as individual credit cards during 2000-2006 period, it can be clearly seen that the total household credit increased from 4.5 million U.S. dollars in 2003 to 47.6 million U.S. dollars in 2006. The cumulative amount of consumer credit reached up to 442.5 million U.S. dollars during the 2000-2006 period, of which around 92 million U.S. dollars was allocated as the Turkish Lira based housing

loans, 65 million U.S. dollars as Turkish Lira based automobile loans and 171 million U.S. dollars as Turkish Lira based individual credit cards.

When the consumer loan portfolio of the Turkish banking system is examined in detail in Figure 5.14, it can be clearly seen that the share of housing loans in Turkish Lira increased from less than 2 percent of the total credit before 2003 to 12 percent by the end of 2006. Figure 5.15 looks at the allocation of consumer credit itself. This figure clearly reveals that the housing loans constituted about 6 percent of the total household credit until the end of 2003 and the share increased to 32 percent by the end of 2006.

In 2006, most of the commercial banks extend Turkish Lira based housing loans with maturities varying from 12 to 300 months. Products with over 120 months of maturity have been introduced recently. When the maturity structure of the housing loans are examined in Figure 5.16, it can be clearly seen the Turkish Lira based loans with a maturity of 61-120 months constitute the largest share of 44 percent followed by loans with a maturity of 37-60 months with a share of 26 percent. Loans with 121-180 month make up 13 percent of the housing loans where as loans with 181-240 months and loans over 241 months make up 3 percent of the loans in total. Therefore in comparison to the maturity structure of mortgage markets in developed countries, housing loans with maturities that are longer than 10 years constitute a much smaller portion of the housing loan portfolio of the Turkish banks.

5.6 Squatter Settlements

As a consequence of the massive urbanization and internal migration from rural to metropolitan areas, the rate of housing construction has not been able to match the rate of population increase. Because the public sector and financial markets have been unable to facilitate affordable housing delivery through the market mechanism for a large number of households, who do not have the means to purchase or rent housing units within the legal housing stock, excessive demand for affordable housing for low-income households in Turkey has been met by the construction of unauthorized dwellings at substandard quality in squatter settlements.

The Turkish word for squatter housing, "gecekondu" literally means "landed overnight". Legally, what is understood from the term is a dwelling erected on land, which does not belong to the builder, without the consent of the owner, and without observing the laws and regulations concerning construction and building (see Başlevent and Dayıoğlu, 2005). Gecekondus are usually found at the outskirts of the major cities, built on state property or on land belonging to the municipalities.

Gecekondu settlements provide an attractive alternative for housing for most households at the bottom of the income distribution. In 1987, the price of formal sector housing units in Istanbul ranged from 11,364 U.S. dollars to 113,636 U.S. dollars while a majority of the gecekondu dwellings were sold at prices below 1,364 U.S. dollars (see Pamuk, 1996). Besides providing shelter to the relatively poorer sections of the society, gecekondus constitute a source of unearned income for many low income families and

imputed rent from residing in squatter housing has a non-negligible positive impact on the income distribution.[100]

Due to lack of reliable data, information about the illegal building stock is limited. According to 2002 estimates, 27 percent of Turkey's urban population resides in gecekondus. While 22 percent of the urban population of Ankara was living in squatter settlements in 1955, it reached 62.5 percent in 2002. This figure is estimated to be over 50 percent in Istanbul and Izmir. For the country at large, the share increased from 5 percent in 1955 to 27 percent in 2002 (see Başlevent and Dayıoğlu, 2005). This picture shows the gravity of the unplanned settlements in Turkey.

In earlier decades prior to the 1960s, the gecekondu settlers were tolerated by the public as poor individuals trying to escape from rural poverty. This has discouraged the authorities from making a serious attempt to curtail the invasion of public land. Over time, the urban poor in gecekondu settlements gained an important leverage as a large political constituency. Recognizing the voting potential of such groups, the political parties either ended up granting amnesties to gecekondus or legalized them through the extension of land titles to dwellers and upgrading of gecekondu neighborhoods. This process has unintentionally accelerated the invasion of public property and widespread land speculation.

Main consequences of these amnesty laws and formalization of gecekondu settlements have been the extension of development and sale rights to illegally occupied land; commercialization of unauthorized housing production; proliferation of rental housing markets, and corresponding densification in the gecekondu settlements (see

[100] Başlevent and Dayıoğlu (2005) find that home ownership has an equalising effect on income distribution in the urban areas of Turkey. Data from the 1994 Household Income Survey showed that when imputed rent is included in household income, the Gini coefficient for the bottom 20 per cent goes down.

Pamuk, 1996). Other important contributing factors to the commercialization of the gecekondu districts have been their increasing proximity to the city centers and provision of infrastructure and public utilities to these districts by municipalities.

Table 5.13 provides a clear evidence of the scale of the illegally built squatter houses that were legalized by the Amnesty Law No. 2805 in 1983, Law No. 2981 and Law No.3290 in 1984. From 1984-1989, the number of gecekondu dwellings that obtained construction permits under the amnesty law constituted about 40 percent of the dwelling units that obtained the construction permit under the Construction Law No.3194. After 1993, this ratio fell below 1 percent due to narrower scope of the amnesty.

The number of gecekondu dwellings that obtained occupancy permits under the amnesty law during 1984-1987 constituted on average 80 percent of the dwelling units that obtained occupancy permit under the Construction Law No. 3194. The number even reached 128 percent of the dwellings with occupancy permits obtained through legal channels in 1985.

As Pamuk (1996) describes in detail, the character of gecekondu construction changed considerably as a result of the amnesty in 1984. The law not only legalized the illegally built squatter houses, but also allowed the owners to add a maximum of four floors to their buildings. Some gecekondu dwellers have greatly benefited from newly gained development rights on the plots they have occupied. In this process, the land owners have turned over the land to small scale contractors for the construction of a multi-story apartment building and in return gained ownership rights for a previously agreed percentage of the apartment units. This type of housing development system emerged in the context of limited capital and lack of access to construction loans from the banks. Furthermore, the amnesty laws have activated the land and dwelling acquisition in quasi-

formal real estate markets in gecekondu settlements based on expectations of legalization in the future. Even though gecekondu is often characterized as lacking official title to land, households in gecekondu areas have been undertaking housing investments that are economically significant and actively engaging in entrepreneurial real estate activities. The presence of different degrees of property rights outside of the legal system and informal arrangements have not discouraged the conduct of monetary transactions and the proliferation of professionals specializing in land and real estate sale in gecekondu settlements.

Rental markets also constitute an important feature of commercialization of the gecekondu settlements. The increased demand for housing by urban poor, lack of new vacant public land to occupy, and construction of multi-story apartments increased the share of tenants among the gecekondu settlers dramatically. This process has increased the densities in gecekondu settlements and compounded the already serious urban infrastructure deficiencies.

Even though commercialization and quasi-legal property ownership exist in the gecekondu areas, several researchers like Başlevent and Dayıoğlu (2005) argue that ownership of squatter housing hardly gives the dweller complete control over the real estate wealth. For instance, it is argued in this paper that extralegal property such as squatter housing is a "dead capital" because it cannot be used as collateral in any formal transaction in financial institutions or transferred legally to next generations as bequest. This extralegality forces the gecekondu communities to operate in a different social environment and to respect the informal social contracts rather than the legal system. It is further argued that this extralegal setup causes poorer segments of the society to remain undercapitalized as their property is not recognized outside the informal system they have created.

5.7 Estimation of the Housing Wealth

Having identified the basic characteristics of the housing market in Turkey, in this section of the paper, an estimation approach for the housing wealth series will be developed.

Previous studies have used various methods to estimate the housing wealth in Turkey. Akkoyunlu (2002) developed a model, which identifies the initial housing stock by dividing the population at the initial year by family size indicating the total number of households at that year. In the calculation of housing wealth, she used initial value of the house price index determined by the ratio of initial nominal private housing investment and initial real private investment. The depreciation rate is the inverse of the average life of a house and she used various ranges from 100 years to 30 years for the average life of a house. Real private housing investment series is obtained by dividing the nominal private housing investment series by housing price index. The change in the housing price index was constructed by adding 2 -5 percent per annum growth rate over the change in prices of other goods and services.

Akkoyunlu (2002) uses various assumptions for the growth rate of housing prices, depreciation rate and initial housing stock in order to make the estimated series consistent with the published data. She assumes that housing lasts 50 years on average and the real price increases by 3.25 percent per annum.

This method relies on many ad hoc assumptions to estimate the housing wealth. The paper fails to substantiate how some of the parameter values are chosen and why they are preferred over the others. Comparison of annual overall inflation and housing price inflation data during the 1984-2006 period shows that there is no substantial difference in

the average growth rate of prices as there are periods housing prices rise faster or slower than the overall inflation. At the same time, average housing age, which is important for the depreciation rate, is not consistent with the evidence. Around 80 percent of the building stock in Turkey was below 30 years of age according to the 2000 building census.

Aydede (2007) on the other hand, attempted to use occupancy permits and the number of households in Turkey in order to estimate the housing stock. The number dwelling units are obtained from occupancy permits statistics together with the dwelling value. In order to find the total stock of the dwelling units for each year, Aydede (2007) divides the total population by 4.362 to find the total number of households in 1970 and the number of new dwelling units is added to this number for the subsequent years. The housing wealth is computed by multiplying the total number of dwellings derived from this estimation with the dwelling value obtained from the occupancy permit statistics. The nominal values are deflated with consumer price index in 1987 prices.

The number 4.362 was chosen to find the same number of households (9,730,018) as found by the population census in 1985. However the other check point for total number of households in 1990 (11,188,636) is not consistent with his estimation.

Aydede (2007) accounts for this discrepancy in the following way. He argues that the number of total occupancy permits is not a correct measure to find each year's added dwelling units due to the existence of illegal occupations and high rural population, for which there is no need for permit. Therefore his measure of total number of dwelling units underestimates the correct number each year. Furthermore he does not introduce any depreciation rate for the housing stock. He argues however that since the price of the newly added dwelling units is the average price of all dwelling units, the total value of dwelling

units may overestimate the true value of housing wealth. Even though these two factors may offset each other, his measure cannot directly point out the correct magnitude of the housing wealth.

This paper follows a different approach for the estimation of the housing wealth in Turkey although the approximation procedure incorporates some elements from Aydede (2007) and Akkoyunlu (2002). Instead of estimating the total housing wealth in Turkey, the paper will focus on a measure for urban, legal and licensed housing wealth. The most important reason for concentrating on the authorized housing is that Turkish urban planning authorities have problems with estimating the actual magnitude as well as the value of the squatter settlements. The issue is further complicated by the existence of quasi-legal status gained by some squatter settlements through amnesties or title deeds granted by municipal authorities. Adding the legally completed new dwelling units over a mixed stock of legal and illegal housing at an arbitrary initial year will simply not capture the development of the housing stock and housing wealth accurately.

Another important reason for concentrating on authorized housing is that the constructed housing wealth series will be used in the estimation of the housing wealth effect on consumption of durables and non-durables in Turkey. One of the most important channels, through which the housing wealth can affect consumption behaviour in the economy, is the collateral channel that allows the homeowners to borrow from the financial institutions using their homes as collateral. However for this to happen, the property ownership must be legally documented and the property must possess all the necessary construction and occupancy permits as well as technical standards to be eligible for real estate transactions. Since there is a substantial undocumented and unauthorized dwelling

stock in Turkey, using total number of households from population census to estimate the total housing stock simply mixes the legal and illegal housing.

In order to estimate the legal urban authorized housing wealth, I use the 2000 Building Census figures on total number of dwellings in urban areas (cities and towns), total number of dwellings in urban areas with construction permits and total number of dwellings in urban areas with occupancy permits as displayed in Table 5.6. The figures indicate that there are about 16.2 million dwellings in 2000, of which 13.6 million are in cities and towns. Rural construction is not subject to the same requirements for occupancy and construction permits as the urban housing. Of the urban dwellings, 4,524,170 dwelling units have occupancy permits in 2000. This corresponds to 33 percent of the urban housing stock in 2000.

In this study the housing wealth in urban areas is estimated based on the residential housing data with occupancy permits. Obviously, ignoring the illegal construction will grossly underestimate the overall housing wealth in Turkey, however it will also allow us to concentrate on the housing wealth that can be transferable to next generations as bequest as well as used as collateral in the financial and legal system.[101]

All of the series used in the wealth estimation contain information about floor area of dwelling units produced over time and the average price of one square meter each year on an annual as well as quarterly basis for legal licensed housing.

[101] On the other hand, one can also plausibly claim that the urban dwellings stock with occupancy permits in 2000 contain some of the legalized squatter settlements during 1984-1998 following the amnesty. This one time legalization of certain squatter settlements in particular during 1984-1987 period will simply increase the

Following data series are used:

a. Production of dwellings (m2)

Series were obtained on a quarterly basis for 1986-2006 from OECD Main Economic Indicators.

b. Completed or Partially Completed New Buildings and New Additions according to Occupancy Permits

-Number of Buildings

-Floor Area (m2)

-Value, Turkish Lira

-Number of Dwelling Units

Data on building construction statistics are collected from municipalities of provinces, districts and sub-districts. The occupancy permits must be obtained for completed buildings. Buildings without permits in sub-districts, villages and squatter houses in cities are excluded. The data is annual from 1965-2005 and obtained from Turkish Statistics Office (TÜİK).

c. Residential Construction According to Occupancy Permits

- Number of Residential Buildings

- Area m2

- Value, Turkish Lira

Data is obtained on a quarterly basis from 1993-2007 from State Planning Organization Main Economic Indicators Fixed Capital Investment series.

---

level of the stock measure without affecting the year to year changes occurring as a result of legal construction.

From the TÜİK residential construction with occupancy permits data, average dwelling price in 2000 can be obtained, which is 14,940,617,152 TL (23,897 U.S. dollars). 2000 is the base year, therefore this is the real value of the dwelling unit in Turkish Lira terms.

The number of dwellings (4,524,170) is multiplied with the average dwelling price in 2000 in order to get the value of the total dwellings. (67,593,891,902,435,800 TL) This figure is converted into total floor area in square meters because the flow of residential construction data is in terms of square meters in each quarter.

The real price of one square meter at 2000:Q4, which is 111,559,061 TL is from the State Planning Organization data. By dividing the real value of total dwellings with the real price of one square meter floor area, total floor area of the dwelling stock at the end of 2000 is obtained. (605,902,302 square meters).

Total square meter floor area of residential production according to the occupancy permits is available from 1993:Q1-2007:Q2 from the State Planning Organization (DPT) dataset. The TÜİK dataset provides total floor area of residential dwellings production on an annual basis from 1965-2005. The OECD quarterly floor area production of dwellings data is used to interpolate the annual data to quarterly series by using the quarterly growth rates from the OECD production figures before 1993. Total OECD production of dwellings is smaller than the TÜİK values, however quarterly percentage change of the floor area production is approximately same as the DPT dataset. For 1995 original quarterly data is reconstructed using the OECD growth rates in order to smooth the construction flow series.

In order to construct the floor area of dwelling stock each period, residential square meter construction (flow) each quarter is added (or subtracted for periods before 2000:Q4)

to the stock of residential floor area using one percent quarterly depreciation (4 percent annualized). I use 2000:Q4 floor area measure as the fixed point in the calculation.

$$\text{Floor Area}_{t-1} \times (0.99) + \text{Residential Construction}_{t} = \text{Floor Area}_{t}$$

The choice of depreciation rate comes from the inverse of the average age of building stock in Turkey. According to findings of 2000 building census, 80 percent of the dwelling stock is less than 30 years of age and average age of buildings in 5 big cities is less than 25 years.

As the final step to compute the real value of housing stock, the total floor area is multiplied with the real price of one square meter for each quarter. Until 1993:Q1 the square meter values are available only on an annual basis, therefore the average price is assumed to be constant each quarter. After 1993:Q1, quarterly square meter price data is used. Nominal floor area prices are deflated with 2000 base year annual consumer price index before 1993:Q1 and with quarterly consumer price index after 1993:Q1. In order to smooth the price series for 1995, average annual price is used for each quarter.

The real value of housing stock is converted into New Turkish Lira. Per capita measures were obtained by dividing the real series with population. Population series were obtained on a quarterly basis from OECD Analytical Database for the period of 1987:Q1-2006:Q4. All of the series in the study are seasonally unadjusted.

Figure 5.17 shows the price per square meter floor area deflated with the consumer price index. Figure 5.18 shows the quarterly residential floor area construction that is added to the floor area measure of the housing stock figure obtained from 2000 building census. The construction figures refer to the quarterly additions to the legally licensed residential dwellings floor area and as mentioned, values before 1993:Q1 are interpolated using

OECD quarterly growth rates. Figure 5.19 displays the stock of floor area of dwellings in square meters obtained after depreciation. The total floor area of dwellings in 2000:Q4 corresponds to the 2000 census figure. Figure 5.18 and Figure 5.19 successfully display the secular upward trend in the dwelling stock in Turkey during the 1987-2006 period together with the decline in the rate of residential construction following 2001 crisis and the increase after 2003 with the improvement in the economy.

Figure 5.20 shows the real per capita housing wealth series constructed using the real price per square meter floor area in Figure 5.17 and the dwelling stock in Figure 5.19. The movement of the series is consistent with the real prices per square meter floor area. The estimated housing wealth series gives a rich exposition of the quarterly cyclical developments in the residential construction sector during the 1987-2006 period.

As explained by the evolution of the occupancy permits for residential dwellings, following the transition to the democratic rule in 1984, and liberalization of the economy, there was a boom in the housing starts for a decade, which coincided with the rapid urbanization and mass migration from rural areas. In addition, the availability of loans from the Housing Development Administration (TOKİ) extended to the construction cooperatives, which are mainly founded by the middle-income households that are first-time homeowners, provided an additional impetus to the housing sector until the mid-1990s. Therefore the estimated housing wealth series reflects the secular upward trend in the real floor area prices and dwelling stock during this period, which result from the strong supply and demand conditions in the housing sector.

Following the 1994 financial crisis until the end of 2002, Turkish economy experienced several negative shocks that adversely affected the construction sector. The

1994 financial crisis followed by a sharp devaluation of the currency led to a contraction in the economy. In 1998, the contagious effects of the Russian default led to a capital outflow from the financial markets, which in turn increased the overall interest rates in the economy. The 1999 earthquake severely hit the industrial areas of İzmit and İstanbul. In that year, GDP and the private investment in construction sector declined significantly. In 2000 and 2001, Turkish economy experienced a severe economic crisis. The construction sector went into a slump afterwards until 2003. The combined effect of the declining rate of growth in the number of occupancy permits as well as the falling floor area prices has been captured successful by the persistent fall in the estimated housing wealth series from 1994 until the second quarter of 2002 in Figure 5.20.

Following the IMF based disinflation program, the housing sector started to improve again. Between 2003 and 2006, the investment in construction sector grew rapidly following the fall in interest rates and inflation, the availability of housing loans from the banking industry, and the mass housing projects initiated by the Housing Development Administration (TOKİ). Consistent with the general improvement in the macroeconomic outlook and the revitalization of the residential construction sector, both floor area prices and the rate of growth in the housing stock have started to increase after 2003. The estimated housing wealth series reflect these cyclical developments although it can be concluded that the per capita housing wealth has not yet recovered to the pre-crisis level in 2001.

5.8 Conclusion

This paper provides a comprehensive look at the housing market characteristics in Turkey. The analysis concludes that the home ownership in Turkey is very high although the existing housing stock is unevenly distributed across income groups. As a consequence of high population growth, declining household sizes, massive urbanization and internal migration from rural to metropolitan areas, the rate of housing construction falls behind the rate of household formation, which has created an excessive demand for affordable housing in Turkey. The public sector and financial institutions such as mortgage markets have been unable to facilitate affordable housing due to unfavorable macroeconomic climate and lack of institutional infrastructure. Therefore home ownership is mainly financed through private financial savings. The unmet demand by the low-income households in Turkey has resulted in the construction of unauthorized dwellings in squatter settlements.

On the basis of these characteristics, this paper develops an estimation of the housing wealth in Turkey using primary sources on housing stock, residential construction figures and average floor area prices obtained from building census, construction and occupancy permit statistics. Unlike the previous literature estimating the housing wealth using total number of households in the population, this paper estimates the housing wealth associated with the dwellings with occupancy permits in order to capture the collateral channel, through which home owners can borrow from the financial institutions using their legally documented homes as collateral. Since there is a substantial undocumented and unauthorized dwelling stock in Turkey, using this methodology to measure the housing wealth will potentially avoid the problems associated with identifying the extent of the illegal housing stock.

Another strength of this methodology in comparison to the previous studies is that quarterly data series are used in the estimation of the housing wealth. The movements of the housing wealth series are consistent with the developments in the residential construction sector in Turkey during the 1987-2006 period, which is highly sensitive to the cyclical conditions of the economy. The estimated downward trend in the housing wealth after 1997 is mainly driven by the decline in the real residential floor area prices as well as the fall in the rate of growth of the residential construction with occupancy permits as a consequence of the slump in the housing sector following the financial crises in 1994 and 1998, the earthquake in industrial centers in 1999 and the economic crisis in 2001. Consistent with the general improvement in the macroeconomic outlook after 2003, the housing wealth has started to increase. In conclusion, it can be argued that this measure successfully captures the cyclical fluctuations of the housing wealth in Turkey, which may not be adequately studied using solely the annual data, and therefore can be used in econometric analysis to estimate the relationship between the housing wealth and consumption behaviour of households.

Table 5.1: Rate of Homeownership in Urban Areas

(in percent)

	Households Not Paying Rent	Tenant Households
1965	61.34	38.66
1970	62.04	37.96
1975	63.86	36.14
1985	63.49	36.51
1990	58.92	41.08
2000	68.40	31.60
Homeowner	59.80	
Housing Provided by Employer	2.20	
Not Home Owner-No Rent	5.50	
Other	0.80	
Unknown	0.10	

Source: Data compiled from the population census cited by Kayıket (2003) and the study on home ownership in Turkey by the Undersecretariat of Housing (2003).

Table 5.2: Distribution of Household Disposable Income
(in percent)

	1987	1994	2002	2003	2004	2005
Total Income	100.00	100.00	100.00	100.00	100.00	100.00
Wages, Salaries and Daily Wage	24.10	28.30	38.75	41.78	42.16	42.52
Entrepreneur Income	51.50	42.40	34.45	32.02	31.81	28.81
Agriculture	22.80	16.70	13.16	9.84	9.38	
Manufacturing		4.40	3.33	3.96	3.93	
Construction		1.70	1.30	1.32	1.22	
Commerce		14.40	9.76	10.46	10.19	
Services		5.20	6.90	6.44	7.08	
Property Income	13.60	19.30	9.25	6.22	4.85	5.63
Real Estate Income	11.80	11.60	4.11	3.59	2.65	2.92
Imputed Rent *		6.60				
Actual Rent		5.00	4.11	3.59	2.65	2.92
Income from Financial Assets	1.80	7.70	5.14	2.63	2.20	2.71
Transfer Income	10.80	10.00	17.54	19.98	21.19	23.05
From the Government		6.90	14.27	17.45	18.33	
From Abroad		1.40	0.89	0.60	0.85	
From Other Sources		1.70	2.38	1.93	2.01	

Source: TÜİK Household Income and Consumption Expenditures Surveys provided by Yükseler (2003), Yükseler (2004), and Yükseler and Türkan (2007). *Imputed rent income is not included except for 1987 and 1994.

Table 5.3: Income Distribution in Turkey

	1963	1968	1973	1987	1994	2002	2003	2004	2005
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
First 20 % (Q1)	4.50	3.00	3.50	5.20	4.90	5.30	6.00	6.04	6.05
Second 20 % (Q2)	8.50	7.00	8.00	9.60	8.60	9.80	10.30	10.70	11.08
Third 20 % (Q3)	11.50	10.00	12.50	14.10	12.60	14.00	14.50	15.22	15.83
Fourth 20 % (Q4)	18.50	20.00	19.50	21.20	19.00	20.80	20.90	21.88	22.60
Fifth 20 % (Q5)	57.00	60.00	56.50	49.90	54.90	50.10	48.30	46.17	44.44

Source: Yükseler (2004) and Yükseler (2007)

Table 5.4: Population Characteristics in Turkey

Years	Total Population (in thousands)	Total Population Growth (%)	Total Number of Households (in thousands)	Average Size of Households (number of persons)	Distribution of Population by Age Groups (Percent)		
					0-14	15-64	65+
1960	27,509	2.52	4,885	5.68	42.36	54.19	3.45
1965	31,151	2.50	5,536	5.67	42.88	53.20	3.92
1970	35,321	2.58	6,262	5.69	41.55	54.17	4.28
1975	40,025	2.35	6,983	5.78	41.39	54.22	4.39
1980	44,484	2.26	8,522	5.25	40.42	55.03	4.56
1985	50,286	2.46	9,730	5.21	38.48	57.37	5.15
1990	56,154	2.28	11,189	5.05	35.75	60.25	4.00
1995	61,737	1.86		n.a.	33.00	62.47	4.53
2000	67,420	1.70	15,070	4.50	30.46	64.39	5.15
2005	72,065	1.29		n.a.	28.27	66.12	5.60

Source: World Development Indicators and Turkish Statistics Office (TÜİK).

Table 5.5: Urban Population Characteristics in Turkey

Years	Urban Population (in thousands)	Proportion of Urban Population (%)	Urban Population Growth (%)	Population in lstanbul (in thousands)	Population in urban agglomerations > 1 million (in thousands)	Population in urban agglomerations > 1 million (% of total population)
1960	8,665	31.50	4.71	1,453	2,938	10.68
1965	10,654	34.20	4.06	2,001	4,157	13.35
1970	13,493	38.20	4.66	2,772	5,716	16.18
1975	16,650	41.60	3.97	3,600	7,171	17.92
1980	19,484	43.80	3.24	4,397	8,551	19.22
1985	26,350	52.40	5.77	5,407	10,460	20.80
1990	33,243	59.20	4.58	6,552	12,580	22.40
1995	38,339	62.10	2.78	7,665	14,465	23.43
2000	43,621	64.70	2.49	8,744	16,442	24.39
2005	48,500	67.30	2.05	9,712	18,431	25.58

Source: World Development Indicators.

Table 5.6: Characteristics of the Housing Stock in Turkey

Building Census	1984	2000
Number of Municipalities	1,699	3,212
Number of Buildings	4,387,971	7,838,675
Number of Residential Buildings		6,735,813
Number of Dwellings	7,096,277	16,235,830
Number of Dwellings in Cities and Towns		13,597,676
Number of Construction Permits in Cities and Towns		8,366,428
Number of Occupancy Permits in Cities and Towns		4,524,170
Share of Construction Permits in Dwellings of Cities and Town (in percent)		61.53
Share of Occupancy Permits in Dwellings of Cities and Towns (in percent)		33.27
Share of Occupancy Permits in Construction Permits (in percent)		54.08

Notes: Dwelling Unit is defined as a separate and independent enclosure used for residence by a single person, a family, or a group of persons having a covered roof, a separate access to a street corridor or common place and door of its own.
Source: 2000 Building Census Conducted by State Statistics Office (TÜİK)

Table 5.7: Top Five Cities with the Largest Share in Building and Dwelling Stock in 2000

	Building Stock	Dwelling Stock	Average Age of Building
Istanbul	869,444	3,393,077	18
Izmir	522,243	1,140,731	23
Ankara	384,489	1,128,625	22
Bursa	270,023	640,197	19
Adana	253,447	469,189	18

Source: 2000 Building Census

Table 5.8: New Buildings and Additions According to the Construction Permits by Type of Investor

	Total	Private Sector	%	Construction Cooperatives	%	Public Sector	%
1954	51,374	49,602	96.55			1,772	3.45
1955	54,224	53,178	98.07			1,046	1.93
1956	50,666	49,618	97.93			1,048	2.07
1957	49,284	48,521	98.45			763	1.55
1958	50,848	50,135	98.60			713	1.40
1959	46,557	44,944	96.54			1,613	3.46
1960	49,133	48,342	98.39			791	1.61
1961	45,875	45,276	98.69			599	1.31
1962	47,555	46,708	98.22			847	1.78
1963	45,031	44,063	97.85			968	2.15
1964	48,781	47,484	97.34			1,297	2.66
1965	60,420	58,888	97.46			1,532	2.54
1966	67,650	66,092	97.70			1,558	2.30
1967	64,433	63,337	98.30			1,096	1.70
1968	71,364	69,944	98.01			1,420	1.99
1969	74,600	73,085	97.97			1,515	2.03
1970	75,503	70,418	93.27	3,666	4.86	1,419	1.88
1971	74,473	69,880	93.83	3,601	4.84	992	1.33
1972	76,149	71,075	93.34	3,621	4.76	1,453	1.91
1973	85,730	76,845	89.64	6,229	7.27	2,656	3.10
1974	73,207	67,306	91.94	4,564	6.23	1,337	1.83
1975	77,852	74,138	95.23	2,539	3.26	1,175	1.51
1976	74,988	70,548	94.08	2,168	2.89	2,272	3.03
1977	73,192	66,229	90.49	4,714	6.44	2,249	3.07
1978	84,319	76,167	90.33	4,672	5.54	3,480	4.13
1979	87,371	80,971	92.67	4,981	5.70	1,419	1.62
1980	69,579	63,308	90.99	5,156	7.41	1,115	1.60
1981	58,103	50,720	87.29	5,913	10.18	1,470	2.53
1982	54,361	44,812	82.43	7,983	14.69	1,566	2.88
1983	58,968	47,935	81.29	7,785	13.20	3,248	5.51
1984	63,153	51,258	81.16	9,105	14.42	2,790	4.42
1985	71,844	55,459	77.19	13,740	19.12	2,645	3.68
1986	102,888	71,500	69.49	28,240	27.45	3,148	3.06
1987	138,155	96,198	69.63	37,303	27.00	4,654	3.37
1988	139,995	94,870	67.77	41,671	29.77	3,454	2.47
1989	136,015	95,519	70.23	37,724	27.74	2,772	2.04
1990	123,304	95,795	77.69	23,477	19.04	4,032	3.27
1991	121,486	95,819	78.87	23,066	18.99	2,601	2.14
1992	137,990	100,115	72.55	30,709	22.25	4,166	3.02
1993	147,033	110,858	75.40	31,200	21.22	4,975	3.38
1994	143,281	111,579	77.87	28,153	19.65	3,549	2.48
1995	137,905	114,232	82.83	21,761	15.78	1,912	1.39
1996	126,722	98,093	77.41	26,572	20.97	2,057	1.62
1997	126,956	96,164	75.75	28,714	22.62	2,078	1.64
1998	116,235	87,057	74.90	25,956	22.33	3,222	2.77
1999	92,469	76,791	83.05	13,898	15.03	1,780	1.92
2000	79,140	62,154	78.54	12,664	16.00	4,322	5.46
2001	77,430	65,235	84.25	8,649	11.17	3,546	4.58
2002	43,430	36,379	83.76	4,928	11.35	2,123	4.89
2003	50,140	42,972	85.70	4,911	9.79	2,257	4.50
2004	75,495	67,592	89.53	5,793	7.67	2,110	2.79
2005	106,664	95,456	89.49	6,758	6.34	4,450	4.17

Notes: The first column of the table displays the total number of new buildings and additions according to construction permits each year. Definition of buildings is composed of residential apartments and houses, commercial and industrial buildings, and buildings used for social, health care, cultural, religious, and administrative purposes. The second column displays the new buildings that are produced by the private sector, the fourth column provides data for the buildings that are produced by the construction cooperatives and the seventh column provides data for the buildings produced by the public sector. Shares of each sector in total are provided in adjacent columns. Source: Turkish Statistics Office (TÜİK) Construction Statistics.

Table 5.9: Completed and Partially Completed New Buildings and Additions According to the Occupancy Permits by Type of Investor

	Total	Private Sector	%	Construction Cooperatives	%	Public Sector	%
1964	10,331	9,636	93.27	330	3.19	335	3.24
1965	19,371	18,324	94.60	711	3.67	336	1.73
1966	22,254	21,827	98.08			427	1.92
1967	29,443	28,745	97.63			698	2.37
1968	37,669	36,957	98.11			712	1.89
1969	39,744	39,211	98.66			533	1.34
1970	42,274	40,159	95.00	1,328	3.14	787	1.86
1971	42,242	41,017	97.10	969	2.29	456	1.08
1972	52,182	50,449	96.68	1,430	2.74	303	0.58
1973	52,560	48,705	92.67	1,958	3.73	1,897	3.61
1974	48,068	46,699	97.15	1,071	2.23	298	0.62
1975	55,314	53,138	96.07	1,815	3.28	361	0.65
1976	49,550	48,021	96.91	1,149	2.32	380	0.77
1977	58,028	55,769	96.11	1,784	3.07	475	0.82
1978	56,525	53,514	94.67	2,489	4.40	522	0.92
1979	57,351	54,044	94.23	2,644	4.61	663	1.16
1980	63,331	60,390	95.36	2,351	3.71	560	0.88
1981	57,232	54,368	95.00	2,002	3.50	862	1.51
1982	54,156	50,449	93.15	2,787	5.15	920	1.70
1983	54,532	50,556	92.71	2,853	5.23	1,123	2.06
1984	57,231	52,853	92.35	3,228	5.64	1,120	1.96
1985	52,183	48,715	93.35	2,861	5.48	607	1.16
1986	71,461	65,936	92.27	4,371	6.12	1,154	1.61
1987	83,523	72,881	87.26	6,431	7.70	1,208	1.45
1988	83,714	76,223	91.05	6,263	7.48	1,228	1.47
1989	94,799	81,990	86.49	11,198	11.81	1,611	1.70
1990	94,489	81,699	86.46	10,332	10.93	2,458	2.60
1991	92,388	79,654	86.22	11,838	12.81	896	0.97
1992	105,293	87,588	83.19	16,528	15.70	1,177	1.12
1993	101,712	82,314	80.93	17,437	17.14	1,961	1.93
1994	99,993	83,443	83.45	15,607	15.61	943	0.94
1995	96,661	80,297	83.07	14,753	15.26	1,611	1.67
1996	104,776	83,713	79.90	19,478	18.59	1,585	1.51
1997	106,436	87,731	82.43	17,409	16.36	1,266	1.19
1998	91,816	77,680	84.60	13,020	14.18	1,116	1.22
1999	86,777	68,655	79.12	16,661	19.20	1,461	1.68
2000	90,849	73,205	80.58	16,746	18.43	898	0.99
2001	86,155	63,870	74.13	18,812	21.84	3,473	4.03
2002	47,197	31,513	66.77	15,062	31.91	622	1.32
2003	41,342	28,584	69.14	10,797	26.12	1,961	4.74
2004	40,792	31,644	77.57	8,510	20.86	638	1.56
2005	61,091	45,009	73.68	15,220	24.91	862	1.41

Notes: The first column of the table displays the total number of completed and partially completed new buildings and additions according to occupancy permits each year. The second column displays the new buildings that are produced by the private sector, the fourth column provides data for the buildings that are completed by the construction cooperatives and the seventh column provides data for the buildings completed by the public sector. Shares of each sector in total are provided in adjacent columns. Source: Turkish Statistics Office (TÜİK) Construction Statistics.

Table 5.10: New Dwelling Units According to the Construction Permits by Type of Investor

Years	Total Number of New Dwelling Units According to Construction Permits	Number of New Dwelling Units According to Construction Permits by Construction Cooperatives	Share of Construction Cooperatives in Total (%)	Number of New Dwelling Units with Credit from Housing Development Administration (Including Personal Credits)	Share of New Dwelling Units with Credit from Housing Development Administration in Total (%)
1958	53,389	1,837	3.44		
1959	51,091	323	0.63		
1960	56,227	718	1.28		
1961	52,760	3,524	6.68		
1962	58,748	3,756	6.39		
1963	57,286	2,148	3.75		
1964	60,822	1,478	2.43		
1965	80,461	2,795	3.47		
1966	91,151	3,570	3.92		
1967	99,373	4,172	4.20		
1968	110,263	4,514	4.09		
1969	132,066	8,277	6.27		
1970	154,825	11,654	7.53		
1971	150,357	14,561	9.68		
1972	165,983	14,277	8.60		
1973	194,981	25,507	13.08		
1974	161,047	13,966	8.67		
1975	181,685	14,005	7.71		
1976	224,584	16,643	7.41		
1977	216,128	25,142	11.63		
1978	237,097	26,049	10.99		
1979	251,846	31,437	12.48		
1980	203,989	31,538	15.46		
1981	144,397	26,904	18.63		
1982	160,078	48,518	30.31		
1983	169,037	36,841	21.79		
1984	189,486	38,426	20.28	149,947	79.13
1985	259,187	76,563	29.54	87,865	33.90
1986	392,825	142,779	36.35	157,776	40.16
1987	497,674	163,863	32.93	157,420	31.63
1988	473,582	167,514	35.37	58,883	12.43
1989	413,004	131,504	31.84	29,765	7.21
1990	381,408	70,730	18.54	113,039	29.64
1991	393,000	77,068	19.61	83,298	21.20
1992	472,817	122,694	25.95	24,811	5.25
1993	548,130	136,012	24.81	17,053	3.11
1994	523,794	131,780	25.16	30,574	5.84
1995	518,236	111,106	21.44	26,570	5.13
1996	454,295	103,757	22.84	26,999	5.94
1997	464,117	119,320	25.71	22,559	4.86
1998	432,599	104,186	24.08	37,620	8.70
1999	339,446	70,323	20.72	15,601	4.60
2000	315,162	61,267	19.44	2,899	0.92
2001	279,616	40,469	14.47	3,289	1.18
2002	161,431	23,561	14.60		
2003	202,237	20,347	10.06		
2004	329,774	27,209	8.25		
2005	510,080	34,786	6.82		

Notes: The first column of the table displays the total number of new dwelling units produced in each year according to the construction permits under the Construction Law No.3194. The second and the third columns display the new dwelling units with construction permits that are produced by the construction cooperatives and the share of this construction in total respectively. The fourth and the fifth columns provide data for the new dwelling units that obtained credit from Housing Development Administration each year and the share in total number of dwellings respectively.
Source: State Planning Organization Special Commission Report on Housing 2001; Turkish Statistics Office (TÜİK) Data on New Dwelling Units According to the Construction Permits and Housing Development Administration (TOKİ)

Table 5.11: New Dwelling Units According to the Occupancy Permits by Type of Investor

Years	Total Number of New Dwelling Units According to Occupancy Permits	Number of New Dwelling Units According to Occupancy Permits by Construction Cooperatives	Share of Construction Cooperatives in Total (%)	Number of New Dwelling Units with Credit from Housing Development Administration (Including Personal Credits)	Share of New Dwelling Units with Credit from Housing Development Administration in Total (%)
1964	14,313	797	5.57		
1965	32,614	1,579	4.84		
1966	40,973	2,967	7.24		
1967	50,282	2,231	4.44		
1968	62,910	3,508	5.58		
1969	65,185	3,310	5.08		
1970	71,589	3,734	5.22		
1971	72,816	4,019	5.52		
1972	88,228	5,636	6.39		
1973	96,133	8,153	8.48		
1974	84,199	5,830	6.92		
1975	97,431	7,892	8.10		
1976	102,110	9,166	8.98		
1977	116,409	10,917	9.38		
1978	120,615	11,688	9.69		
1979	124,297	13,978	11.25		
1980	139,207	12,056	8.66		
1981	118,778	12,501	10.52		
1982	115,986	15,571	13.42		
1983	113,453	17,201	15.16		
1984	122,490	19,456	15.88	7,350	6.00
1985	118,205	21,273	18.00	46,672	39.48
1986	168,597	34,311	20.35	82,594	48.99
1987	191,109	41,931	21.94	35,038	18.33
1988	205,485	43,389	21.12	93,279	45.39
1989	250,480	67,140	26.80	126,221	50.39
1990	232,018	58,566	25.24	75,120	32.38
1991	227,570	61,842	27.17	78,134	34.33
1992	268,886	83,204	30.94	86,479	32.16
1993	269,694	83,421	30.93	85,901	31.85
1994	245,610	68,767	28.00	69,235	28.19
1995	248,946	68,799	27.64	47,702	19.16
1996	267,300	79,229	29.64	39,882	14.92
1997	277,026	76,541	27.63	45,302	16.35
1998	238,958	64,438	26.97	21,188	8.87
1999	215,613	64,997	30.15		
2000	245,155	78,799	32.14		
2001	243,464	84,576	34.74		
2002	161,374	51,610	31.98		
2003	162,781	51,941	31.91		
2004	164,734	46,528	28.24		
2005	240,269	53,247	22.16		

Notes: The first column of the table displays the total number of new dwelling units produced in each year according to the occupancy permits under the Construction Law No.3194. The second and the third columns display the new dwelling units with occupancy permits that are produced by the construction cooperatives and the share of this construction in total respectively. The fourth and the fifth columns provide data for the new dwelling units that obtained credit from Housing Development Administration each year and the share in total number of dwellings respectively.

Source: State Planning Organization Special Commission Report on Housing 2001; Turkish Statistics Office (TÜİK) Data on New Dwelling Units According to the Construction Permits and Housing Development Administration (TOKİ)

Table 5.12: Annual Growth in Private Investment in Construction Sector and GDP

	Gross Fixed Capital Formation in Building Construction (in percent)	GDP (in percent)
1987	n.a.	n.a.
1988	19.60	2.10
1989	3.40	0.30
1990	-3.20	9.30
1991	-0.40	0.90
1992	5.50	6.00
1993	13.00	8.00
1994	9.20	-5.50
1995	4.20	7.20
1996	-1.70	7.00
1997	-0.40	7.50
1998	-1.80	3.10
1999	-8.80	-4.70
2000	-9.70	7.40
2001	-8.00	-7.50
2002	-14.90	7.90
2003	-11.40	5.80
2004	15.30	8.90
2005	29.90	7.40
2006	26.40	6.10

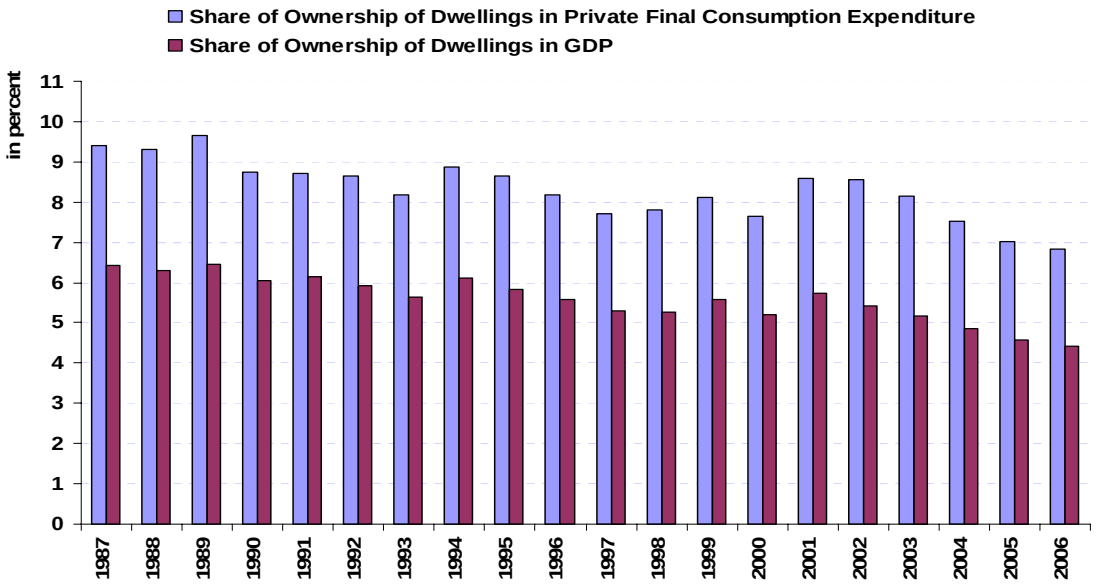
Notes: The series for annual private gross fixed capital formation in building construction and gross domestic product are obtained from the Turkish Statistics Office (TÜİK) data using expenditure on the gross domestic product during 1987-2006 at 1987 prices. Growth rates represent annual percentage changes. Source: Turkish Statistics Office (TÜİK)

Table 5.13: New Dwelling Units According to Construction and Occupancy Permits under the Amnesty Law

Years	(A) Total Number of New Dwelling Units According to Construction Permits under the Construction Law No. 3194	(B) Total Number of New Dwelling Units According to Construction Permits under the Amnesty Law No. 2981 and No.3290	B/A (%)	(C) Total Number of New Dwelling Units According to Occupancy Permits under the Construction Law No. 3194	(D) Total Number of New Dwelling Units According to Occupancy Permits under the Amnesty Law No. 2981 and No.3290	D/C (%)
1984	189,486	78,350	41.35	122,490	73,972	60.39
1985	259,187	114,911	44.34	118,205	151,814	128.43
1986	392,825	160,695	40.91	168,597	152,453	90.42
1987	497,674	219,916	44.19	191,109	189,263	99.03
1988	473,582	55,402	11.70	205,485	47,892	23.31
1989	413,004	49,871	12.08	250,480	49,871	19.91
1990	381,408	17,580	4.61	232,018	17,155	7.39
1991	393,000	10,712	2.73	227,570	10,124	4.45
1992	472,817	10,872	2.30	268,886	10,786	4.01
1993	548,130	2,600	0.47	269,694	3,234	1.20
1994	523,794	5,201	0.99	245,610	5,114	2.08
1995	518,236	2,148	0.41	248,946	2,630	1.06
1996	454,295	1,744	0.38	267,300	2,127	0.80
1997	464,117	915	0.20	277,026	1,001	0.36
1998	432,599	1,094	0.25	238,958	836	0.35

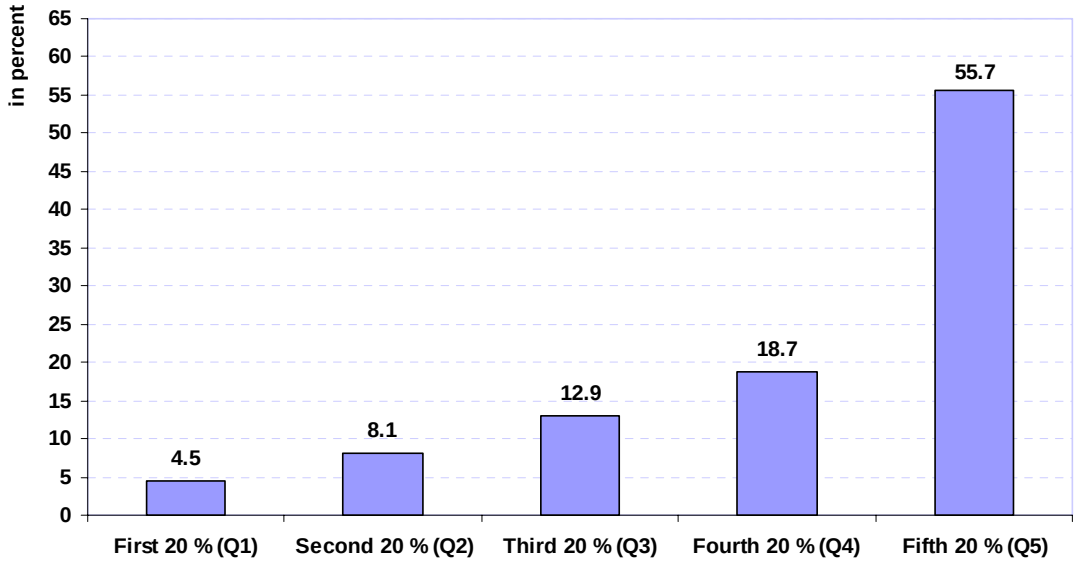
Source: Turkish Statistics Office (TÜİK) and State Planning Organization (DPT), 2001, "Special Commission Report on Housing (Konut Özel İhtisas Komisyonu Raporu)", *8th Five Year Development Plan,* DPT 2594-ÖİK 606.

Figure 5.1: Income from Ownership of Dwellings



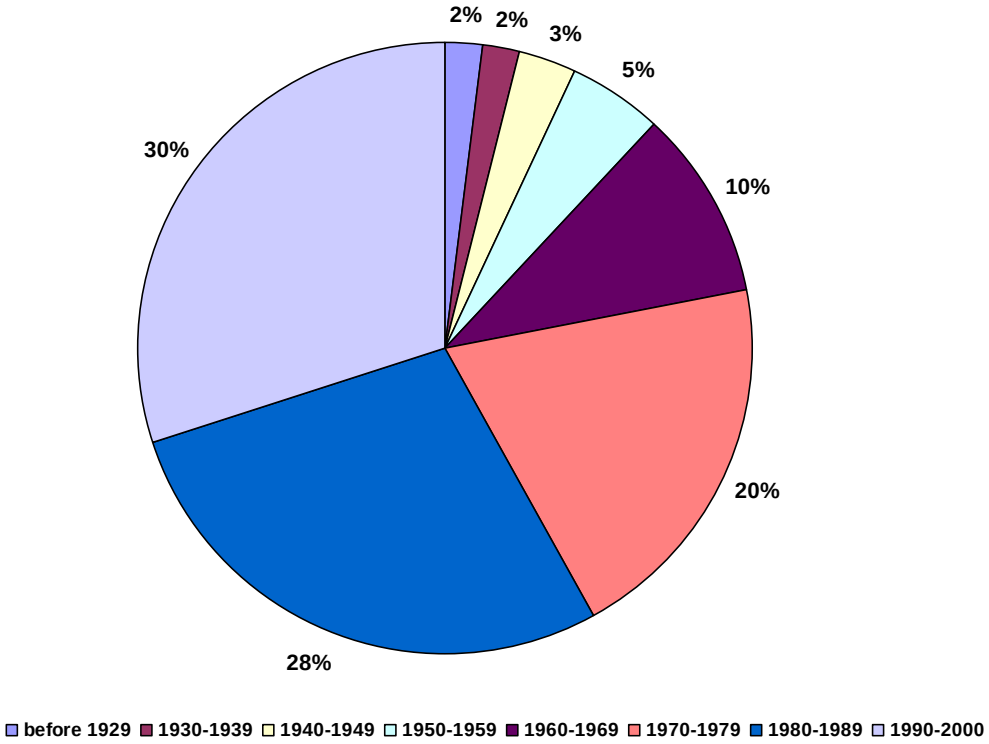
Sources: Turkish Statistics Office (TÜİK) Expenditures on the Gross Domestic Product at 1987 Prices.

Figure 5.2: Distribution of Real and Imputed Mean Housing Wealth by Income Groups



Source: 1994 Household Income and Consumption Expenditure Survey reported by Kayıket (2003)

Figure 5.3: Distribution of Dwelling Stock in Cities by Date of Construction



Source: Undersecretariat of Housing (2001)

Figure 5.4: Share of Building Construction in GDP

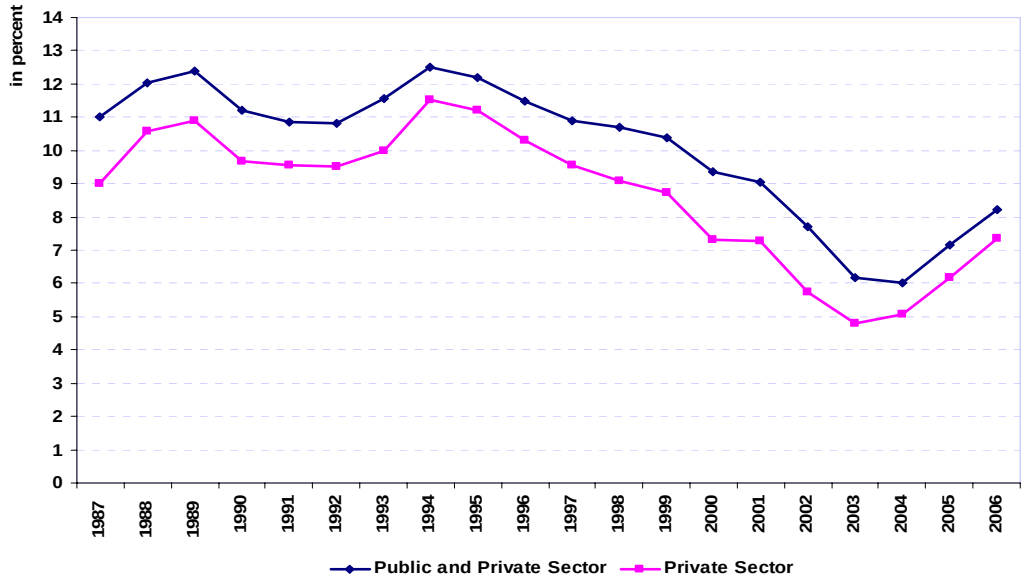
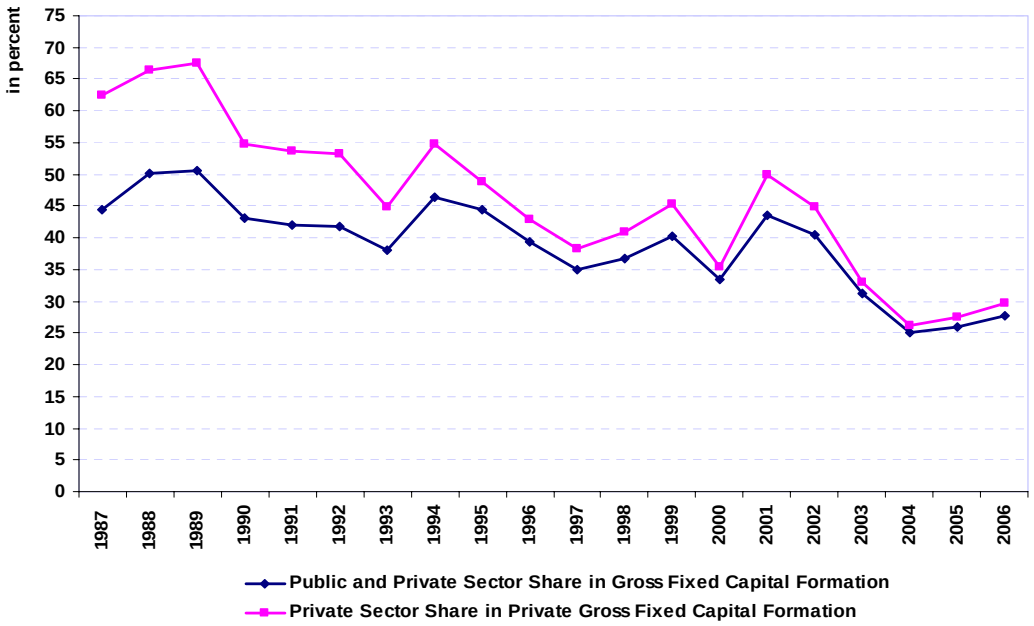
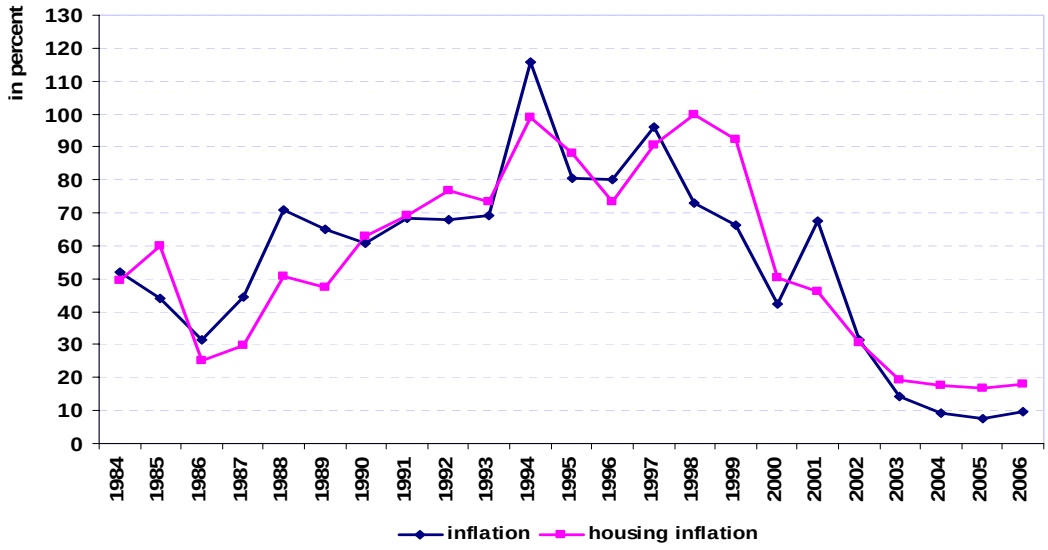


Figure 5.5: Share of Building Construction by Public and Private Sector in Gross Fixed Capital Formation



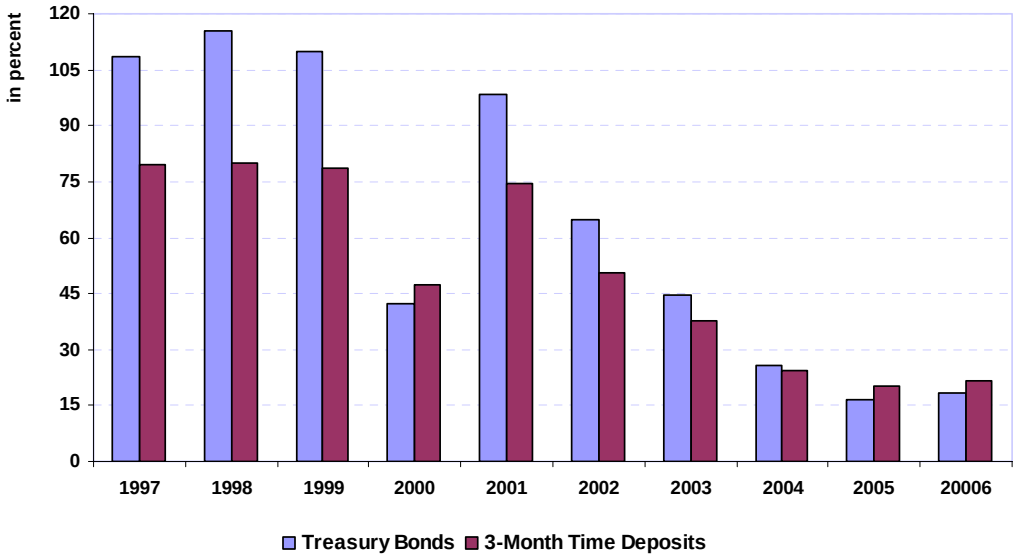
Sources: Turkish Statistics Office (TÜİK) Expenditures on the Gross Domestic Product at 1987 Prices.

Figure 5.6: Annual Changes in Consumer Price Index for All Items and Housing



Source: OECD Quarterly Main Economic Indicators

Figure 5.7: Average Annual Interest Rates



Notes: Average annual rates on Treasury Bonds (DIBS) are obtained by averaging the monthly compounded interest rate over the year. Average annual interest rates for 3-month time deposits were obtained by averaging the quarterly interest rates over the year. No treasury auction took place for December 1999.
Sources: State Planning Organization (DPT) and International Financial Statistics

Figure 5.8: New Buildings and Additions According to Construction Permits

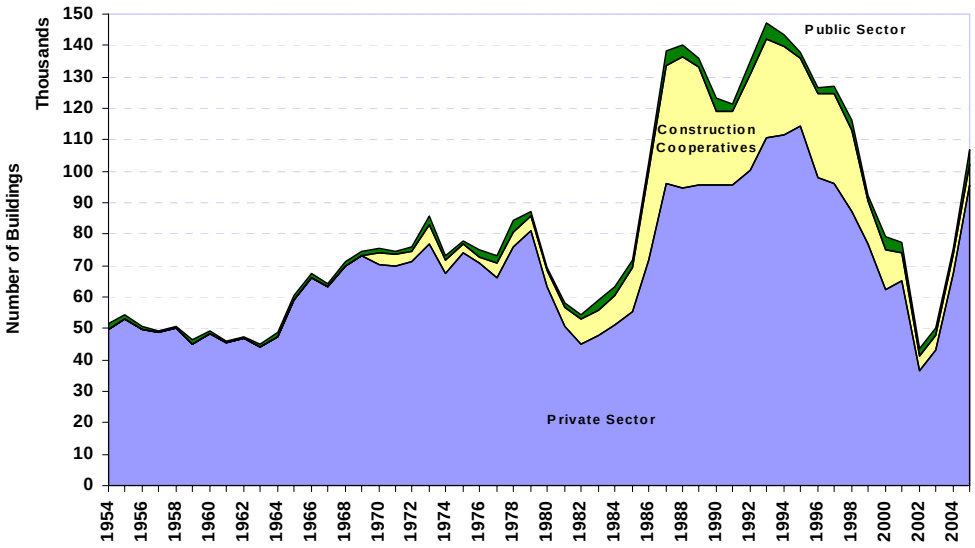
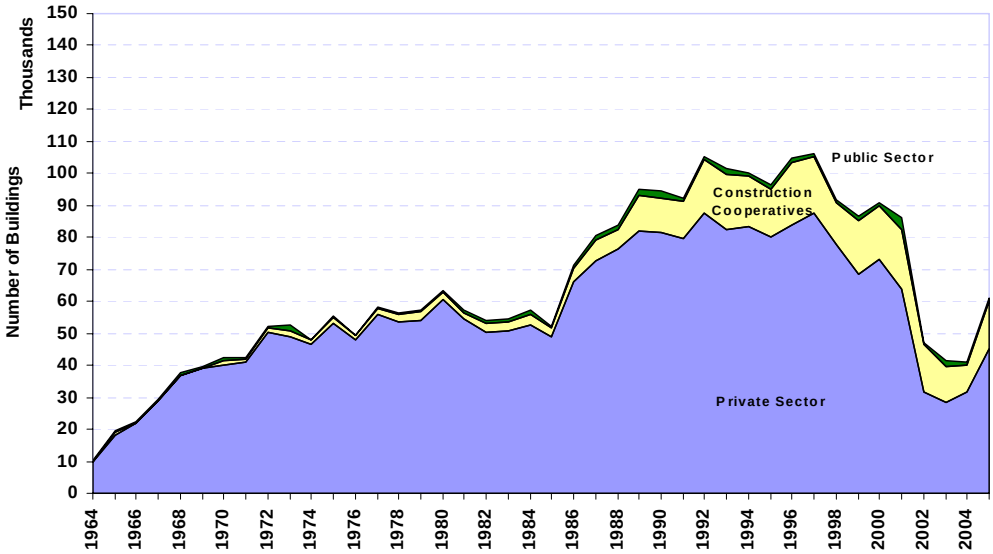


Figure 5.9: Completed and Partially Completed New Buildings and Additions According to Occupancy Permits



Sources: State Planning Organization 2001 Special Commission Report on Housing; Turkish Statistics Office (TÜİK) Data on New Buildings and Dwelling Units according to the Construction and Occupancy Permits, and Housing Development Administration (TOKİ).

Figure 5.10: New Dwelling Units According to Construction Permits

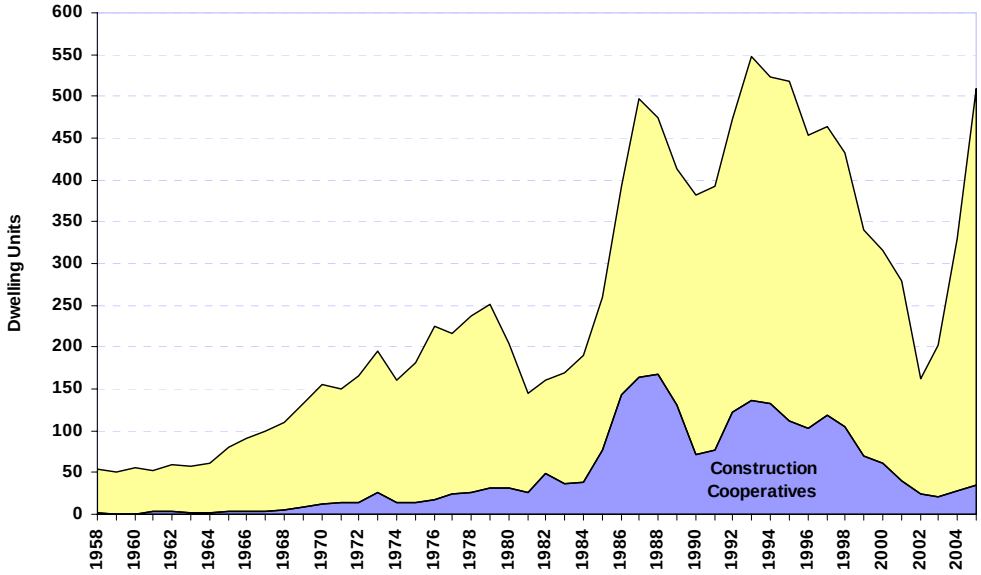
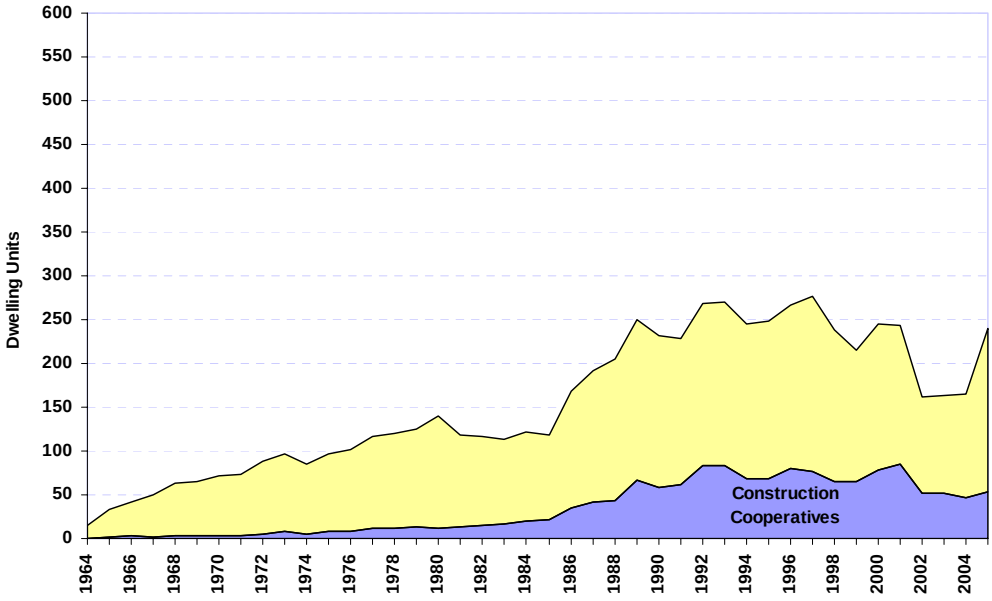
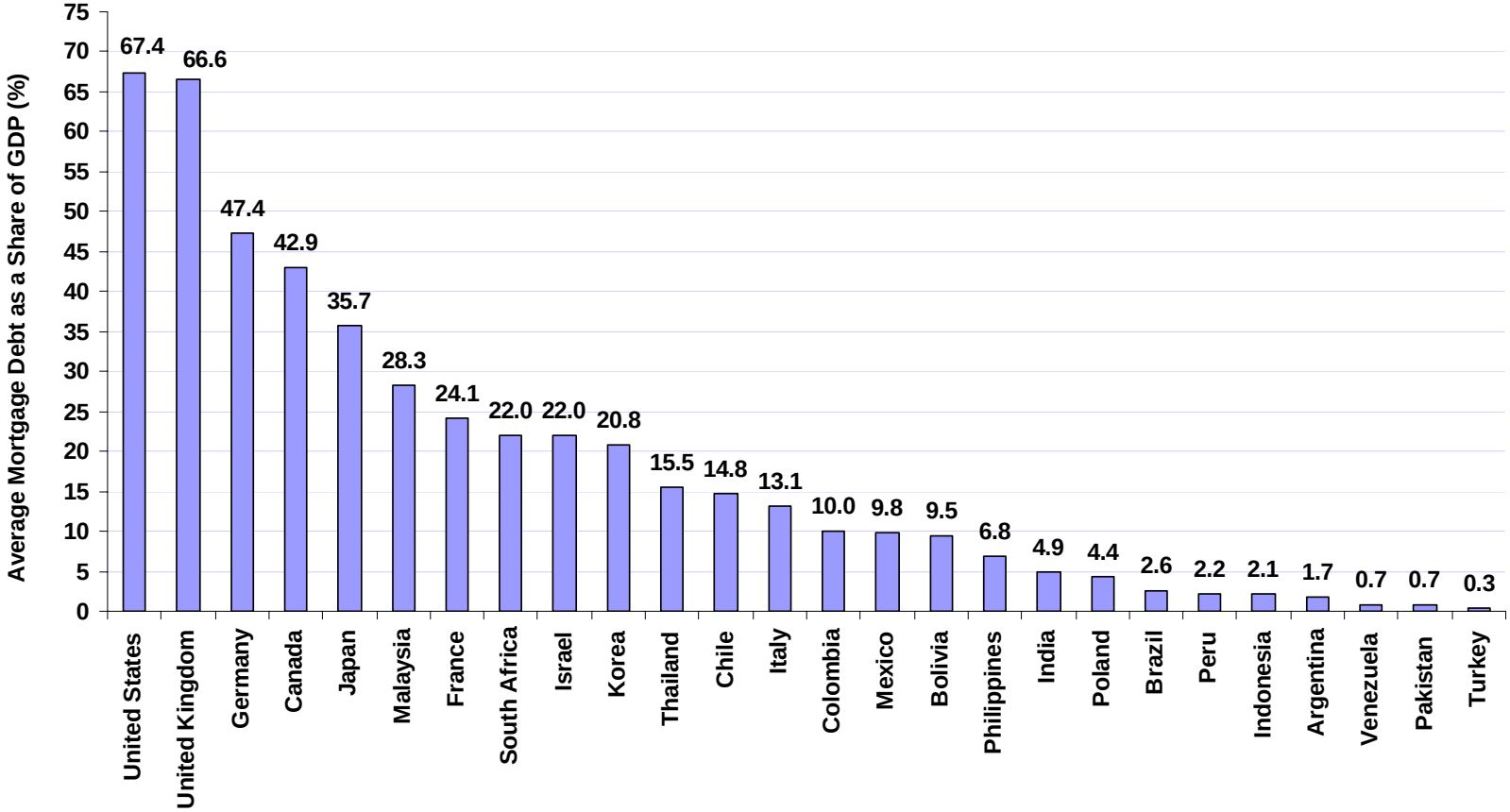


Figure 5.11: New Dwelling Units According to Occupancy Permits



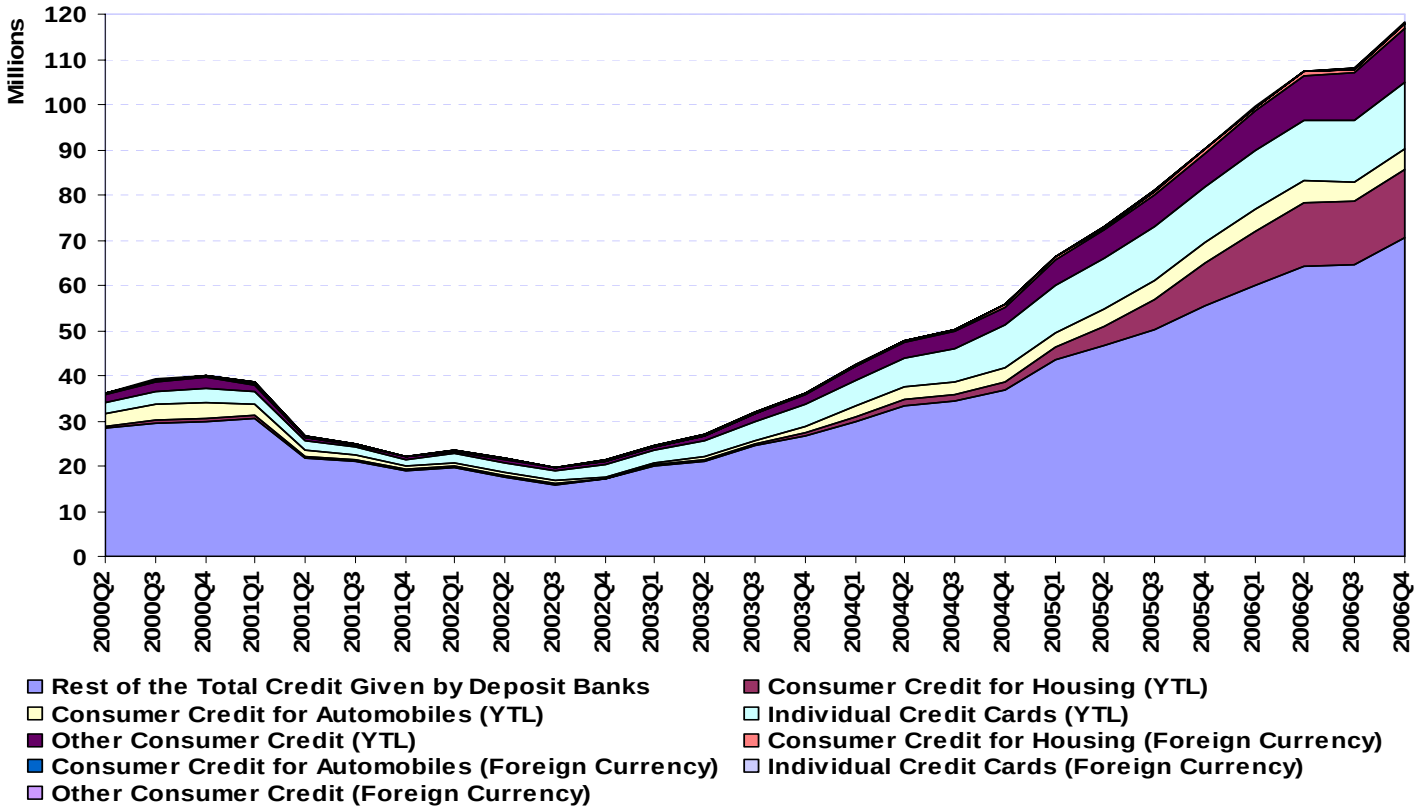
Sources: State Planning Organization 2001 Special Commission Report on Housing; Turkish Statistics Office (TÜİK) Data on New Buildings and Dwelling Units according to the Construction and Occupancy Permits, and Housing Development Administration (TOKİ).

Figure 5.12: Average Mortgage Debt as a Share of GDP (2001-2005)
(in percent)



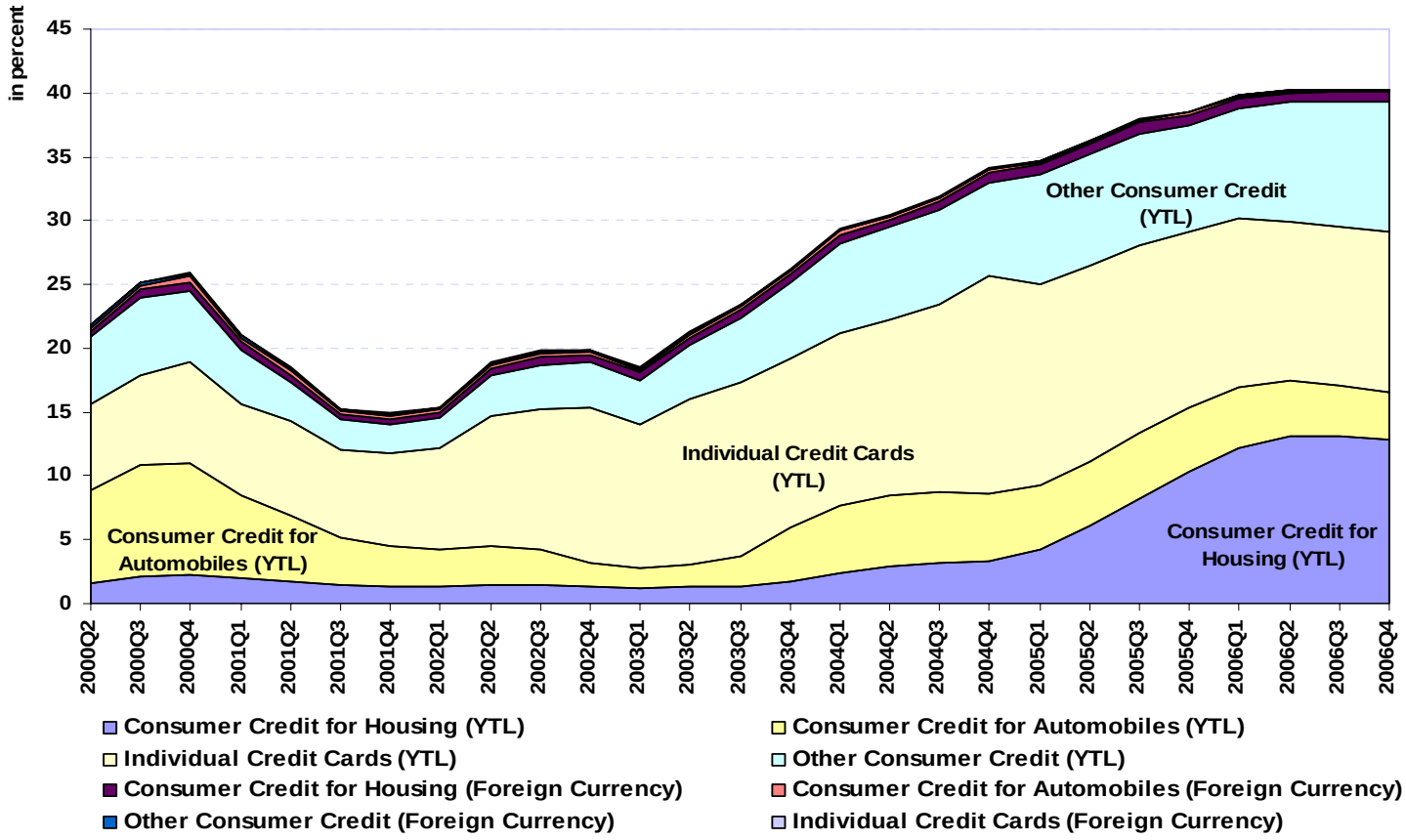
Source: Warnock and Warnock (2008)

Figure 5.13: Allocation of Total Credit Given by Deposit Banks



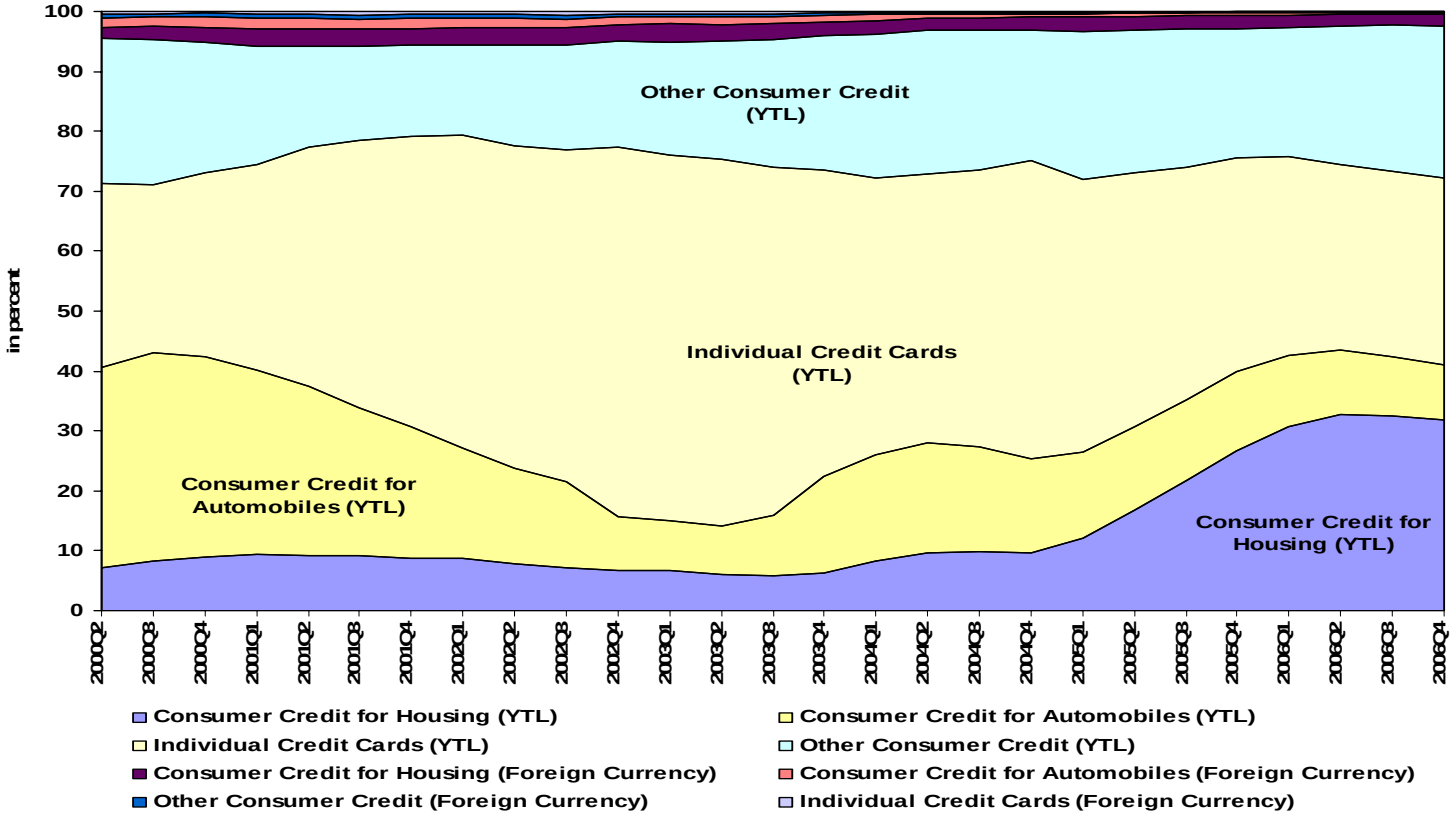
Source: Central Bank of Republic of Turkey

Figure 5.14: Share of Household Credit in Total Credit Given by Deposit Banks



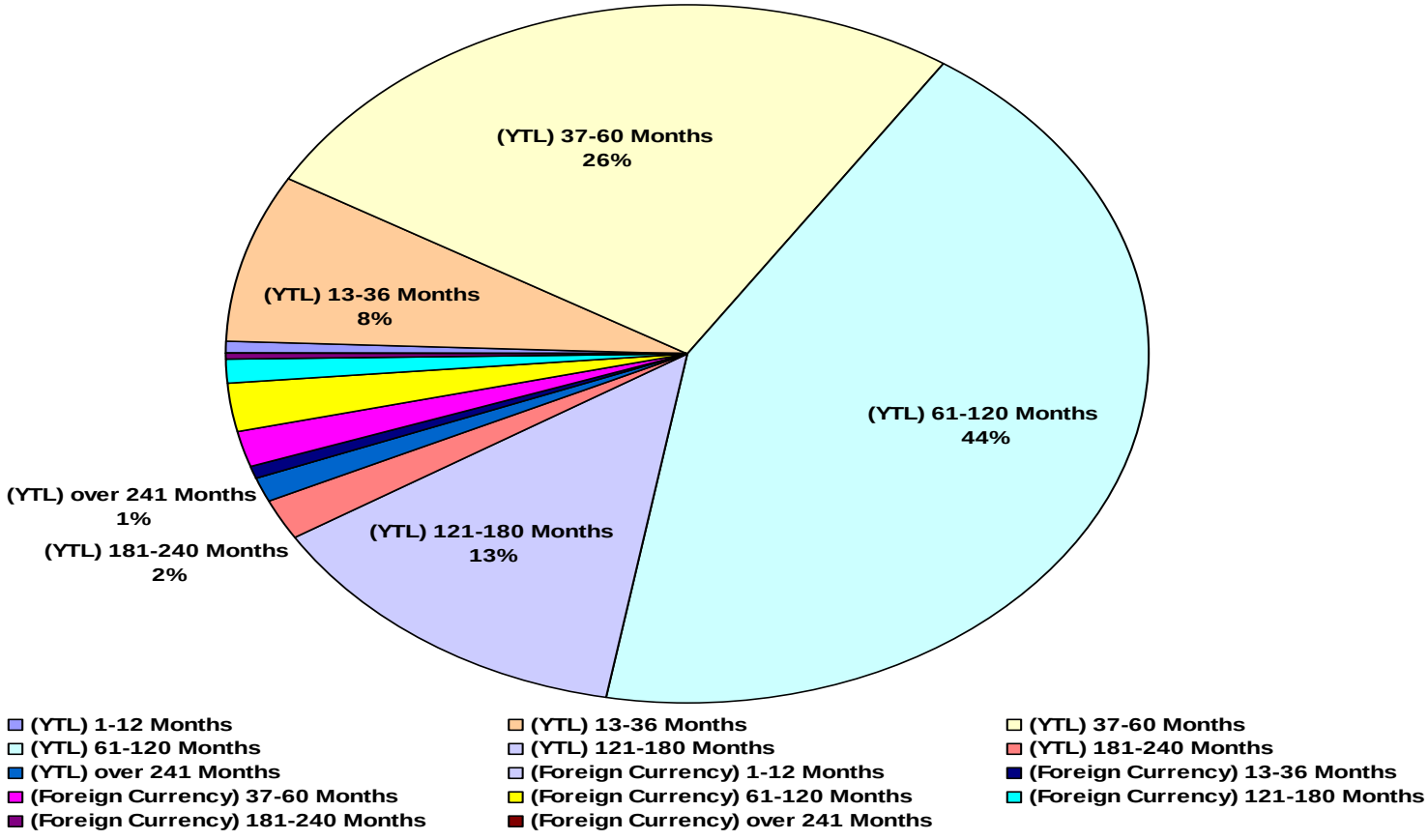
Sources: Central Bank of Republic of Turkey

Figure 5.15: Allocation of Household Credit Given by Deposit Banks



Sources: Central Bank of Republic of Turkey

Figure 5.16: Maturity of Consumer Credit for Housing in 2006



Source: Central Bank of Republic of Turkey

Figure 5.17: Real Price Per Square Meter Floor Area

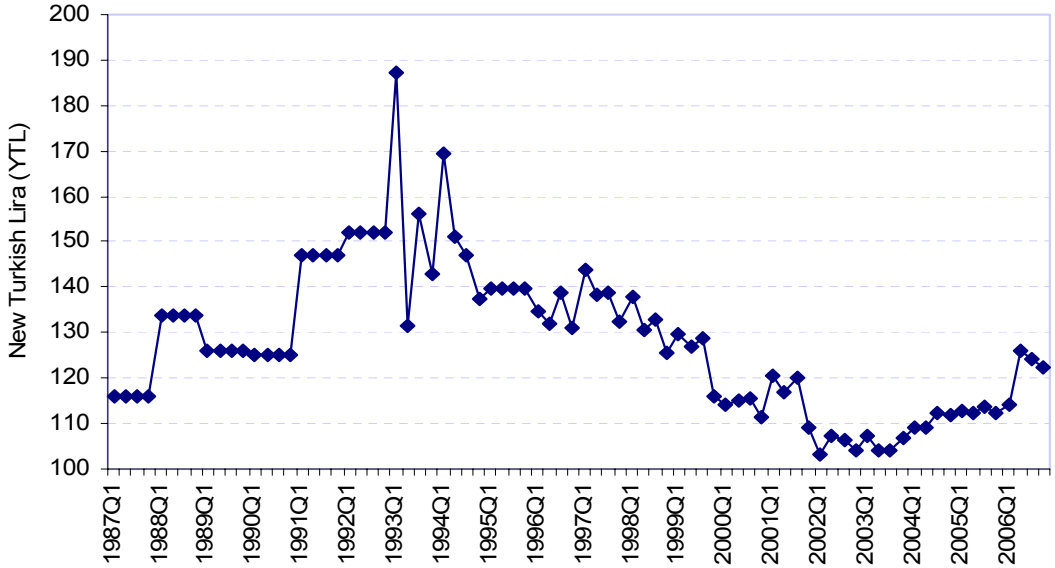


Figure 5.18: Quarterly Residential Floor Area Construction in Square Meters

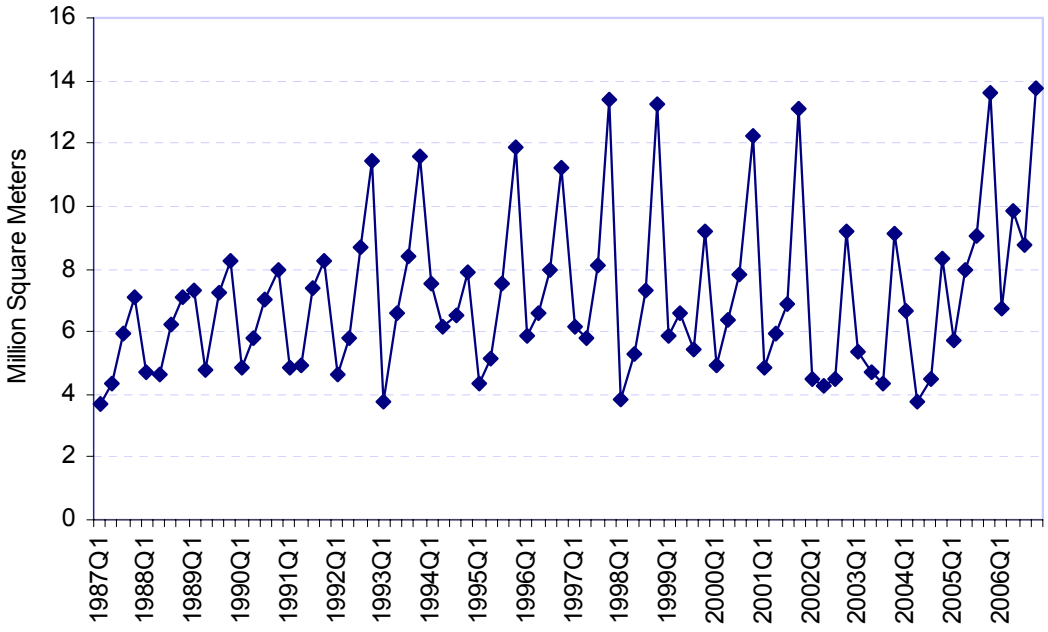


Figure 5.19: Stock of Floor Area of Dwellings in Square Meters after Depreciation

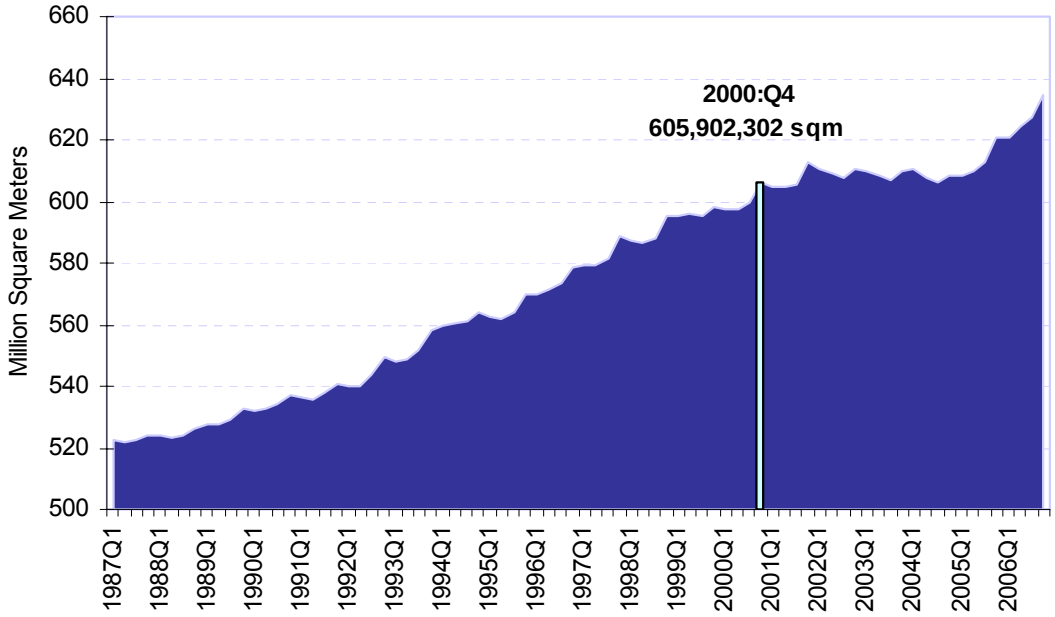
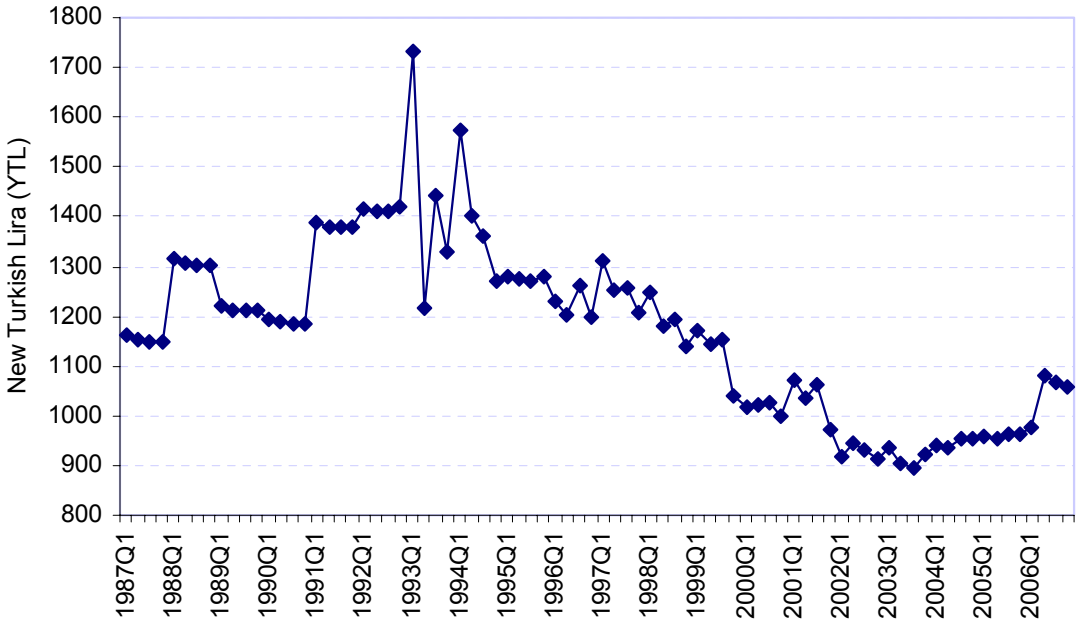


Figure 5.20: Real Per Capita Housing Wealth



Chapter 6: Allocation of Financial Wealth in Turkey

6.1 Introduction

The financial sector development is a critical pillar in achieving sustained economic growth. A large body of evidence provided by Levine (2003) and Beck, Levine and Loayza (1999) shows that the financial intermediaries can exert positive impact on the overall GDP growth. In theory, deep and liquid financial markets with diverse products and services enhance access to finance for firms and individuals. A well-regulated and a stable financial sector can reduce the macroeconomic volatility by providing risk sharing opportunities. An improvement in the general system-wide access to finance increases the amount of money that is intermediated through the financial sector, and the extent to which capital is allocated to the private sector enterprises on the basis of market signals. This, in return, facilitates the allocation of funds to the long-term investments based on the appropriate risk and return characteristics. Finally, a well-functioning financial system can potentially improve the resource allocation and overall productivity in the economy through gathering and evaluating information on investment projects, and monitoring and disciplining the borrowers' performance (see Levine, 1997).

The development, functioning and structure of the financial system are highly connected with the macroeconomic stability of the economy. When the volatility of the monetary, fiscal, and exchange rate policies increases, there is less incentive for the financial institutions to allocate funds to firms, and for the savers to participate in the financial markets. Furthermore the liquidity, depth and diversity of the financial system significantly decline.

The Turkish economy has started to liberalize its financial system and capital account regime in the early 1980s. However the transformation of the financial system, as well as its pattern of integration into the world financial markets have been conditioned by the growing public sector borrowing requirement and the lack of price stability in Turkey. This paper analyzes the patterns of financial wealth allocation and the characteristics of financial markets in Turkey during the 1987-2006 period.

Section 2 of the paper describes the important macroeconomic developments that affected the structure of the Turkish financial system. The banking system predominantly functioned as a finance house for the increasing government borrowing needs during the 1990s and ceased to perform the traditional role of intermediation between the firms and households. The high interest rates offered by the government debt securities completely crowded out the private investment in the real sector. In addition, capital account liberalization increased the vulnerability of the Turkish economy to boom-bust cycles driven by international capital flows and to financial crises triggered by the sudden reversals in short-term capital flows. With the implementation of the IMF-based disinflation program, the inflation and the nominal interest rates on government debt securities substantially declined in Turkey since 2001. Coupled with the resumed economic growth, these developments have gradually increased the incentives for the financial sector to invest in real economy in Turkey.

Section 3 of the paper looks at the patterns in allocation of financial wealth in this macroeconomic environment. The analysis shows that more than 65 percent of the financial investment by domestic investors is allocated to bank deposits. In particular, financial liberalization and deregulation in Turkey in an environment of chronically high

inflation and growing public sector borrowing requirement resulted in the dollarization of bank deposits and increase in outstanding government debt securities that crowded out the private corporate bonds market. Gold is an important financial asset where informal savings in the Turkish economy are invested.

Section 4 of the paper looks at the financial wealth allocation and portfolio choices in non-bank financial institutions in Turkey. The first part of the section provides a comparative analysis of the stock market characteristics in Turkey and other emerging markets with respect to market capitalization, value traded, turnover and concentration. Furthermore the return and volatility of the Istanbul Stock Exchange are analyzed with reference to the major social, economic, political and legal events shaping the 1987-2006 period. The next parts of section 4 specifically look at the stock market penetration patterns, preference for stock holdings as financial wealth, and analysis of investor profiles in the Istanbul Stock Exchange on the basis of portfolio sizes, nationality, age, gender and location. The results show that Istanbul Stock Exchange is characterized by the dominance of foreign institutional investors in the total equity portfolio. On the other hand, share of domestic institutional investors is very limited in international standards. Domestic investors are mainly composed of individuals with small portfolio investments. The final analysis looks at the financial wealth allocation in institutional investment schemes provided by the mutual funds and private pension plans, which are at their early stages of development in Turkey. Consistent with the crowding-out in the economy, the mutual funds and pension plans have predominantly invested in public debt instruments and repo transactions. Final section concludes.

6.2 Macroeconomic Developments in Turkey

Beginning with January 1980, the Turkish economy has started to liberalize its financial system and capital account regime. However, the liberalization in the 1980s coincided with the period when the Turkish economy started to experience a drastic deterioration in the government's fiscal balance. As a consequence, the development, structure and functioning of the financial system in Turkey, and its pattern of integration into the world financial markets have been conditioned by the growing public sector borrowing requirement and the lack of price stability in the last two decades.

As Boratav, Korkut and Yeldan (2006) show under the financially repressed conditions of the 1970s and early 1980s, the deficit financing through the central bank advances i.e. monetization and transfer expenditures from the government budget to the state economic enterprises rapidly increased. After the removal of interest ceilings following the financial system reforms in the 1980s, the government preferred to borrow through issues of debt instruments.

As Table 6.1 displays, the domestic debt stock as a percentage of GDP increased from 18 percent in 1986 to 58 percent by 2001. The rise in the domestic debt gave way to a spiral of rapid build-up in interest payments. Figure 6.1 shows that the share of interest payments on domestic debt in consolidated government budget increased from less than 5 percent in the early 1980s to 46 percent in 2001.[102] The deterioration of the fiscal position of the government, and the financing of the deficit through debt instruments led to an

[102] The public sector borrowing requirements to GDP ratios averaged 4.5 percent during 1981-1988, but rose 10.2 percent in 1991, and averaged 9.4 percent over 1990-1999. In 2000, public sector borrowing requirement to GDP ratio reached to 15.1 percent. (See Boratav, Korkut and Yeldan, 2006)

overall increase in the inflation and interest rates as displayed by Figure 6.2. The average interest rate on treasury bonds reached over 100 percent in the late 1990s.

High rates of inflation strongly interfered with the ability of the financial sector to allocate resources effectively in Turkey. Recent theories by Huybens and Smith (1998 and 1999) emphasizing the importance of the informational asymmetries in the credit markets show that increase in the rate of inflation drives down the real rate of return on assets in general, which exacerbates the credit market frictions and credit rationing. In return, the reduction in the capital formation negatively influences the long-run growth.[103] In addition to the effects in the credit markets, high and variable inflation also leads to asset and liability dollarization in the financial system (see Ize and Yeyati, 1998).

The liberalization of the capital account in August 1989 and the full convertibility of the Turkish Lira made it also possible for the government to finance its public sector borrowing requirement. Turkish Lira yields on government debt securities and other Turkish Lira denominated assets were very attractive due to the high risk premium associated with inflation and devaluation risk. Given the small size of the domestic financial system and the insufficiency of funds that the government could borrow with a cost that would not completely crowd out the private sector, Turkish banks borrowed short-term capital from abroad and invested in high yield government securities. As Table 6.2 indicates, net capital inflows directed to portfolio debt investment and bank loans as a percentage of GDP have been mainly positive during the 1987-2006 period. The capital account liberalization served the government by enabling banks to engage in extremely

[103] Using data on inflation, banking sector activity, equity market size, equity market liquidity, and the rates of return on stocks for 100 countries over the 1960–1995 period, Boyd, Levine and Smith (2001) find that higher inflation implies lower long-run levels of real activity and slower long-run growth rates because financial

profitable short-term borrowing from abroad so as to finance the public sector borrowing requirement. Thus the short-term capital flows became "the long arm of fiscal policy overcoming the credit restraints and money constraints of the monetary authority" (see Cizre-Sakallıoğlu and Yeldan, 2000).

The Turkish financial sector ceased to perform the traditional role of intermediation between the firms and households. Rather, it functioned as a finance house for ever increasing government borrowing needs especially during the 1990s. Consistent with the findings of Hauner (2006) for 73 middle-income economies, continuously large public sector borrowing had adverse consequences on the functioning of the Turkish banking sector and securities markets. The dominance of government debt securities interrupted the financial deepening as well as the development of the corporate debt markets. When public sector absorbed a large share of the available credit in the banking sector, banks in Turkey engaged in very limited amount of credit allocation to the private sector. The crowding-out effect increased when banks became reluctant to lend to the borrowers, who cannot pay the required premium over the interest rates charged for the public sector debt.

The capital account liberalization in 1989 has made the Turkish economy more prone to financial cycles. The high interest rates attracting short-term capital deterred the private investment and made the financial assets connected with the government debt securities more attractive compared to real sector investment. Arbitrage-seeking inflows and outflows of capital contributed to the rising external and domestic instability. At the same time, the growth performance of the economy has become dependent on the foreign capital flows. Typically, excessive bank lending created a boom-bust cycle where the initial

---

intermediaries allocate capital less effectively. Furthermore stock market liquidity and trading volume are smaller while stock return variability increases.

increase in the growth rate of real GDP, private investment and consumption was accompanied by a real appreciation of the Turkish Lira, an increase in imports and a deterioration of the current account balance leading to financial crises (see Çimenoğlu and Yentürk, 2005).

The Turkish economy experienced three main financial crises in 1994, 1998 and 2001 triggered by the sudden and huge reversals in the short-term capital flows. The first crisis, which took place in January 1994, started when the Central Bank of Turkey implemented policies that artificially lowered the interest rates on government debt while attempting to defend the exchange rate by selling foreign currency reserves. The imminent risk of devaluation and the downgrading of Turkey's foreign debt rating by Moody's and Standard and Poors triggered a sharp decline in foreign bank loans and a panic sale of portfolio equities and debt securities by the domestic and foreign institutional investors. In response, an austerity program with the IMF was announced in April of 1994, and Lira was devalued. The economy went into a recession with the GDP per capita declining by 7.6 percent.

The Asian financial crisis and the Russian default in 1998 had a serious impact on the Turkish economy. The loss of confidence in emerging markets resulted in a massive shift of funds by the international portfolio managers. As Table 6.2 displays, the outflow in portfolio equities and debt securities reached to over 3 percent of GNP. The crisis affected the fiscal deficit through high real interest rates, and significantly increased the cost of debt financing. In the following year, the earthquake in İzmit industrial center further deteriorated the recovery prospects in the economy. The GDP per capita declined by 3 and 12 percent in 1998 and 1999 respectively.

The last economic crisis took place when Turkey was implementing the 1999 IMF-sponsored disinflation program. However, one year after introducing the program, a financial crisis was triggered by the liquidity problems in the banking sector. The initial crisis was contained by an IMF package. However a public quarrel between the president and the prime minister over corruption investigation followed by cabinet resignations triggered the second liquidity crisis in February 2001. Turkey's stabilization program based on crawling peg exchange rate regime ended with the devaluation of Lira. Turkish economy entered into a severe recession in 2001 with the GDP per capita declining by 9.6 percent.

Since 2001, a new disinflation program was initiated in order to bring the inflation down to single digits and to reduce the public debt burden to achieve steady GDP growth path. The newly elected government implemented a fiscal and monetary stabilization program, and a broad range of financial and public sector structural reforms with the assistance of the IMF (see Boratav, Korkut and Yeldan, 2006). As can be seen in Figure 6.2, the inflation and the nominal interest rates for deposits and treasury bonds have declined substantially. The average inflation rate in consumer prices has fallen from 78 percent in the 1990s to 9.83 percent in 2006. Coupled with the resumed economic growth in Turkey, these developments have gradually reduced the crowding-out effect, and increased the incentives for the private banks to invest in real sector and other financial products and services. Since 2003, there is a clear upward trend in the availability of the banking sector credit to the private sector.[104] The most important driver of this rapid credit

[104] Between 2003 and 2006, average annual growth of per capita bank credit to private sector was 34 percent. Since 2002, consumer credit loans precipitously increased from 6 percent of the total credit to 26 percent in 2006. Consumer loans and individual credit cards combined increased from less than 20 percent from 1993

growth was the decline in public sector borrowing requirement and the interest rates on government debt securities. Availability of global liquidity also provided the needed supply of credit to the banking sector. As can be seen in Table 6.2, capital flows to Turkey have accelerated with the improvement in the economy.

Given these economic developments during the 1987-2006 period and the important role played by the fiscal policies in shaping the development, functioning and structure of the Turkish financial system, the following sections of the paper examine in detail the allocation of financial wealth and the main characteristics of the financial markets in Turkey.

6.3 Allocation of Financial Wealth in Turkey

Despite the macroeconomic and political instability, the Turkish financial system has deepened following the financial liberalization and deregulation over the last 20 years. As displayed by Table 6.3-a and Table 6.3-b, the total assets of the Turkish financial institutions increased from 23 billion U.S. dollars (30 percent of GDP) in 1986 to 404 billion U.S. dollars (100 percent of GDP) by the end of 2006.

The most important financial asset continued to be the bank deposits. Total bank deposits increased from 17 billion U.S. dollars (23 percent of GDP) in 1986 to 195 billion U.S. dollars (47 percent of GDP) in 2006. As Table 6.3-c shows, 77 percent of the financial assets were allocated to the bank deposits in 1986 and this share has declined to 48 percent in 2006 with the diversification of the investment choices. Consistent with the chronic and high inflationary environment, the most prominent change was observed in the increase of the foreign currency denominated deposits that reached 30 percent of the total financial

---

until the 2001 crisis to roughly 40 percent of total credit by the end of 2006. These developments led to consumption and investment boom in Turkey since 2003.

assets in the 1990s. By 2006, the share of foreign currency denominated deposits declined to 18 percent of the total financial assets and reached the same share as the Turkish Lira denominated deposits.

Starting from the 1980s, financing of public deficit resulted in an increasing stock of domestic as well as foreign debt in Turkey. The outstanding public securities, which were 3 billion U.S. dollars (4 percent of GDP) at the end of 1986, reached 178 billion U.S. dollars (44 percent of GDP) by the end of 2006. As a consequence of the government's borrowing requirement, the growth of the private equity and corporate debt markets were negatively affected. The corporate bonds have vanished from the private securities market. The issuance of common stocks remained the only financial instrument available for the private sector. Although the share of common stocks reached 14 percent of the total financial assets until 1991, the growth in outstanding private securities was outpaced by the increase in public securities. The outstanding common stock reached 29 billion U.S.dollars in 2006 and constituted 7 percent of GDP.

In summary, while the growth of the size of the financial system has been quite significant, a large part of the growth was simply due to the resource transfer from the general public to the government. In an environment of macroeconomic instability and chronic inflation, the financial liberalization and deregulation in Turkey resulted in the dollarization of bank deposits and crowding-out of private investment as a consequence of the increase in outstanding government debt securities.

In Table 6.4, a detailed analysis of the portfolio choices of the domestic investors shows that of the 281.5 billion U.S. dollars worth of financial assets in 2006, 25 percent is allocated to foreign currency deposits (71.7 billion U.S. dollars), and 43 percent to Turkish

Lira deposits (120.8 billion U.S. dollars) in the banking system. The share of Turkish Lira deposits have increased by 10 percent since 2003 with the overall macroeconomic stability and the decline in the inflation rate. On the other hand, the Turkish Lira denominated government bonds and treasury bills constitute 13 percent (38 billion U.S. dollars) of the portfolio of domestic investors in 2006. The share has declined from 19 percent in 2003. Investment through institutional investors constitutes only a limited portion of the portfolio allocation by domestic investors. The share of mutual fund investment has declined from 8.5 percent in 2003 to around 5.5 percent (15.6 billion U.S. dollars) in 2006, but the pension plan investment has increased to 0.71 percent. Finally, investment in common stocks reached 6.6 percent (18.6 billion U.S. dollars) of the domestic investors' portfolio allocation. In conclusion, more than 65 percent of the domestic financial investment is allocated to bank deposits.

When the portfolio choices of the foreign investors in Turkey are examined, of the 65.5 billion U.S. dollars invested in 2006, 53 percent (35 billion U.S. dollars) is allocated to common stocks and 40 percent (26 billion U.S. dollars) to government bonds and treasury bills. The common stock portfolio of foreign investors is two times the size of the common stock portfolio by domestic investors.

While the lack of attractive capital market investment opportunities, and crowding-out effect of excessive government borrowing have all contributed to the mobilization of formal savings into the bank deposits and sovereign debt securities, macroeconomic uncertainty, chronically high and volatile inflation have driven a significant portion of the informal savings into inflation hedges and tax shelters such as real estate, gold, mattress money particularly in the form of foreign currency, and overseas bank accounts. While the

total amount of these informal savings cannot be estimated with accuracy, several studies indicate that as a percentage of GDP, they are as high as the formal savings (see World Bank, 2003).

One of the potentially largest sources of wealth that remains outside the formal financial system is the stock of gold in Turkey. The Turkish households hold a substantial amount of gold as part of their financial assets or in the form of personal jewelry due to its traditional importance. Table 6.5 shows that the estimated gold stock in the economy increased from 56.5 billion U.S. dollars in 2001 to over 120 billion U.S. dollars in 2006. In fact, the importance of informal gold holdings has been recognized by the government with the establishment of the Istanbul Gold Exchange in 1995, which has the explicit objective of mobilizing the informal gold stock into the formal financial system.

6.4 Non-Bank Financial Institutions

Well-functioning non-bank financial institutions such as stock markets, mutual funds, and private pension plans perform different but complementary roles to the banking system in providing resources for a variety of financing needs by individuals, businesses and the public sector (see World Bank, 2003). The growth of non-bank financial institutions diversifies the venues, through which financial savings can be channeled and thereby helps mobilizing the long-term funds necessary for the development of equity and corporate debt markets. In addition, they provide a stable and competitive source of funding to corporations, and can enhance the efficient use of capital for generating output and growth. A stable macroeconomic environment can facilitate the development of financial intermediation by non-bank financial institutions. In Turkey, due to long standing

macroeconomic imbalances and the associated dominance of government debt markets, the stock market and institutional investors have remained relatively underdeveloped.

The following sections of the paper analyze in detail the characteristics and the investor profile of the Turkish stock market as well as the role of the institutional investors such as mutual funds and private pension plans in allocating financial wealth in Turkey.

6.4.1 Characteristics of the Stock Market in Turkey and Other Emerging Markets

The Istanbul Stock Exchange has commenced its stock trading in January of 1986. The market capitalization of the stock exchange has fluctuated over the years with the conditions of the economy, but continued to increase over the 1986-2006 period. Table 6.6 shows the market capitalization to GDP ratios in Turkey and the selected emerging market economies in Latin America and East Asia. It can be seen that market value of shares in the Istanbul Stock Exchange has reached 40 percent of the GDP in 2006 in comparison to 1.24 percent in 1986, when the Istanbul Stock Exchange started its operation. After expanding in the 1990s, stock market capitalization reached its peak of 61 percent in 1999 and significantly declined following the economic crisis in 2001.[105]

In comparison to other emerging markets, the evolution of the importance of private stock market in the Turkish economy follows a similar path to the Latin American economies except Chile. Private stock markets are highly developed in Chile where the market capitalization to GDP ratio exceeds 100 percent. The evolution of the Turkish stock market capitalization as a share of GDP is below the levels of many emerging market economies in East Asia. The market capitalization as a share of GDP approaches 94 percent

[105] On the average, the free float in the Turkish market is estimated to be 20-30 percent of the total outstanding equity. As a matter of fact, some of the largest companies in Turkey have a much lower free float (2–10 percent), with several state-owned enterprises being exempted from the 5 percent minimum free float

in Korea, 90 percent in India, 67 percent in Thailand and 158 percent in Malaysia in 2006. Turkey, Indonesia and the Philippines have comparable stock market sizes.

Table 6.7 shows the value traded to GDP ratios in Turkey and the selected emerging markets. The share of market value of traded stocks in GDP increased from 0.02 percent in 1986 to 56 percent in 2006. The transaction volume to GDP ratio has reached its peak of 89 percent in 2000.

In comparison to the emerging markets, the value traded to GDP ratio is clearly above the Latin American markets. The share of traded value of equities in Chile and Brazil is only about 20 percent and 24 percent of their GDP in 2006 respectively. On the other hand, the Istanbul Stock Exchange is at the same level as India, Malaysia and Thailand. In particular, traded value of shares in Korea dramatically increased since 1998 and approached 150 percent of GDP in 2006.

The turnover ratio indicates the ratio of traded value of stocks to market capitalization. It is an indicator of the liquidity of the market, but also shows whether or not short-term investments dominate in the stock market. The turnover ratio in the Istanbul Stock Market has reached 145 in 2006 approaching the turnover ratios in Korean and Indian stock markets. On the other hand, liquidity of the stock market in Turkey exceeds the Latin American and most East Asian markets.

The number of listed companies has reached 314 in 2006 in comparison to 40 in the year of commencement in 1986. Table 6.10 shows the market concentration of ten largest companies in comparison to the total domestic market capitalization and value traded in Istanbul Stock Exchange, Nasdaq, NYSE and other emerging market exchanges. The

---

requirement set by the Istanbul Stock Exchange. Therefore these factors give an upward bias to the market capitalization figures. (See World Bank, 2003)

figures show that Indian, Korean and Malaysian stock exchanges has the lowest market concentration in capitalization among the emerging markets but are clearly below the levels of concentration in NYSE and Nasdaq. The Istanbul Stock Exchange on the other hand, has similar levels of concentration with Chile and Thailand. The Latin American markets are clearly the most concentrated in terms of market capitalization. For example, ten largest companies account for 78 percent and 76 percent of the market capitalization in Argentina and Mexico respectively.

In terms of value traded, Indian, Korean and Malaysian exchanges have lower concentration than NYSE and Nasdaq. 43 percent of trading value is accounted by ten companies in Istanbul Stock Exchange. This ratio is higher in all other emerging markets.

Table 6.11 shows the financial intermediation to the private sector provided by the banking sector credit, stock market capitalization and bond market capitalization. The size of domestic credit to private sector (21 percent) is slightly below the size of market capitalization (24 percent) in Turkey. At the same time, the private bond market virtually does not exist. These figures can be explained by the fact that banking sector credit allocation to the private sector has been interrupted by the crowding-out effect of the public sector borrowing requirement. Argentina, Mexico, Colombia and Venezuela have similar sizes of domestic credit to GDP ratios and they are below the other emerging market economies. Korea, Malaysia, Thailand and Chile have the largest sizes of private bond markets and credit to the private sector among the emerging markets.

Figure 6.3 displays the monthly index values of the Istanbul Stock Exchange since the commencement of the stock trading in January of 1986 and the percentage monthly returns. Table 6.12-a shows the local currency based and the U.S. dollars based values of

the IMKB-100 index at the end of each year and the annual percentage returns. The table shows that Lira based (U.S. dollars based) index increased from 1.71 (131) in 1986 to 39,117 (1620) in 2006. Figure 6.3 and Table 6.12-a show that the Istanbul Stock Exchange index has experienced positive returns in the majority of the months since 1986. Abnormally high and low returns in the IMKB-100 index indicate the excessive volatility of the stock market. Table 6.12-b shows the dates corresponding to the highest and the lowest monthly returns in each year and the percentage standard deviation of monthly returns. There is a clear indication that historical pattern of high return volatility declined since 2003 after the improvement in the macroeconomic conditions following the disinflation program.

The appendix lists the chronology of major legal, economic, political and financial events in Turkey related to the Istanbul Stock Exchange and indicates the important events occurred during the months corresponding to the highest and the lowest monthly returns in each year. The performance of the Istanbul Stock Exchange is affected by the economic conditions and developments in the domestic politics as well as international relations of the country. In particular, following the financial crisis and the associated capital outflow in 1994, 1998 and 2001, the Turkish stock market has been negatively affected.

6.4.2 Analysis of Investor Profiles in the Istanbul Stock Exchange

The analysis of investor profiles in the Istanbul Stock Exchange started in 2002 with the cooperation of the Association of Capital Market Intermediary Institutions of Turkey (TSPAKB) and the Clearing and Settlement Center of Istanbul Stock Exchange (Takasbank). After the establishment of the Central Registry Agency (MKK) in November 2005, the dematerialization of securities held by individual and corporate investors enabled

more detailed analysis of various categories of stock investors in terms of portfolio sizes, nationality, demographic characteristics and geographical distribution.

Table 6.13 shows the breakdown of identified and active accounts with a positive balance of equity investment held under the custody of the Takasbank and the Central Registry Agency. “Foreign” refers to investors with foreign citizenship and “domestic” refers to investors with Turkish citizenship regardless of actual residence. The investors are divided into several categories. The “fund” category refers to mutual funds and private pension plans, “corporate” refers to investment trusts, banks, financial intermediaries and corporations, “individual” refers to individuals and “other” refers to charities, associations and cooperatives.

Table 6.13 displays that the total number of identified and active accounts have continuously declined from 1.14 million in April, 2002 to over 1.02 million at the end of December, 2006. On the other hand, the portfolio size of active accounts has grown from 10.6 billion U.S. dollars to 53 billion U.S. dollars.

When investor categories are examined in detail, it can be seen that the number of active accounts held by foreign funds have continuously increased. The portfolio size of foreign funds increased from 2.3 billion U.S. dollars in 2002 to 14.6 billion U.S. dollars by the end of 2006. As a result, foreign fund investors constitute 27 percent of the total portfolio size of active accounts, and 22 percent of total number of stocks at the end of 2006. Similarly foreign corporate investors also increased the number of active accounts over time. Portfolio size of foreign corporate investors reached 19.9 billion U.S. dollars in 2006 and constitutes 37 percent of the total portfolio size of active accounts and 29 percent

of total number of stocks. Foreign institutional investors in total account for 65 percent of the total portfolio size of active accounts in 2006.

Domestic investment funds, on the other hand, have a portfolio size of 567 million U.S. dollars in 2006, which constitutes less than 1.5 percent of the total portfolio. Domestic corporate investors have continuously increased their portfolio sizes from 687 million U.S. dollars in 2002 to 5.8 billion U.S. dollars in 2006 accounting for around 11 percent of the total portfolio size.

Active accounts held by domestic individual investors declined from 1.32 million units in 2002 to slightly over 1 million in 2006. Although the total portfolio size continued to rise from 4.5 billion U.S. dollars in 2002 to more than 11 billion U.S. dollars in 2006, the share of domestic individual investors in total portfolio size of active accounts rapidly declined from 43 percent in 2002 to 21 percent in 2006.

In comparison, the international evidence provided by the World Federation of Exchanges on stock market investors in the emerging markets shows that the share of individual investors in total value traded in Brazil's Bovespa has been over 20 percent during the 2001-2006 period. On the other hand, share of institutional investors increased from 16 percent in 2001 to over 27 percent in 2006. International investors account for 25 percent of the total value traded in 2001 and their share increased to 36 percent in 2006. On the other hand, for the Korean Stock Exchange, institutional investors i.e. investment trust companies and commercial banks, account for more than 16 percent of the market capitalization while corporations account for 19 percent, individuals account for close to 20 percent and foreigners account for 40 percent in 2003. Finally, for the Thailand Stock Exchange, the domestic individual investors account for 23 percent and domestic

institutional investors account for 37 percent of the market capitalization in 2003. The foreign institutional investors account for 27 percent of the market capitalization.

When the investor profiles of the London Stock Exchange are examined, the foreign investors constitute 33 percent of the market capitalization in 2004. The share of domestic individual investors and households accounts for 14 percent of the market capitalization in 2004 while domestic institutional investors such as pension and insurance funds account for 33 of the market capitalization in 2004 (see Federation of European Stock Exchanges, 2007).

In summary, comparative analysis with the world stock markets shows that the investor profile in the Istanbul Stock Exchange is characterized by the dominance of the foreign institutional investors in the total equity portfolio. On the other hand, the share of domestic institutional investors is very limited in international standards. Domestic investors are mainly composed of individual stock owners.

Figure 6.4 displays the total number of domestic and foreign active and identified investors. Total number of individual investors has been declining from 1.03 million in 2002 to 880 thousand in 2005, but slightly increased to 923 thousand in 2006. These figures indicate that individual stock investors correspond to less than 4 percent of the civilian labor force. Due to high volatility in returns, investing in stock market has been an unattractive option for domestic investors in comparison to the Turkish Lira and foreign currency deposits, government debt, and overnight repos. The study by the World Bank (2003) indicates that a portfolio of 100 percent investment in the stocks of the Istanbul Stock Exchange was the least efficient portfolio during the 1990s. Consistent with this study, Figure 6.4 indicates that the penetration of stock ownership is very limited in the

Turkish economy. In comparison, the stock investors correspond to 16 percent of the economically active population in Korea in 2004.

Table 6.14-a and Table 6.14-b display the breakdown of investor categories by the portfolio size in 2006. Among the total number of 927 thousand investors, 921 thousand of them are domestic investors. On the other hand, of the 53 billion U.S. dollars worth of total portfolio, 34.6 billion U.S. dollars (65 percent) is held by foreign investors and 18.6 billion U.S. dollars (35 percent) is held by domestic investors. The foreign investors are mainly composed of the investment funds and corporate investors and therefore 99 percent of their portfolio is concentrated on sizes greater than 1.000.000 New Turkish Lira. Roughly 12 percent of the total portfolio size is held by the domestic institutional investors.

The domestic individual investors constitute 21 percent of the total portfolio size of the market by holding 11.13 billion U.S. dollars worth of portfolio. More than 80 percent of the total domestic individual investors (767.1 thousand) are small investors holding portfolio sizes of less than 10.000 New Turkish Lira. The share of their portfolio constitutes only 6 percent of the total investment by the domestic individuals. 12 percent of the domestic individuals have portfolio sizes less than 50.000 New Turkish Lira constituting 15 percent of the total investment by domestic individuals. On the other hand, 1417 domestic individuals are large investors holding 38 percent of total portfolio held by the domestic individual investors.

Table 6.15-a and Table 6.15-b look at the breakdown of individual investors in detail. Of the 919 thousand domestic individual investors with a portfolio size of 11 billion U.S. dollars, 50 percent of the investors are between the ages 40-59 and 38 percent of the investors are between the ages 20-39.

Distribution of domestic investors by provinces in Table 6.16 indicates that 32 percent of the total investors come from Istanbul and their share in total portfolio size is 66 percent. Ankara and İzmir combined constitute 22 percent of the total investors and their portfolio share is 15 percent. About 33 percent of the individual investors come from Istanbul and they constitute 56 percent of total individual portfolio. Ankara and İzmir combined constitute 22 percent of the total individual investors, and their portfolio share is 17 percent. The number of individual investors in Istanbul, Ankara and İzmir combined is 502 thousand, which is greater than 417 thousand in the rest of the country.

6.4.3 Foreign Portfolio Investment in the Istanbul Stock Exchange

More than 30 sizable stock exchanges in the emerging market economies implemented significant financial liberalization reforms during the mid-1980s and early 1990s (see Bekaert, Harvey, and Lundblad, 2003). The reduction or elimination of the rules limiting investments by private pension plans and other institutional investors from the developed economies has produced a large pool of capital that is available for investment in the portfolio securities of the emerging markets.

Turkey has eliminated all restrictions on foreign portfolio investment in securities traded on the Istanbul Stock Exchange with the Issuance of Decree 32 in August of 1989. The foreign institutional and individual investors are allowed to purchase or sell any type of registered securities and repatriate the capital and profits without any restrictions. As a consequence, over time the importance of foreign portfolio investments in the Istanbul Stock Exchange has continuously increased.

Table 6.17 shows that market value of the foreigner's portfolio in Istanbul Stock Exchange increased from 6 billion U.S. dollars in 1997 to 35 billion U.S. dollars in 2006

while the annual volume of transactions by foreigners increased 10 times from 8.9 billion U.S. dollars to 88 billion U.S. dollars during the same period. The average portfolio size of the foreign investors remained relatively stable until 2003 and increased precipitously from 5 billion U.S. dollars in 2003 to 34 billion U.S. dollars in 2006. Table 6.18 shows that foreign investors are particularly active in investing in the Istanbul Stock Exchange during the years when large volumes of public offerings through privatization of state enterprises are made.[106]

Investment in the Istanbul Stock Exchange has provided significant returns for the foreign investors during the 1997-2006 period. Table 6.17 shows that there has been a net capital inflow into the Istanbul Stock Exchange except for the crisis year of 2000. In particular since 2003, after the implementation of the IMF-based disinflation program and improvement in the macroeconomic and political stability, foreigners have become net purchasers of equities. When the changes in the value of stock market units held by foreigners are examined in Table 6.17, the cumulative gain in the market value of the foreigner's portfolio reached 19.1 billion U.S. dollars. 7.5 billion U.S. dollars loss during the crisis period of 2000 and 5 billion U.S. dollars loss in the aftermath have been offset by 21 billion U.S. dollars gain in the portfolio value since 2003 with combined effect of the increase in stock prices and appreciation of the Turkish Lira.

One important characteristics of the Istanbul Stock Exchange is that IMKB-100 index is strongly driven by the portfolio equity investments of foreign investors. It can be

[106] In year 1998, when public shares of İş Bankası was offered in SPO, foreign share increased to 75 percent of the total capital raised. Similarly, during SPO of Tüpraş, which is a state owned refinery, foreigners constituted 70 percent and 46 percent of capital raised in IPO and SPOs respectively in year 2000. In 2005, 73 percent of Vakıf Bank IPO was sold to foreigners and their share rose up to 74 percent and 84 percent in IPO and SPOs respectively. During the Turkish Airlines SPO in 2006, foreign investors constituted 52 percent and 42 percent of the capital raised by IPO and SPOs respectively.

argued that the movements of the stock market index is mainly a reflection of capital flows into the economy and functions as a leading indicator of the boom-bust periods. Furthermore, international economic conditions such as major developments in other emerging market economies are transmitted to the Turkish economy through the portfolio equity investment in the stock market.

Figure 6.5 displays the monthly market value of the stock units i.e. equity portfolio held by the foreign banks, brokerage houses or individuals under the custody of the Clearing and Settlement Center of the Istanbul Stock Exchange and IMKB-100 index since December, 1995. Similarly, Figure 6.6 shows the value of the monthly stock transactions, i.e. total purchases and sales in secondary markets realized on behalf and account of foreign investors and IMKB-100 index since January, 1997. Both figures clearly indicate a one-to-one relationship between the performance of the Istanbul Stock Exchange and the stock transactions realized by the foreign investors.

Figure 6.7 displays the share of the foreign investors in total market value of stock units held under the custody of the Clearing and Settlement Center of the Istanbul Stock Exchange. It can be clearly seen that foreigner's share in total market value of stock units increased from 39 percent in 1997 to 65 percent 2006. The increase particularly accelerated since the end of 2002. In other words, domestic investors share in total portfolio value have fallen below 50 percent.

Figure 6.7 also shows that the annual share of foreign purchases in total value traded in secondary markets remained relatively stable during the 1997-2003 period and increased from 7 percent in 1997 to 20 percent in 2006. Another way of interpreting these results in Figure 6.7 is that domestic investors are responsible for the overwhelming share

of stock transactions realized in the secondary markets while they hold less than 50 percent of the total portfolio value. In other words, domestic investors prefer to trade their stock holdings more frequently in comparison to the foreign investors. Table 6.17 in fact shows that the average portfolio holding period by the foreign investors is around 9 months, which is clearly longer than the holding period by the domestic investors.

Finally, Figure 6.8 looks at the association between foreign net purchases and the monthly returns in the Istanbul Stock Exchange. The figure shows that of the total 120 months during the January 1997-December 2006 period, the Istanbul Stock Exchange had positive returns when the foreign investors realized net purchases for 52 months, and had negative returns when foreign portfolio investors realized net sales for 30 months. The scatter plot clearly verifies the positive association between the behavior of the net purchases by the foreign investors and the percentage monthly stock returns. On the other hand, net sales with positive stock market returns and net purchases with negative returns indicate the possibility of profit realization by the foreigners.

6.4.4 Domestic Institutional Investors

A. Mutual Funds

The mutual funds and private pension plans constitute another type of non-bank financial institutions. The mutual funds are important collective investment schemes, through which individuals can allocate their savings into various capital market instruments. In particular, the growth of the mutual funds widens the range of savings channels in addition to the bank deposits.

The first mutual fund in Turkey was established in 1987. Two different types of mutual funds exist in the Turkish capital markets. Type A mutual funds are required to

invest at least 25 percent of their assets in equities that are issued by the Turkish companies, whereas mutual funds that have no such obligation are classified as Type B. Type A and Type B mutual funds were not separated until 1994.

The mutual fund industry in Turkey is very small and highly fragmented, with a few players accounting for the majority of the assets under management. Number of mutual funds operating in the Turkish capital markets increased to 289 by the end of 2006, of which 126 are Type A mutual funds.

As Table 6.19 displays, net asset value of the Type A mutual funds increased from 81 million U.S. dollars in 1994 (0.06 percent of GDP) to 652 million U.S. dollars (0.15 percent of GDP) in 2006. The number of open accounts has increased from 62.4 thousand in 2001 to over 133 thousand in 2006. The share of common stocks in the portfolio composition has increased from 34 percent in 1994 to 65 percent in 2006, while the share of public debt instruments has declined from 66 percent to 17 percent. The reverse repo share also declined over time. Investment in foreign securities and corporate bonds are negligible.

The net asset value of the Type B mutual funds increased from 52 million U.S. dollars (0.06 percent of GDP) in 1987 to 15 billion U.S. dollars (4 percent of GDP) in 2006. The total number of open accounts under the Type B mutual funds reached 2.3 million by 2006. These figures indicate that Turkish investors clearly prefer the Type B mutual funds. Portfolio composition of the Type B mutual funds is dominated by repo and public debt instruments. The investment in corporate bonds in the portfolio completely disappeared since the early 1990s. The stock investments constitute only 0.03 percent of the Type B portfolio in 2006. Except for the years 1993, 1997, and 1999 where the stock

investments exceeded more than 10 percent of the mutual funds portfolio, common stocks constitute only about 2.5 percent of the portfolio value of all mutual fund investments. Consistent with the crowding-out in the economy, mutual funds have predominantly invested in the public debt instruments and repo transactions.

As displayed in Table 6.20, in comparison to the other emerging market economies, the role of mutual funds in the Turkish economy is very limited. Total net assets of the mutual funds in Brazilian (Korean) economy have increased from 96 (149) billion U.S. dollars in 2002 to 418 (251) billion U.S. dollars in 2006, representing 19 percent (27 percent) and 39 percent (28 percent) of GDP respectively. Similarly, Mexico and India have larger total net assets of mutual funds, but the share in the economy is similar to Turkey.

B. Private Pension Plans

To enhance the income security available to the retiring workers and to reduce the strain on the public pension system, the Turkish government as part of its social security system reform has recently developed a private pension scheme. The features of this scheme are laid down in Law No. 4632 on the Private Pension Savings and Investment System, which came into effect as of October 7, 2001 (see World Bank, 2003).

The purpose of this law is the regulation and supervision of a new individual pension system that is complementary to the public social security. The system is based on the voluntary participation and the fully funded defined contribution principle, and provides the participants with the ease of portability in the event of their transfer from one employer to another. The expectation is that accumulated assets in the retirement accounts of the

individuals will be managed and invested in the private sector by the private portfolio management companies.

As Table 6.21-a displays, the private pension plans in Turkey started in September, 2003. Net asset value rapidly increased from 31 million U.S. dollars in 2003 to 2 billion U.S. dollars in 2006. Roughly 8 percent of the pension plan portfolio is invested in the common stocks, 73 percent in the public debt instruments and 14 percent in the repo transactions. The number of open accounts increased from 36 thousand in 2003 to 2.8 million in 2006 representing over one million individuals participating in the system. As can be seen in Table 6.21-b, the share of participants in private pension plans reached 4 percent of the civilian labor force in 2006. The majority of the investors are in the 25-44 years of age.

In developed countries, the private pension plans play a very important role as institutional investors. In the United States, for example, it is estimated that over 40 percent of the outstanding shares of the corporations listed on the New York Stock Exchange are held by the pension plans. Given the fact that a properly regulated private pension system is still at its early stages, there is a great capacity for the pension plans industry to grow as a key institutional investor in Turkey.

In summary, despite the fact that the role of institutional investors in the Turkish economy is limited, total number of open accounts held by mutual funds and private pension plans has exceeded 5 million and total net asset value reached about 18 billion U.S. dollars by 2006, of which predominant share is invested in public debt instruments. Only 592 million U.S. dollars worth of net assets are held as common stocks in 2006 indicating limited degree of indirect stock ownership in Turkey.

6.5 Conclusion

Beginning with January 1980, the Turkish economy has started to liberalize its financial system and capital account regime. However the liberalization in the 1980s coincided with the period when Turkey started to experience drastic deterioration of the government fiscal balances. As a consequence, the financial system development and integration into the world financial markets have been constrained by the growing public sector borrowing requirement and the lack of price stability in the last two decades. The capital account liberalization enabled the Turkish banking system to function as a finance house for the increasing government borrowing needs by channeling the short-term funds borrowed from the international capital markets during the 1990s. The Turkish financial sector in return ceased to perform the traditional role of intermediation between the firms and households. The high interest rates offered by the government debt securities completely crowded out the private investment in the real sector.

Arbitrage-seeking inflows and outflows of capital determined the boom-bust cycles in the Turkish economy in the 1990s. The real GDP, private investment and consumption growth became dependent on the excessive bank lending, which was accompanied by the real appreciation of the domestic currency, increase in imports and the deterioration of current account balance followed by recurrent financial crises. Since the financial liberalization in 1989, Turkish economy has experienced three main financial crises in 1994, 1998 and 2001, which are triggered by the sudden and huge reversals in short-term capital flows.

With the implementation of a broad range of fiscal and monetary stabilization, and financial and public sector structural reforms under the auspices of the IMF-based disinflation program since 2001, the inflation and the nominal interest rates on government debt securities substantially declined in Turkey. The average inflation rate in consumer prices has fallen from 78 percent in the 1990s to 9.83 percent in 2006. Coupled with the resumed economic growth, these developments have gradually reduced the crowding-out effect, and increased the incentives for the private banks to invest in real sector and other financial products and services in Turkey. Since 2003, there is a clear upward trend in the availability of the banking sector credit to the private sector.

Given these economic developments during the 1987-2006 period and the important role played by the fiscal policies in shaping the development, functioning and structure of the Turkish financial system, this paper examines in detail the allocation of financial wealth and the main characteristics of the financial markets in Turkey.

The Turkish financial system has deepened following the financial liberalization and deregulation over the last 20 years. Nevertheless the most important form of financial asset still continued to be the bank deposits. Consistent with the chronic and high inflationary environment, the most prominent change was observed in the increase of the foreign currency denominated deposits that reached 18 percent of the total financial assets in 2006.

Starting from the 1980s, the increasing public deficits and their mode of financing resulted in the growing stock of outstanding public securities including government bonds and treasury bills. The lack of attractive capital market investment opportunities, limited development of non-bank financial institutions, and the crowding-out effect of excessive

government borrowing have contributed to the mobilization of formal savings mainly to the bank deposits and sovereign debt securities while informal savings have been driven to real estate and gold.

The paper also looks at the characteristics and the financial wealth allocation in non-bank financial institutions in Turkey such as the stock market and the institutional investors.

In comparison to the other emerging markets, the characteristics of the Istanbul Stock Exchange in terms of the market capitalization, value traded, turnover, and concentration resemble mainly the Latin American stock markets. The IMKB-100 index has been historically very volatile and this volatility has been mainly driven by the fact that the Istanbul Stock Exchange is very sensitive to economic conditions as well as development in the political and international relations of the country. When the investor profiles in the Istanbul Stock Exchange on the basis of portfolio sizes, nationality, age, gender and location are analyzed, the results show that the Istanbul Stock Exchange is characterized by the dominance of the foreign institutional investors in the total equity portfolio. On the other hand, the share of domestic institutional investors is very limited in comparison to the other world stock markets. The domestic investors are mainly composed of individuals with small portfolio investments. These findings clearly reveal that the stock ownership in Turkey is very limited and the stock market is one of the least preferred investment choices by the domestic investors.

One important characteristics of the Istanbul Stock Exchange is that the IMKB-100 index is strongly driven by the foreign portfolio equity investments due to the increase in the share of the foreign investors in total market value. The share of domestic investors has

fallen to 35 percent in 2006. As a consequence, movements of the stock market index are mainly driven by the stock transactions realized on behalf of the foreign investors. The stock market index captures the influence of capital inflows to the Turkish economy. Furthermore, the international economic conditions such as major developments in other emerging market economies are transmitted to the Turkish economy through the portfolio equity investment in the stock market.

Financial wealth allocation and portfolio choices by the institutional investment schemes such as mutual funds and private pension plans are also analyzed in the paper. In comparison to the other emerging market economies, the role of institutional investors in the Turkish economy is very limited. In 2006, roughly 6 percent of the financial assets of the domestic investors are invested in mutual funds and private pension plans. Consistent with the crowding-out in the economy, mutual funds and pension plans have predominantly invested in public debt instruments and repo transactions. Only 592 million U.S. dollars worth of net assets are held as common stocks by the institutional investors in 2006 indicating the limited degree of indirect stock ownership in Turkey. The lack of diversification in financial instruments and limited exposure of the institutional investors to equity and corporate debt markets show that the Turkish non-bank financial institutions have remained relatively underdeveloped.

Table 6.1: Domestic and Foreign Debt Outstanding

	Foreign Debt Stock (million USD)	Foreign Debt Stock (as a percentage of GDP)	Domestic Debt Stock (million USD)	Domestic Debt Stock (as a percentage of GDP)
1986	32,206	42.60	13,909	18.40
1987	40,326	46.39	16,908	19.45
1988	40,722	45.20	15,696	17.42
1989	41,751	39.01	18,142	16.95
1990	49,035	32.55	19,534	12.97
1991	50,489	33.49	19,241	12.76
1992	55,592	34.99	22,702	14.29
1993	67,356	37.54	24,716	13.78
1994	65,601	50.57	20,806	16.04
1995	73,278	43.28	22,292	13.17
1996	79,222	43.76	29,292	16.18
1997	84,236	44.53	30,688	16.22
1998	96,411	48.29	37,135	18.60
1999	102,979	56.02	42,437	23.09
2000	118,691	59.56	54,216	27.21
2001	113,591	78.21	84,857	58.42
2002	129,701	70.53	91,691	49.86
2003	144,301	60.03	139,262	57.94
2004	160,839	53.14	167,262	55.26
2005	169,000	46.51	182,265	50.16
2006	207,735	51.58	177,956	44.19

Source: State Planning Organization (DPT). GDP series are from WDI.

Table 6.2: Capital Inflows to Turkey

	Net Portfolio Equity Investment		Net Portfolio Debt Investment		Net Foreign Bank Loans		Per Capita GDP Growth
	million USD	% of GNP	million USD	% of GNP	million USD	% of GNP	%
1987	-25	-0.03	307	0.36	572	0.66	n.a.
1988	-6	-0.01	1,184	1.32	-1,190	-1.33	0.51
1989	-42	-0.04	1,428	1.33	-130	-0.12	4.68
1990	-45	-0.03	592	0.39	1,510	1.00	6.09
1991	56	0.04	567	0.38	-2,199	-1.48	-5.75
1992	300	0.19	2,111	1.33	-374	-0.24	0.46
1993	431	0.24	3,486	1.95	1,265	0.71	6.64
1994	994	0.77	164	0.13	-4,612	-3.57	-7.57
1995	120	0.07	117	0.07	1,692	1.00	5.6
1996	198	0.11	372	0.21	4,494	2.50	2.67
1997	-42	-0.02	1,676	0.89	1,256	0.66	3.34
1998	-539	-0.27	-6,172	-3.05	2,253	1.11	-2.86
1999	382	0.21	3,047	1.66	816	0.44	-11.84
2000	456	0.23	566	0.28	2,162	1.09	2.78
2001	-115	-0.08	-4,400	-3.11	-9,411	-6.65	-9.57
2002	-58	-0.03	-535	-0.30	-1,373	-0.76	7.2
2003	872	0.36	1,593	0.66	3,194	1.32	5.79
2004	1,402	0.47	6,621	2.21	1,240	0.41	8.76
2005	5,649	1.56	7,788	2.15	10,375	2.87	3.38
2006	1,897	0.47	5,476	1.37	690	0.17	6.43

Source: The net inflows of portfolio investment in equities, portfolio investment in debt securities and foreign bank loans are obtained from International Financial Statistics. GNP and GDP are obtained from Turkish State Statistics Office. Consumer Price Index (with 2000 base year) deflating the GDP series and population figures are obtained from the OECD Main Economic Indicators and the OECD Analytical Database respectively.

Table 6.3-a: Financial Asset Allocation
(million U.S. dollars)

	Financial Assets	Banking Sector			Private Sector Securities			Public Sector Securities				
	TOTAL	Foreign Currency Deposits	Turkish Lira Savings Deposits	Other Turkish Lira Deposits	Common Stocks	Corporate Bonds	Other	Government Bond	Treasury Bill	Revenue Sharing Certificates	Foreign Currency Indexed Bonds	Privatisation Bond
1986	22,789	2,187	7,575	7,681	1,053	174	14	1,999	1,088	489	529	0
1987	27,476	3,995	6,767	9,376	1,585	428	62	2,364	1,889	619	393	0
1988	24,972	4,139	6,955	7,145	1,728	298	71	2,692	1,402	323	221	0
1989	34,873	5,682	9,870	9,135	2,910	336	240	4,700	1,530	296	173	0
1990	43,390	6,728	11,109	11,372	4,945	475	93	6,423	1,868	273	102	0
1991	46,172	9,553	11,292	9,631	6,366	322	200	4,863	3,598	20	328	0
1992	54,176	11,178	10,607	9,533	5,743	195	1,155	10,097	4,938	0	729	0
1993	55,694	11,897	8,514	8,854	4,931	115	2,703	13,122	4,460	0	1,099	0
1994	47,720	14,082	8,492	6,177	2,843	37	527	6,060	7,919	530	1,054	0
1995	60,663	17,820	11,208	7,102	3,666	39	1,135	8,382	10,340	203	358	409
1996	81,097	24,442	16,110	9,939	3,951	25	130	11,629	14,212	41	127	491
1997	87,527	26,832	15,587	10,800	4,441	19	88	17,440	11,599	0	0	720
1998	109,286	30,616	20,546	14,353	6,031	18	23	18,457	18,678	0	0	564
1999	124,445	34,106	24,701	15,465	7,023	5	0	36,444	5,993	0	0	709
2000	148,374	37,724	26,628	19,014	10,222	2	0	51,153	3,063	0	0	568
2001	165,579	41,956	19,010	11,915	7,305	1	0	70,973	13,913	0	0	508
2002	181,592	45,698	21,171	14,316	8,062	0	0	69,042	22,649	0	0	654
2003	260,830	51,179	32,455	23,874	12,901	0	0	121,056	18,206	0	0	1,159
2004	324,332	58,936	46,260	30,923	18,766	0	0	144,707	22,556	0	0	2,185
2005	377,379	59,546	65,075	43,756	23,765	0	0	168,998	13,267	0	0	2,972
2006	404,767	73,899	77,950	43,239	28,962	85	9	171,167	6,789	0	0	2,668

Table 6.3-b: Size of Financial Assets in the Economy (as a percentage of GDP)

Financial Assets		Banking Sector			Private Sector Securities			Public Sector Securities				
	TOTAL	Foreign Currency Deposits	Turkish Lira Savings Deposits	Other Turkish Lira Deposits	Common Stocks	Corporate Bonds	Other	Government Bond	Treasury Bill	Revenue Sharing Certificates	Foreign Currency Indexed Bonds	Privatisation Bond
1986	30.15	2.89	10.02	10.16	1.39	0.23	0.02	2.64	1.44	0.65	0.70	0.00
1987	31.61	4.60	7.78	10.79	1.82	0.49	0.07	2.72	2.17	0.71	0.45	0.00
1988	27.72	4.59	7.72	7.93	1.92	0.33	0.08	2.99	1.56	0.36	0.24	0.00
1989	32.58	5.31	9.22	8.54	2.72	0.31	0.22	4.39	1.43	0.28	0.16	0.00
1990	28.80	4.47	7.37	7.55	3.28	0.32	0.06	4.26	1.24	0.18	0.07	0.00
1991	30.63	6.34	7.49	6.39	4.22	0.21	0.13	3.23	2.39	0.01	0.22	0.00
1992	34.10	7.04	6.68	6.00	3.61	0.12	0.73	6.35	3.11	0.00	0.46	0.00
1993	31.04	6.63	4.75	4.94	2.75	0.06	1.51	7.31	2.49	0.00	0.61	0.00
1994	36.78	10.85	6.55	4.76	2.19	0.03	0.41	4.67	6.10	0.41	0.81	0.00
1995	35.83	10.52	6.62	4.19	2.16	0.02	0.67	4.95	6.11	0.12	0.21	0.24
1996	44.79	13.50	8.90	5.49	2.18	0.01	0.07	6.42	7.85	0.02	0.07	0.27
1997	46.27	14.18	8.24	5.71	2.35	0.01	0.05	9.22	6.13	0.00	0.00	0.38
1998	54.74	15.34	10.29	7.19	3.02	0.01	0.01	9.25	9.36	0.00	0.00	0.28
1999	67.70	18.55	13.44	8.41	3.82	0.00	0.00	19.83	3.26	0.00	0.00	0.39
2000	74.46	18.93	13.36	9.54	5.13	0.00	0.00	25.67	1.54	0.00	0.00	0.29
2001	114.00	28.89	13.09	8.20	5.03	0.00	0.00	48.86	9.58	0.00	0.00	0.35
2002	98.75	24.85	11.51	7.79	4.38	0.00	0.00	37.55	12.32	0.00	0.00	0.36
2003	108.51	21.29	13.50	9.93	5.37	0.00	0.00	50.36	7.57	0.00	0.00	0.48
2004	107.15	19.47	15.28	10.22	6.20	0.00	0.00	47.81	7.45	0.00	0.00	0.72
2005	103.86	16.39	17.91	12.04	6.54	0.00	0.00	46.51	3.65	0.00	0.00	0.82
2006	100.51	18.35	19.36	10.74	7.19	0.02	0.00	42.50	1.69	0.00	0.00	0.66

Table 6.3-c: Percentage Distribution of Financial Assets

	Financial Assets	Banking Sector			Private Sector Securities			Public Sector Securities				
	TOTAL	Foreign Currency Deposits	Turkish Lira Savings Deposits	Other Turkish Lira Deposits	Common Stocks	Corporate Bonds	Other	Government Bond	Treasury Bill	Revenue Sharing Certificates	Foreign Currency Indexed Bonds	Privatisation Bond
1986	100.00	9.60	33.24	33.71	4.62	0.76	0.06	8.77	4.77	2.15	2.32	0.00
1987	100.00	14.54	24.63	34.12	5.77	1.56	0.22	8.60	6.87	2.25	1.43	0.00
1988	100.00	16.57	27.85	28.61	6.92	1.19	0.29	10.78	5.61	1.29	0.88	0.00
1989	100.00	16.29	28.30	26.20	8.35	0.96	0.69	13.48	4.39	0.85	0.50	0.00
1990	100.00	15.51	25.60	26.21	11.40	1.10	0.21	14.80	4.31	0.63	0.24	0.00
1991	100.00	20.69	24.46	20.86	13.79	0.70	0.43	10.53	7.79	0.04	0.71	0.00
1992	100.00	20.63	19.58	17.60	10.60	0.36	2.13	18.64	9.11	0.00	1.35	0.00
1993	100.00	21.36	15.29	15.90	8.85	0.21	4.85	23.56	8.01	0.00	1.97	0.00
1994	100.00	29.51	17.79	12.94	5.96	0.08	1.10	12.70	16.59	1.11	2.21	0.00
1995	100.00	29.38	18.48	11.71	6.04	0.06	1.87	13.82	17.05	0.34	0.59	0.68
1996	100.00	30.14	19.86	12.26	4.87	0.03	0.16	14.34	17.52	0.05	0.16	0.61
1997	100.00	30.66	17.81	12.34	5.07	0.02	0.10	19.93	13.25	0.00	0.00	0.82
1998	100.00	28.01	18.80	13.13	5.52	0.02	0.02	16.89	17.09	0.00	0.00	0.52
1999	100.00	27.41	19.85	12.43	5.64	0.00	0.00	29.29	4.82	0.00	0.00	0.57
2000	100.00	25.42	17.95	12.81	6.89	0.00	0.00	34.48	2.06	0.00	0.00	0.38
2001	100.00	25.34	11.48	7.20	4.41	0.00	0.00	42.86	8.40	0.00	0.00	0.31
2002	100.00	25.17	11.66	7.88	4.44	0.00	0.00	38.02	12.47	0.00	0.00	0.36
2003	100.00	19.62	12.44	9.15	4.95	0.00	0.00	46.41	6.98	0.00	0.00	0.44
2004	100.00	18.17	14.26	9.53	5.79	0.00	0.00	44.62	6.95	0.00	0.00	0.67
2005	100.00	15.78	17.24	11.59	6.30	0.00	0.00	44.78	3.52	0.00	0.00	0.79
2006	100.00	18.26	19.26	10.68	7.16	0.02	0.00	42.29	1.68	0.00	0.00	0.66

Source: Private and public securities are from Capital Markets Board of Turkey (SPK) Annual Report 2006; SPK Monthly Statistical Bulletin July 2007, and SPK Developments in Turkish Capital Markets Report 2007/I. Banking deposits are from Central Bank of Turkey and State Planning Organization Main Economic Indicators. Other Turkish Lira Deposits are composed of deposits of commercial, official and other institutions and savings certificates. Other private securities include commercial paper, asset backed securities, bank bills and bank guaranteed bills, profit and loss sharing certificates, and real estate certificates. Turkish Lira values are converted into U.S. dollars using purchase rate as of last day for each year. GDP in U.S. dollars is from World Development Indicators.

Table 6.4: Investment Portfolio Choices of Domestic and Foreign Investors (million U.S. dollars)

Domestic Investors																							
	TOTAL (million USD)	TOTAL (%)	Foreign Exchange Bank Deposits	(%)	Turkish Lira Bank Deposits	(%)	Repo	(%)	Government Bonds and Treasury Bills (Turkish Lira)	(%)	Government Bonds and Treasury Bills (Foreign Currency)	(%)	Eurobond	(%)	Mutual Funds	(%)	Special Finance Houses Participation Accounts	(%)	Common Stocks	(%)	Pension Funds	(%)
2003	168,022	100	49,384	29.39	54,216	32.27	2,206	1.31	32,125	19.12	1,637	0.97	3,114	1.85	14,227	8.47	2,891	1.72	8,191	4.87	31	0.02
2004	218,617	100	56,683	25.93	76,924	35.19	1,230	0.56	42,191	19.30	1,921	0.88	4,100	1.88	18,213	8.33	4,496	2.06	12,638	5.78	221	0.10
2005	257,531	100	56,917	22.10	108,109	41.98	1,106	0.43	39,839	15.47	1,316	0.51	3,979	1.55	21,872	8.49	6,343	2.46	17,141	6.66	908	0.35
2006	281,535	100	71,756	25.49	120,851	42.93	1,558	0.55	38,205	13.57	1,246	0.44	3,830	1.36	15,577	5.53	7,934	2.82	18,581	6.60	1,997	0.71

Foreign Investors										
	TOTAL (million USD)	TOTAL (%)	Common Stocks (Equities)	(%)	Government Bonds and Treasury Bills	(%)	Eurobond	(%)	Bank Deposits	(%)
2003	17,166	100	8,954	52.16	3,895	22.69	1,293	7.53	3,024	17.62
2004	33,542	100	16,141	48.12	12,570	37.48	1,135	3.38	3,696	11.02
2005	58,220	100	33,782	58.02	20,370	34.99	634	1.09	3,434	5.90
2006	65,544	100	34,897	53.24	26,019	39.70	555	0.85	4,073	6.21

Source: State Planning Organization (DPT) Developments in Financial Markets, January 2005, December 2006. Mutual funds data is from the Capital Markets Board of Turkey and data for common stocks holdings of domestic investors is from the Central Registry Agency (MKK) and Takasbank. New Turkish Lira values are converted using the Central Bank U.S. dollar purchase rate as of last day of December for each year. Government Bonds and Treasury Bills represent the market value of public securities held under the custody of banks on behalf of domestic investors. Common Stocks also include the market value of equities held in the portfolios of banks and financial institutions.

Table 6.5: Estimated Gold Stock

Estimated Gold Stock	2001	2002	2003	2004	2005	2006
Million New Turkish Lira	81,317	104,679	109,429	114,555	131,682	170,383
Billion USD	56.5	64	78.4	85.5	98.1	120.6

Source: Association of Capital Market Intermediary Institutions of Turkey (TSPAKB) Capital Markets Factsheet

Table 6.6: Market Capitalization as Percentage of GDP

	LATIN AMERICA							EAST ASIA					
	TURKEY	ARGENTINA	BRAZIL	CHILE	COLOMBIA	MEXICO	VENEZUELA	INDIA	INDONESIA	KOREA	MALAYSIA	PHILIPPINES	THAILAND
1986	1.24	1.43	15.70	22.92	2.35	4.60	2.56	5.58	0.10	12.51	53.34	6.72	6.68
1987	3.71	1.37	5.75	25.55	3.45	5.97	5.02	6.24	0.09	23.50	57.58	8.88	10.85
1988	1.26	1.60	9.73	27.80	2.92	7.53	3.11	8.12	0.28	50.27	66.11	11.30	14.29
1989	6.34	5.51	9.59	33.77	2.87	10.11	3.49	9.35	2.22	61.16	102.56	28.10	35.50
1990	12.66	2.31	3.54	43.24	3.52	12.46	17.78	12.17	7.06	41.93	110.42	13.38	28.00
1991	10.42	9.76	10.50	76.83	9.79	31.22	21.68	17.89	5.32	31.27	119.32	22.45	36.46
1992	6.25	8.14	11.59	66.66	11.54	38.24	13.00	26.67	8.65	32.57	158.92	26.04	52.27
1993	20.90	18.57	22.69	93.56	16.56	49.77	13.78	35.77	20.86	38.50	329.37	74.17	104.40
1994	16.65	14.32	34.65	123.64	17.17	30.88	7.27	39.53	26.71	45.29	267.55	86.63	90.97
1995	12.27	14.64	19.20	103.52	19.34	31.63	4.88	35.81	32.94	35.19	250.73	79.41	84.28
1996	16.58	16.42	25.84	87.03	17.64	32.00	14.73	31.81	40.03	24.89	304.58	97.35	54.94
1997	32.29	20.23	29.32	87.00	18.31	39.00	16.99	31.36	13.49	8.92	93.45	38.08	15.60
1998	16.85	15.16	19.07	65.34	13.56	21.78	8.31	25.42	23.16	35.07	136.55	54.19	31.20
1999	61.32	29.59	38.84	93.47	13.43	32.01	7.63	40.98	45.78	88.83	183.76	55.34	47.71
2000	34.96	58.43	35.09	80.31	11.41	21.53	6.94	32.17	16.26	29.05	129.47	34.19	24.03
2001	32.46	71.64	33.72	82.12	16.12	20.30	5.06	23.08	14.34	45.66	136.37	29.80	31.46
2002	18.47	101.37	24.47	70.74	11.89	15.89	4.26	25.79	15.33	45.64	130.17	24.15	35.60
2003	28.45	30.04	42.46	116.63	17.96	19.17	4.57	46.37	23.28	54.20	161.91	29.59	83.46
2004	32.48	30.32	49.77	122.14	25.72	25.16	5.44	55.74	28.52	62.99	160.40	33.39	71.52
2005	44.46	33.56	53.79	114.75	37.43	31.15	3.46	68.64	28.38	90.74	138.59	40.82	70.10
2006	40.33	37.25	66.58	119.69	41.38	41.51	4.54	90.36	38.11	94.05	158.02	58.48	67.67

Source: Market capitalization in U.S. dollars is obtained from Standard and Poor's Emerging Markets Database and IFC-Standard and Poor's Global Stock Markets Factbook (various years); annual GDP in current U.S. dollars is from World Development Indicators.

Table 6.7: Value Traded as Percentage of GDP

	LATIN AMERICA							EAST ASIA					
	TURKEY	ARGENTINA	BRAZIL	CHILE	COLOMBIA	MEXICO	VENEZUELA	INDIA	INDONESIA	KOREA	MALAYSIA	PHILIPPINES	THAILAND
1986	0.02	0.28	10.78	1.68	0.14	2.97	0.09	4.43	0.002	9.78	4.18	1.88	2.63
1987	0.13	0.23	3.27	2.40	0.22	11.09	0.33	2.47	0.004	17.80	11.90	4.59	9.17
1988	0.11	0.47	5.44	2.47	0.16	3.13	0.38	4.21	0.005	42.24	7.44	2.31	9.08
1989	0.75	2.50	3.62	3.05	0.19	2.80	0.22	5.95	0.53	52.62	17.73	5.66	18.62
1990	3.88	0.60	1.21	2.48	0.18	4.65	4.75	6.92	3.49	28.79	24.69	2.74	26.82
1991	5.68	2.54	3.28	5.22	0.49	10.09	6.26	8.67	2.28	27.73	21.69	3.32	30.63
1992	5.15	6.85	5.26	4.56	1.13	12.26	4.50	8.48	2.81	35.19	36.74	5.86	64.65
1993	12.95	4.37	13.10	5.86	1.31	15.49	3.22	7.95	5.80	58.46	229.71	12.48	69.54
1994	16.72	4.42	20.05	9.54	2.68	19.67	1.66	8.49	6.67	67.56	169.79	21.77	55.48
1995	30.35	1.78	10.30	15.52	1.36	11.99	0.68	6.18	7.13	35.81	86.48	19.87	33.95
1996	20.34	1.61	13.35	11.17	1.40	12.93	1.87	24.95	14.14	31.79	172.10	30.80	24.42
1997	29.62	8.78	23.24	8.97	1.74	13.05	4.45	38.64	19.90	33.32	153.03	24.76	16.04
1998	34.29	5.29	17.38	5.57	1.55	8.11	1.68	35.82	11.12	42.14	41.41	15.53	19.33
1999	44.21	2.74	14.87	9.42	0.82	7.49	0.79	61.90	14.22	185.41	61.29	26.05	34.01
2000	89.93	2.10	15.72	8.09	0.47	7.80	0.59	110.78	8.67	208.67	64.77	10.80	18.95
2001	53.66	1.56	11.79	6.16	0.43	6.44	0.32	52.12	6.02	146.08	23.60	4.42	30.94
2002	38.43	1.33	9.53	4.64	0.34	4.27	0.11	38.81	6.67	144.84	29.03	4.04	37.79
2003	41.44	3.79	10.94	8.84	0.51	3.68	0.18	47.32	6.29	112.26	48.21	3.31	68.22
2004	48.71	4.99	14.10	12.09	1.49	6.27	0.40	54.48	10.73	93.89	50.55	4.23	68.14
2005	55.39	8.97	17.48	15.87	5.18	6.87	0.17	55.00	14.60	152.00	38.14	7.07	50.67
2006	56.54	2.12	23.83	19.72	8.34	9.54	0.37	70.45	13.40	150.91	44.69	9.62	45.13

Source: Value traded in U.S. dollars is obtained from Standard and Poor's Emerging Markets Database and IFC-Standard and Poor's Global Stock Markets Factbook (various years). Annual GDP in current U.S. dollars is from World Development Indicators.

Table 6.8: Turnover Ratio

	LATIN AMERICA							EAST ASIA					
	TURKEY	ARGENTINA	BRAZIL	CHILE	COLOMBIA	MEXICO	VENEZUELA	INDIA	INDONESIA	KOREA	MALAYSIA	PHILIPPINES	THAILAND
1986	2.46	16.08	74.41	9.58	7.60	67.96	4.15	77.02	1.37	103.40	7.75	42.52	47.82
1987	5.07	14.73	41.53	10.65	7.67	179.29	8.07	43.90	4.23	107.44	22.61	61.28	111.71
1988	5.46	28.95	37.84	10.14	5.27	51.70	10.93	59.17	2.54	128.06	12.55	24.38	78.57
1989	18.96	24.52	17.88	9.92	6.49	33.35	5.43	68.81	42.68	101.49	21.84	29.07	78.47
1990	42.45	33.63	23.60	6.31	5.63	44.05	43.02	65.88	75.78	61.27	24.63	13.55	92.62
1991	52.90	45.34	22.03	8.79	7.06	47.89	33.10	56.78	40.12	82.25	20.16	18.85	102.16
1992	68.23	83.86	31.51	6.74	11.28	37.44	27.85	36.96	41.22	114.84	27.31	24.85	153.64
1993	80.88	33.04	32.58	7.40	9.84	36.78	23.65	27.46	40.55	172.18	94.27	25.07	91.52
1994	94.16	28.13	83.40	9.48	18.90	44.50	18.23	24.23	29.44	174.15	60.13	29.81	60.94
1995	225.98	12.31	47.85	15.31	7.80	32.98	9.76	17.08	25.27	97.76	35.86	26.15	41.38
1996	133.30	10.62	61.07	12.02	8.06	42.54	19.64	76.66	40.75	110.35	65.09	36.50	36.74
1997	113.49	49.50	85.81	10.48	10.17	39.68	31.04	122.27	64.21	167.27	72.61	34.76	39.22
1998	154.88	30.24	70.95	7.25	9.56	28.55	14.23	128.96	59.40	173.81	30.89	31.14	71.22
1999	102.76	12.04	52.97	11.39	5.81	29.04	10.18	192.55	46.97	327.91	39.76	46.49	90.63
2000	206.19	4.77	43.48	9.36	3.85	32.28	8.90	308.24	32.92	362.50	44.59	15.84	53.20
2001	161.53	2.33	34.50	7.49	3.17	31.55	5.49	191.40	39.28	358.50	17.53	6.76	109.32
2002	170.12	1.52	32.00	6.03	2.39	23.85	2.46	164.97	47.57	338.40	22.65	7.56	114.60
2003	192.39	6.24	32.43	10.25	3.44	20.75	3.55	138.54	34.42	235.70	34.31	8.51	117.80
2004	182.32	17.83	34.85	12.14	7.68	29.36	9.03	115.47	43.32	174.01	33.42	14.03	95.80
2005	153.90	29.69	37.19	15.53	17.81	25.69	4.58	93.55	54.82	210.79	26.85	20.38	75.19
2006	145.09	6.47	42.03	18.71	22.91	27.68	9.11	94.41	43.48	169.83	32.04	20.87	69.58

Source: Standard and Poor's Emerging Markets Database and IFC-Standard and Poor's Global Stock Markets Factbook (various years).

Table 6.9: Number of Listed Companies

	LATIN AMERICA							EAST ASIA					
	TURKEY	ARGENTINA	BRAZIL	CHILE	COLOMBIA	MEXICO	VENEZUELA	INDIA	INDONESIA	KOREA	MALAYSIA	PHILIPPINES	THAILAND
1986	40	217	592	231	99	155	108	1912	24	355	223	130	98
1987	50	206	590	209	96	190	110	2106	24	389	232	138	125
1988	50	186	589	205	86	203	47	2238	24	502	238	141	141
1989	50	178	592	213	82	203	74	2407	57	626	251	144	175
1990	110	179	581	215	80	199	76	2435	125	669	282	153	214
1991	134	174	570	221	83	209	87	2556	141	686	321	161	276
1992	145	175	565	245	80	195	91	2781	155	688	369	170	305
1993	152	180	550	263	89	190	93	3263	174	693	410	180	347
1994	176	156	544	279	113	206	90	4413	216	699	478	189	389
1995	205	149	543	284	190	185	90	5398	238	721	529	205	416
1996	229	147	551	283	189	193	87	5999	253	760	621	216	454
1997	257	136	536	295	189	198	91	5843	282	1135	708	221	431
1998	277	130	527	287	163	194	94	5860	288	1079	736	221	418
1999	285	129	478	285	145	188	87	5863	277	1178	757	226	392
2000	315	127	459	258	126	179	85	5937	290	1308	795	230	381
2001	310	111	428	249	123	168	63	5795	316	1409	809	232	452
2002	288	83	399	254	114	166	59	5650	331	1518	865	235	400
2003	284	107	367	240	114	159	54	5644	333	1563	897	234	419
2004	296	104	357	239	114	152	59	4730	331	1573	962	233	465
2005	302	101	381	245	114	151	50	4763	335	1620	1021	235	468
2006	314	103	392	244	114	131	53	4796	344	1694	1027	238	476

Source: Standard and Poor's Emerging Markets Database and IFC-Standard and Poor's Global Stock Markets Factbook (various years).

Table 6.10: Market Concentration: Ten Largest Companies in Comparison to Total Domestic Market Capitalization and Value Traded (in percent)

2006	Market Capitalization	Value Traded
Nasdaq	29.50	32.60
NYSE	16.10	5.90
Istanbul SE, Turkey	48.70	43.20
Buenos Aires SE, Argentina	77.80	76.80
Sao Paulo SE, Brazil	52.20	39.20
Santiago SE, Chile	48.30	46.10
Colombia SE, Colombia	67.40	64.70
Mexico SE, Mexico	76.90	70.70
Bombay SE, India	32.20	19.60
Jakarta SE, Indonesia	53.50	54.70
Korea Exchange, Korea	36.30	20.90
Bursa Malaysia, Malaysia	36.10	25.10
Philippine SE, Philippines	56.50	52.60
Thailand SE, Thailand	44.20	30.40

Source: World Federation of Exchanges Annual Report and Statistics 2006

Table 6.11: Financial Intermediation to the Private Sector

Average 1995-2005	Domestic Credit to Private Sector / GDP (%)	Stock Market Capitalization / GDP (%)	Private Bond Market Capitalization / GDP (%)
United States	154.76	114.02	90.92
Turkey	21.11	24.84	0.51
Argentina	17.89	29.66	4.50
Brazil	47.27	28.41	9.40
Chile	67.28	89.19	15.95
Colombia	30.04	16.34	0.47
Mexico	22.48	28.26	2.81
Venezuela	15.66	9.74	0.00
India	27.73	34.33	0.73
Indonesia	38.91	21.88	1.46
Korea	79.02	44.42	39.58
Malaysia	155.36	175.72	38.54
Philippines	38.73	46.19	0.16
Thailand	114.96	53.88	10.75

Sources: Domestic Credit to GDP ratio is from World Development Indicators. Stock Market Capitalization to GDP ratio is taken from IFC-Standard and Poor's Emerging Market Factsbook. Private Bond Market Capitalization to GDP ratios are obtained from Financial Structure Dataset by Beck, Demirgüç-Kunt and Levine (2007). The shares as a percentage of GDP are averaged over the 1995-2005 period.

Table 6.12-a: IMKB-100 Index and Annual Returns

	IMKB-100			
	YTL Based		USD Based	
	(Jan. 1986=1)	Annual Return (%)	(Jan. 1986=100)	Annual Return (%)
1986	1.71	70.86	131.53	31.53
1987	6.73	293.89	384.57	192.38
1988	3.74	-44.44	119.82	-68.84
1989	22.18	493.07	560.57	367.84
1990	32.56	46.81	642.63	14.64
1991	43.69	34.20	501.50	-21.96
1992	40.04	-8.35	272.61	-45.64
1993	206.83	416.53	833.28	205.67
1994	272.57	31.79	413.27	-50.40
1995	400.25	46.84	382.62	-7.42
1996	975.89	143.82	534.01	39.57
1997	3451.00	253.63	982.00	83.89
1998	2597.91	-24.72	484.01	-50.71
1999	15208.78	485.42	1654.17	241.77
2000	9437.21	-37.95	817.49	-50.58
2001	13782.76	46.05	557.52	-31.80
2002	10369.92	-24.76	368.26	-33.95
2003	18625.02	79.61	778.43	111.38
2004	24971.68	34.08	1075.12	38.11
2005	39777.70	59.29	1726.23	60.56
2006	39117.46	-1.66	1620.59	-6.12

Table 6.12-b: Turkish Lira Based IMKB-100 Index Maximum and Minimum Monthly Returns

	Maximum Return (%)		Minimum Return (%)		Standard Deviation of Monthly Returns (%)
1986	Feb-86	19.87	Mar-86	-3.44	6.93
1987	Jul-87	126.77	Dec-87	-24.43	40.18
1988	Jan-88	27.45	Feb-88	-15.94	12.69
1989	Sep-89	68.41	Jul-89	-11.87	23.41
1990	Jan-90	64.19	Nov-90	-28.74	23.49
1991	Nov-91	47.75	Apr-91	-21.37	20.23
1992	Jun-92	33.66	Feb-92	-25.61	14.88
1993	Feb-93	35.15	Jul-93	-6.50	15.01
1994	Jun-94	34.02	Feb-94	-25.37	14.80
1995	Mar-95	36.79	Nov-95	-15.57	14.75
1996	Jan-96	23.65	Jul-96	-10.11	10.67
1997	Jan-97	64.47	Apr-97	-11.53	19.78
1998	Apr-98	28.70	Aug-98	-39.03	16.97
1999	Dec-99	79.78	Aug-99	-13.56	26.10
2000	Apr-00	20.64	Nov-00	-35.39	15.77
2001	Apr-01	54.15	Sep-01	-22.81	22.35
2002	Nov-02	29.74	Dec-02	-22.03	14.42
2003	Dec-03	27.42	Mar-03	-18.14	13.36
2004	Dec-04	11.05	Apr-04	-10.74	7.20
2005	Nov-05	19.16	Mar-05	-10.00	8.11
2006	Jan-06	12.10	May-06	-13.10	7.59

Notes: Table displays the end of December values for each year.
Source: Istanbul Stock Exchange (IMKB)

Table 6.13: Breakdown of Identified and Active Accounts Held under the Custody of Clearing and Settlement Center and Central Registry Agency of Istanbul Stock Exchange

Investor Category		Number of Active Accounts	Share in Total Number of Stocks in Active Accounts (%)	Portfolio Size of Active Accounts (million USD)	Share in Total Portfolio Size of Active Accounts (%)
Foreign/Fund	5-Apr-02	71	16.55	2,350	22.18
	31-Jan-03	205	11.54	1,382	16.55
	2-Jan-04	400	17.49	3,954	22.79
	3-Jan-05	514	19.42	7,006	24.72
	31-Dec-05	877	25.23	16,625	31.69
	31-Dec-06	1,061	22.02	14,584	27.39
Foreign/Other	5-Apr-02	8	0.55	59	0.56
	31-Jan-03	7	0.37	32	0.39
	2-Jan-04	8	0.18	26	0.15
	3-Jan-05	10	0.14	38	0.13
	31-Dec-05	10	0.10	51	0.10
	31-Dec-06	17	0.05	23	0.04
Foreign/Corporate	5-Apr-02	418	18.69	2,637	24.89
	31-Jan-03	398	17.32	2,160	25.88
	2-Jan-04	763	19.95	4,854	27.97
	3-Jan-05	841	21.09	8,397	29.63
	31-Dec-05	1,195	26.13	17,201	32.79
	31-Dec-06	1,358	29.33	19,894	37.37
Foreign/Individual	5-Apr-02	4,099	0.60	49	0.46
	31-Jan-03	4,042	0.65	51	0.61
	2-Jan-04	3,837	0.57	85	0.49
	3-Jan-05	3,733	0.56	108	0.38
	31-Dec-05	3,558	0.39	135	0.26
	31-Dec-06	3,844	0.35	132	0.25
Domestic/Fund	5-Apr-02	126	0.97	133	1.25
	31-Jan-03	132	1.00	110	1.31
	2-Jan-04	135	1.28	282	1.63
	3-Jan-05	140	1.01	328	1.16
	31-Dec-05	193	1.20	653	1.24
	31-Dec-06	208	1.09	567	1.06
Domestic/Other	5-Apr-02	188	1.57	127	1.20
	31-Jan-03	185	1.81	105	1.26
	2-Jan-04	184	2.06	218	1.26
	3-Jan-05	187	3.03	1,021	3.60
	31-Dec-05	43601*	2.57	1,713	3.26
	31-Dec-06	233	1.90	1,101	2.07
Domestic/Corporate	5-Apr-02	2,496	10.75	687	6.48
	31-Jan-03	2,559	11.23	730	8.75
	2-Jan-04	2,513	9.20	1,277	7.36
	3-Jan-05	2,541	10.72	2,200	7.76
	31-Dec-05	2,419	10.32	4,529	8.63
	31-Dec-06	2,757	12.33	5,808	10.91
Domestic/Individual	5-Apr-02	1,131,633	50.33	4,555	42.99
	31-Jan-03	1,097,200	56.07	3,778	45.26
	2-Jan-04	1,025,069	49.26	6,656	38.36
	3-Jan-05	1,001,190	44.03	9,239	32.61
	31-Dec-05	955,184	34.49	11,757	22.41
	31-Dec-06	1,011,968	32.93	11,132	20.91
Total Identified Active Accounts	5-Apr-02	1,139,039	100.00	10,597	100.00
	31-Jan-03	1,104,728	100.00	8,348	100.00
	2-Jan-04	1,032,909	100.00	17,352	100.00
	3-Jan-05	1,009,156	100.00	28,336	100.00
	31-Dec-05	1,006,993	100.00	52,465	100.00
	31-Dec-06	1,021,446	100.00	53,241	100.00

Notes: * Unidentified accounts are included in this number Source: Central Registry Agency (MKK) and Association of Capital Market Intermediary Institutions of Turkey (TSPAKB)

Table 6.14-a: Breakdown of Investors by Category, Portfolio Size, and Nationality

Number of Total Investors Categorised by Portfolio Sizes December 31, 2006							
		Total		Domestic		Foreign	
Investor Category	Portfolio Size New Turkish Lira	Number of Investors	Portfolio Size million New Turkish Lira (million USD)	Number of Investors	Portfolio Size million New Turkish Lira (million USD)	Number of Investors	Portfolio Size million New Turkish Lira (million USD)
Total Identified Active Investors	0,01-10.000	771,646	1,017 720	768,462	1,013 717	3,184	5 3
	10.001-50.000	111,003	2,455 1,737	110,409	2,441 1,727	594	14 10
	50.001-100.000	20,922	1,461 1,034	20,745	1,448 1,025	177	13 9
	100.001-500.000	17,930	3,612 2,556	17,570	3,523 2,493	360	89 63
	500.001-1.000.000	2,304	1,604 1,135	2,122	1,469 1,040	182	135 95
	>1.000.001	3,295	65,086 46,059	1,791	16,401 11,606	1,504	48,685 34,453
	Total	927,100	75,235 53,241	921,099	26,295 18,608	6,001	48,940 34,633
Investment Fund	0,01-10.000	78	0.04 0.03	29	0.02 0.01	49	0.02 0.02
	10.001-50.000	22	1 0.46	12	0.38 0.27	10	0.27 0.19
	50.001-100.000	25	2 1	7	1 0.41	18	1 1
	100.001-500.000	146	40 28	36	10 7	110	29 21
	500.001-1.000.000	112	85 60	25	19 13	87	66 47
	>1.000.001	811	21,282 15,061	97	771 546	714	20,511 14,515
	Total	1,194	21,409 15,151	206	801 567	988	20,608 14,584
Corporate	0,01-10.000	1,368	1 1	1,205	1 1	163	0.13 0.09
	10.001-50.000	224	6 4	182	4 3	42	1 1
	50.001-100.000	108	8 5	78	6 4	30	2 1
	100.001-500.000	263	71 50	155	40 29	108	31 22
	500.001-1.000.000	147	106 75	72	52 37	75	54 38
	>1.000.001	996	36,128 25,566	234	8,104 5,735	762	28,024 19,831
	Total	3,106	36,320 25,702	1,926	8,208 5,808	1,180	28,112 19,894
Other Institutions	0,01-10.000	68	0.10 0.07	63	0.10 0.07	5	0.001 0.001
	10.001-50.000	33	1 1	31	1 1	2	0.04 0.03
	50.001-100.000	13	1 1	12	1 1	1	0.09 0.06
	100.001-500.000	24	5 4	22	5 4	2	0.48 0.34
	500.001-1.000.000	13	10 7	9	7 5	4	3 2
	>1.000.001	46	1,571 1,112	43	1,542 1,091	3	29 21
	Total	197	1,588 1,124	180	1,555 1,101	17	33 23
Individual	0,01-10.000	770,132	1,016 719	767,165	1,011 716	2,967	5 3
	10.001-50.000	110,724	2,448 1,732	110,184	2,435 1,723	540	12 9
	50.001-100.000	20,776	1,450 1,026	20,648	1,441 1,020	128	9 7
	100.001-500.000	17,497	3,496 2,474	17,357	3,468 2,454	140	28 20
	500.001-1.000.000	2,032	1,403 993	2,016	1,392 985	16	11 8
	>1.000.001	1,442	6,105 4,320	1,417	5,984 4,235	25	121 86
	Total	922,603	15,918 11,264	918,787	15,731 11,132	3,816	187 132

Source: Association of Capital Market Intermediary Institutions of Turkey (TSPAKB)

Table 6.14-b: Percentage Distribution of Investors by Category, Portfolio Size, and Nationality

Percentage Distribution of Total Investors Categorised by Portfolio Sizes December 31, 2006							
		Total		Domestic		Foreign	
Investor Category	Portfolio Size (NTL)	Number of Investors	Portfolio Size (%)	Number of Investors	Portfolio Size (%)	Number of Investors	Portfolio Size (%)
Total Identified Active Investors	0,01-10.000	83.23	1.35	83.43	3.85	53.06	0.01
	10.001-50.000	11.97	3.26	11.99	9.28	9.90	0.03
	50.001-100.000	2.26	1.94	2.25	5.51	2.95	0.03
	100.001-500.000	1.93	4.80	1.91	13.40	6.00	0.18
	500.001-1.000.000	0.25	2.13	0.23	5.59	3.03	0.28
	>1.000.001	0.36	86.51	0.19	62.37	25.06	99.48
		100.00	100.00	100.00	100.00	100.00	100.00
	Total	100.00	100.00	99.35	34.95	0.65	65.05
Investment Fund	0,01-10.000	6.53	0.0002	14.08	0.003	4.96	0.0001
	10.001-50.000	1.84	0.003	5.83	0.05	1.01	0.001
	50.001-100.000	2.09	0.01	3.40	0.07	1.82	0.01
	100.001-500.000	12.23	0.18	17.48	1.26	11.13	0.14
	500.001-1.000.000	9.38	0.40	12.14	2.34	8.81	0.32
	>1.000.001	67.92	99.41	47.09	96.27	72.27	99.53
		100.00	100.00	100.00	100.00	100.00	100.00
	Total	0.13	28.46	0.02	1.06	0.11	27.39
Corporate	0,01-10.000	44.04	0.004	62.56	0.01	13.81	0.00
	10.001-50.000	7.21	0.02	9.45	0.05	3.56	0.00
	50.001-100.000	3.48	0.02	4.05	0.07	2.54	0.01
	100.001-500.000	8.47	0.20	8.05	0.49	9.15	0.11
	500.001-1.000.000	4.73	0.29	3.74	0.63	6.36	0.19
	>1.000.001	32.07	99.47	12.15	98.74	64.58	99.69
		100.00	100.00	100.00	100.00	100.00	100.00
	Total	0.34	48.28	0.21	10.91	0.13	37.37
Other Institutions	0,01-10.000	34.52	0.01	35.00	0.01	29.41	0.004
	10.001-50.000	16.75	0.05	17.22	0.05	11.76	0.12
	50.001-100.000	6.60	0.06	6.67	0.06	5.88	0.28
	100.001-500.000	12.18	0.34	12.22	0.32	11.76	1.44
	500.001-1.000.000	6.60	0.65	5.00	0.45	23.53	10.26
	>1.000.001	23.35	98.89	23.89	99.12	17.65	87.90
		100.00	100.00	100.00	100.00	100.00	100.00
	Total	0.02	2.11	0.02	2.07	0.002	0.04
Individual	0,01-10.000	83.47	6.38	83.50	6.43	77.75	2.47
	10.001-50.000	12.00	15.38	11.99	15.48	14.15	6.60
	50.001-100.000	2.25	9.11	2.25	9.16	3.35	4.95
	100.001-500.000	1.90	21.96	1.89	22.04	3.67	15.09
	500.001-1.000.000	0.22	8.81	0.22	8.85	0.42	6.05
	>1.000.001	0.16	38.35	0.15	38.04	0.66	64.85
		100.00	100.00	100.00	100.00	100.00	100.00
	Total	99.51	21.16	99.10	20.91	0.41	0.25

Table 6.15-a: Breakdown of Individual Investors and Portfolio Sizes by Age Groups in 2006

Breakdown of Individual Investors and Portfolio Sizes by Age Groups											
		Total Domestic Investors		0-19 Years of Age		20-39 Years of Age		40-59 Years of Age		60 years and over	
				Domestic		Domestic		Domestic		Domestic	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
		669,710	249,077	2,275	1,531	259,876	85,910	334,059	127,232	73,500	34,404
	Portfolio Size (NTL)	Number of Investors	Total Size million NTL (million USD)	Number of Investors	Total Size million NTL (million USD)	Number of Investors	Total Size million NTL (million USD)	Number of Investors	Total Size million NTL (million USD)	Number of Investors	Total Size million NTL (million USD)
Domestic	0,01-10.000	767,165	1,011	3,242	4	302,824	366	378,059	512	83,040	129
			716		3		259		362		91
	10.001-50.000	110,184	2,435	389	8	33,376	710	60,038	1,345	16,381	372
			1,723		6		502		952		263
	50.001-100.000	20,648	1,441	83	6	5,096	355	11,749	819	3,720	262
			1,020		4		251		580		185
	100.001-500.000	17,357	3,468	79	15	3,855	754	9,647	1,913	3,776	786
			2,454		11		533		1,354		556
	500.001-1.000.000	2,016	1,392	5	4	390	270	1,081	741	540	377
			985		3		191		524		267
	>1.000.001	1,417	5,984	8	69	245	625	717	2,844	447	2,445
			4,235		49		442		2,013		1,731
		918,787	15,731	3,806	107	345,786	3,080	461,291	8,175	107,904	4,370
			11,132		75		2,179		5,785		3,093
		Total Foreign Investors		0-19 Years of Age		20-39 Years of Age		40-59 Years of Age		60 years and over	
				Foreign		Foreign		Foreign		Foreign	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
		2,678	1,138	19	5	906	364	1,298	577	455	192
	Portfolio Size (NTL)	Number of Investors	Total Size million NTL (million USD)	Number of Investors	Total Size million NTL (million USD)	Number of Investors	Total Size million NTL (million USD)	Number of Investors	Total Size million NTL (million USD)	Number of Investors	Total Size million NTL (million USD)
Foreign	0,01-10.000	2,967	5	17	0.04	1,051	1	1,429	2	470	1
			3		0.03		1		2		1
	10.001-50.000	540	12	5	0.09	144	3	280	6	111	3
			9		0.06		2		4		2
	50.001-100.000	128	9	2	0.13	35	2	74	5	17	1
			7		0.09		2		4		1
	100.001-500.000	140	28			34	6	69	14	37	8
			20				4		10		6
	500.001-1.000.000	16	11			3	2	7	4	6	4
			8				2		3		3
	>1.000.001	25	121			3	6	16	98	6	17
			86				4		69		12
		3,816	187	24	0.26	1,270	21	1,875	130	647	35
			132		0.18		15		92		24
	Total Individual Investors	922,603	15,918	3,830	107	347,056	3,101	463,166	8,305	108,551	4,405

Source: Association of Capital Market Intermediary Institutions of Turkey (TSPAKB)

Table 6.15-b: Percentage Breakdown of Individual Investors and Portfolio Sizes by Age Groups in 2006

Percentage Breakdown of Individual Investors and Portfolio Sizes by Age Groups											
		Total Domestic Investors		0-19 Years of Age		20-39 Years of Age		40-59 Years of Age		60 years and over	
				Domestic		Domestic		Domestic		Domestic	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
		72.89	27.11	0.25	0.17	28.28	9.35	36.36	13.85	8.00	3.74
	Portfolio Size (NTL)	Number of Investors	Total Size (%)	Number of Investors	Total Size (%)	Number of Investors	Total Size (%)	Number of Investors	Total Size (%)	Number of Investors	Total Size (%)
	0,01-10.000	83.50	6.43	85.18	3.72	87.58	11.89	81.96	6.26	76.96	2.95
	10.001-50.000	11.99	15.48	10.22	7.92	9.65	23.05	13.02	16.45	15.18	8.51
Domestic	50.001-100.000	2.25	9.16	2.18	5.28	1.47	11.51	2.55	10.02	3.45	5.99
	100.001-500.000	1.89	22.04	2.08	14.18	1.11	24.48	2.09	23.40	3.50	17.98
	500.001-1.000.000	0.22	8.85	0.13	3.89	0.11	8.76	0.23	9.06	0.50	8.62
	>1.000.001	0.15	38.04	0.21	65.01	0.07	20.30	0.16	34.79	0.41	55.96
		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
		99.59	98.83	0.41	0.68	37.64	19.58	50.21	51.96	11.74	27.78
		Total Foreign Investors		0-19 Years of Age		20-39 Years of Age		40-59 Years of Age		60 years and over	
				Foreign		Foreign		Foreign		Foreign	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
		70.18	29.82	0.50	0.13	23.74	9.54	34.01	15.12	11.92	5.03
	Portfolio Size (NTL)	Number of Investors	Total Size (%)	Number of Investors	Total Size (%)	Number of Investors	Total Size (%)	Number of Investors	Total Size (%)	Number of Investors	Total Size (%)
	0,01-10.000	77.75	2.47	70.83	17.22	82.76	6.41	76.21	1.86	72.64	2.22
	10.001-50.000	14.15	6.60	20.83	33.36	11.34	15.52	14.93	4.79	17.16	7.70
Foreign	50.001-100.000	3.35	4.95	8.33	49.42	2.76	11.48	3.95	4.14	2.63	3.63
	100.001-500.000	3.67	15.09	0.00	0.00	2.68	27.34	3.68	10.90	5.72	23.41
	500.001-1.000.000	0.42	6.05	0.00	0.00	0.24	11.37	0.37	3.39	0.93	12.82
	>1.000.001	0.66	64.85	0.00	0.00	0.24	27.88	0.85	74.92	0.93	50.23
		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
		0.41	1.17	0.63	0.14	33.28	11.47	49.14	69.87	16.95	18.53
	Total Individual Investors	100.00	100.00	0.42	0.67	37.62	19.48	50.20	52.17	11.77	27.67

Table 6.16: Distribution of Domestic Investors by Provinces in 2006

Province	Number of Total Investors	Share of Total Investors (%)	Total Portfolio Size (million NTL)	Share of Total Portfolio Size (%)	Total Individual Investors	Share of Total Individual Investors (%)	Total Individual Portfolio Size (million NTL)	Share of Total Individual Portfolio Size (%)
İSTANBUL	302,491	32.84	17,373	66.07	301,192	32.78	8,855	56.29
ANKARA	108,727	11.80	2,317	8.81	108,482	11.81	1,384	8.80
İZMİR	92,166	10.01	1,537	5.84	92,008	10.01	1,407	8.94
ADANA	23,321	2.53	890	3.39	23,283	2.53	302	1.92
BURSA	35,114	3.81	523	1.99	35,062	3.82	469	2.98
ANTALYA	25,386	2.76	274	1.04	25,356	2.76	265	1.69
HATAY	8,219	0.89	231	0.88	8,208	0.89	99	0.63
KOCAELİ	18,721	2.03	190	0.72	18,696	2.03	189	1.20
BALIKESİR	19,740	2.14	178	0.68	19,717	2.15	171	1.09
MERSİN	16,058	1.74	164	0.62	16,041	1.75	164	1.04
KONYA	10,776	1.17	155	0.59	10,760	1.17	108	0.69
KARABÜK	13,462	1.46	153	0.58	13,438	1.46	134	0.85
KAYSERİ	7,409	0.80	149	0.57	7,403	0.81	145	0.92
DENİZLİ	13,671	1.48	138	0.53	13,646	1.49	136	0.86
AYDIN	13,288	1.44	125	0.47	13,270	1.44	124	0.79
MANİSA	15,649	1.70	122	0.46	15,629	1.70	103	0.66
MUĞLA	13,089	1.42	109	0.42	13,075	1.42	109	0.69
GAZİANTEP	5,986	0.65	103	0.39	5,966	0.65	75	0.48
ZONGULDAK	9,585	1.04	99	0.38	9,565	1.04	97	0.62
TEKİRDAĞ	7,097	0.77	85	0.32	7,090	0.77	64	0.41
OTHER 61 PROVINCES	161,144	17.5	1,378.1	5.2	160,900.0	17.5	1,328.1	8.4
Total	921,099	100.00	26,295	100.00	918,787	100.00	15,731	100.00

Source: Association of Capital Market Intermediary Institutions of Turkey (TSPAKB)

Table 6.17: Investment by Foreign Banks, Brokerage Houses or Individuals in Istanbul Stock Exchange

	Market Value of Stock Units (end of December) million USD	Average of Market Value of Stock Units million USD	Transaction Volume in Secondary Markets (total purchases and sales) million USD	Net Purchases in Secondary Markets million USD	Purchases in IPO and SPO million USD	Net Capital Inflow or Outflow million USD	Change in Market Value of Portfolio million USD	Turnover Rate	Average Holding Period (Days)
1997	6,018	4,837	8,909	-304	524	220	2,713	1.84	396
1998	3,700	4,932	11,645	-426	984	558	-2,876	2.36	309
1999	15,358	6,927	17,837	1,031	9	1,040	10,618	2.57	284
2000	7,404	11,440	33,365	-3,133	2,715	-418	-7,536	2.92	250
2001	5,635	4,849	12,135	509	10	519	-2,288	2.50	292
2002	3,450	4,265	12,856	-14	66	52	-2,237	3.01	242
2003	8,954	5,069	17,325	1,010	82	1,092	4,412	3.42	214
2004	16,141	10,603	37,361	1,430	951	2,381	4,806	3.52	207
2005	33,782	22,446	80,998	4,083	1,445	5,528	12,113	3.61	202
2006	34,897	33,772	88,426	1,131	588	1,719	-604	2.62	279

Notes: Purchases in IPO and SPO refer to foreigners' investment in initial and secondary public offerings. The shares of foreign purchases within the total IPO and SPO offered in each year are obtained from TSPAKB Capital Market Reports. These shares are multiplied by total IPO and SPO volume obtained from public offerings data of IMKB. Net capital inflow or outflow by foreigners refers to sum of net purchases in secondary markets and purchases in IPO and SPO. Change in market value of the portfolio is calculated by summing the net capital inflow or outflow and end of year market value of the portfolio in previous year and subtracting this sum from the current year's portfolio value at the end of the year. Turnover is calculated by dividing the total purchases and sales of foreigners during the year by the average market value of stock units (portfolio value) held by foreign investors. It indicates the number of times the portfolio changes during the year. Average holding period corresponds to the days divided by the half of turnover rate.

Source: Author's calculation from Istanbul Stock Exchange (IMKB), Central Registry Agency (MKK), Clearing and Settlement Center (Takasbank), Association of Capital Market Intermediary Institutions of Turkey (TSPAKB) Investor Profile and Analysis, Turkey Capital Markets Reports (2001-2006) and (TSPAKB) Sermaye Piyasası'nda Gündem, September 2007.

Table 6.18: Distribution of Domestic and Foreign Capital Raised by IPOs and SPOs

	IPO			SPO		
	million USD	Domestic (%)	Foreign (%)	million USD	Domestic (%)	Foreign (%)
1997	420	30	70	229	0	100
1998	383	25	75	928	25	75
1999	91	90	10	139	100	0
2000	2,806	30	70	1,632	54	46
2001	0.24	90	10	10	0	100
2002	56	62	38	179	75	25
2003	11	100	0	89	8	92
2004	483	62	38	826	7	93
2005	1,744	26	74	177	13	87
2006	931	48	52	253	59	41

Source: Initial and secondary public offerings data is obtained from Istanbul Stock Exchange (IMKB). Share of domestic and foreign investors in IPO and SPOs is obtained from TSPAKB Turkey Capital Markets Reports (2001-2006).

Table 6.19: Historical Consolidated Portfolio Structure of Mutual Funds
Type A Mutual Funds

	A Type Equity Mutual Funds					Portfolio Composition of A Type Mutual Funds						
	Number of Funds	Net Asset Value (million New Turkish Lira)	Net Asset Value (million USD)	Net Asset Value of Type A Mutual Funds (as % of GDP)	Number of Open Accounts	Stocks (%)	Public Debt Instruments (%)	Corporate Bonds (%)	Reverse Repo (%)	IMKB Money Market (%)	Foreign Securities (%)	Other (%)
1987												
1988												
1989												
1990												
1991												
1992												
1993												
1994*		3	81	0.06		33.68	65.73	0.59	0.00	0.00	0.00	0.00
1995		4	73	0.04		36.20	63.69	0.11	0.00	0.00	0.00	0.00
1996		18	167	0.09		32.36	67.63	0.00	0.00	0.00	0.00	0.01
1997		69	339	0.18		39.08	17.20	0.00	43.54	0.00	0.00	0.19
1998		72	230	0.12		39.56	15.65	0.00	44.54	0.00	0.20	0.06
1999		283	525	0.29		55.40	13.74	0.00	30.84	0.00	0.00	0.02
2000		520	775	0.39		45.73	11.33	0.00	42.70	0.00	0.15	0.10
2001	162	569	395	0.27	62,469	61.77	15.78	0.00	22.44	0.00	0.01	0.00
2002	134	435	266	0.14	71,322	54.46	13.11	0.00	32.37	0.00	0.07	0.00
2003	133	744	533	0.22	105,816	63.95	17.57	0.00	18.36	0.00	0.12	0.00
2004	123	780	581	0.19	105,275	67.78	20.44	0.00	10.87	0.51	0.39	0.00
2005	126	1,034	770	0.21	142,794	70.44	15.83	0.00	12.29	0.88	0.54	0.02
2006	126	832	588	0.15	133,503	64.76	17.88	0.00	15.53	0.85	0.70	0.28

Type B Mutual Funds

	B Type Fixed Income Mutual Funds					Portfolio Composition of B Type Mutual Funds						
	Number of Funds	Net Asset Value (million New Turkish Lira)	Net Asset Value (million USD)	Net Asset Value of Type B Mutual Funds (as % of GDP)	Number of Open Accounts	Stocks (%)	Public Debt Instruments (%)	Corporate Bonds (%)	Reverse Repo (%)	IMKB Money Market (%)	Foreign Securities (%)	Other (%)
1987		0.05	52	0.06		0.46	24.57	57.72		0.00	0.00	17.25
1988		0.14	75	0.08		0.17	8.68	69.89		0.00	0.00	21.26
1989		0.44	191	0.18		1.98	29.06	63.07		0.00	0.00	5.90
1990		2	518	0.34		2.14	73.75	20.82		0.00	0.00	3.29
1991		2	321	0.21		2.51	70.12	22.35		0.00	0.00	5.02
1992		3	349	0.22		1.34	85.17	8.51		0.00	2.56	2.42
1993		15	1,050	0.59		18.04	73.97	4.68		0.00	2.98	0.33
1994*		25	645	0.50		1.47	91.86	0.19		0.00	2.68	3.80
1995		27	435	0.26		0.36	95.66	0.02		0.00	3.81	0.15
1996		100	935	0.52		0.95	97.23	0.08		0.00	1.68	0.06
1997		121	589	0.31		1.34	27.66	0.00	63.79	0.00	4.65	2.56
1998		275	880	0.44		0.33	40.14	0.00	59.09	0.00	0.32	0.13
1999		936	1,733	0.94		0.88	29.72	0.00	68.92	0.00	0.21	0.28
2000		1,417	2,110	1.06		0.17	13.24	0.00	86.36	0.00	0.20	0.04
2001	115	4,187	2,909	2.00	729,088	0.05	35.27	0.00	64.50	0.00	0.12	0.06
2002	108	8,912	5,452	2.97	1,094,925	0.03	51.04	0.00	48.81	0.00	0.10	0.02
2003	126	19,114	13,694	5.70	2,133,162	0.04	68.90	0.00	30.97	0.00	0.09	0.00
2004	130	23,663	17,632	5.83	2,527,187	0.06	68.71	0.00	28.32	2.91	0.00	0.00
2005	149	28,340	21,102	5.81	2,816,779	0.05	72.26	0.00	26.53	1.15	0.01	0.00
2006	163	21,180	14,988	3.72	2,337,406	0.26	39.07	0.00	59.18	1.41	0.06	0.01

All Mutual Funds

	All Mutual Funds					Portfolio Composition of All Mutual Funds						
	Number of Funds	Net Asset Value (million New Turkish Lira)	Net Asset Value (million USD)	Net Asset Value of All Mutual Funds (as % of GDP)	Number of Open Accounts	Stocks (%)	Public Debt Instruments (%)	Corporate Bonds (%)	Reverse Repo (%)	IMKB Money Market (%)	Foreign Securities (%)	Other (%)
1987		0.05	52	0.06		0.46	24.57	57.72	0.00	0.00	0.00	17.25
1988		0.14	75	0.08		0.17	8.68	69.89	0.00	0.00	0.00	21.26
1989		0.44	191	0.18		1.98	29.06	63.07	0.00	0.00	0.00	5.90
1990		2	518	0.34		2.14	73.75	20.82	0.00	0.00	0.00	3.29
1991		2	321	0.21		2.51	70.12	22.35	0.00	0.00	0.00	5.02
1992		3	349	0.22		1.34	85.17	8.51	0.00	0.00	2.56	2.42
1993		15	1,050	0.59		18.04	73.97	4.68	0.00	0.00	2.98	0.33
1994*		28	726	0.56		5.06	88.95	0.23	0.00	0.00	2.38	3.38
1995		31	509	0.30		5.54	91.04	0.03	0.00	0.00	3.26	0.13
1996		118	1,102	0.61		5.71	92.74	0.07	0.00	0.00	1.43	0.05
1997		190	929	0.49		15.12	23.84	0.00	56.39	0.00	2.95	1.69
1998		347	1,110	0.56		8.45	35.07	0.00	56.08	0.00	0.29	0.11
1999		1,219	2,258	1.23		13.55	26.01	0.00	60.07	0.00	0.16	0.22
2000		1,938	2,884	1.45		12.40	12.72	0.00	74.63	0.00	0.18	0.06
2001	277	4,756	3,304	2.27	791,557	7.43	32.94	0.00	59.47	0.00	0.11	0.05
2002	242	9,347	5,718	3.11	1,166,247	2.56	49.28	0.00	48.04	0.00	0.10	0.02
2003	259	19,858	14,227	5.92	2,238,978	2.43	66.98	0.00	30.50	0.00	0.09	0.00
2004	253	24,444	18,213	6.02	2,632,462	2.22	67.17	0.00	27.77	2.83	0.02	0.00
2005	275	29,374	21,872	6.02	2,959,573	2.52	70.27	0.00	26.03	1.14	0.03	0.00
2006	289	22,012	15,577	3.87	2,470,909	2.70	38.27	0.00	57.53	1.39	0.09	0.02

Notes: Type A and Type B Mutual Funds were reported separately after 1994. The Type A Mutual Funds are required to invest at least 25 percent of their assets in securities issued by Turkish companies. Number of Open Accounts refers to each of the funds an investor has invested in. Net Assets=Portfolio Value + Liquid Assets + Accounts Receivable-Accounts Payable.

Source: Capital Markets Board of Turkey (SPK) Annual Reports 2004 and 2006; Capital Markets Board of Turkey (SPK) Monthly Statistical Bulletin, July 2007; Association of Capital Market Intermediary Institutions of Turkey (TSPAKB) Turkey Capital Markets Report, 2001-2006. New Turkish Lira values are converted into U.S. dollars using purchase rate of Central Bank as of last day of December for each year. Annual GDP in U.S. dollars is obtained from World Development Indicators.

Table 6.20: Total Net Assets of Mutual Funds in Emerging Markets

million USD	1999	2000	2001	2002	2003	2004	2005	2006
U.S.A	6,846,339	6,964,634	6,974,913	6,390,358	7,414,401	8,106,939	8,904,824	10,413,617
Turkey	2,258	2,884	3,304	5,718	14,227	18,213	21,872	15,577
Argentina	6,990	7,425	3,751	1,021	1,916	2,355	3,626	6,153
Brazil	117,758	148,538	148,189	96,729	171,596	220,586	302,927	418,771
Chile	4,091	4,597	5,090	6,705	8,552	12,588	13,969	17,700
Mexico	19,468	18,488	31,723	30,759	31,953	35,157	47,253	62,614
India	13,065	13,507	15,284	20,364	29,800	32,846	40,546	58,219
Korea	167,177	110,613	119,439	149,544	121,663	177,417	198,994	251,930
Philippines	117	108	211	474	792	952	1,449	1,544
% of GDP								
U.S.A	74.29	71.32	69.22	61.34	67.91	69.41	71.72	78.88
Turkey	1.23	1.45	2.27	3.11	5.92	6.02	6.02	3.87
Argentina	2.47	2.61	1.40	1.00	1.48	1.54	1.98	2.87
Brazil	20.07	23.05	26.83	19.12	31.06	33.23	34.33	39.21
Chile	5.60	6.11	7.42	9.97	11.56	13.13	11.75	12.14
Mexico	4.05	3.18	5.10	4.74	5.00	5.14	6.16	7.46
India	2.90	2.94	3.20	4.01	4.95	4.72	5.03	6.42
Korea	37.53	21.62	24.79	27.34	20.01	26.07	25.14	28.37
Philippines	0.15	0.14	0.30	0.62	0.99	1.10	1.47	1.32

Source: Investment Company Institute for total net asset values of mutual funds in emerging markets; Capital Markets Board of Turkey (SPK) for total net asset values of mutual funds in Turkey; World Development Indicators for annual GDP series in U.S. dollars.

Table 6.21-a: Historical Consolidated Portfolio Structure of Pension Plans

	All Pension Plans						Portfolio Composition of Pension Plans						
	Number of Funds	Net Asset Value (million New Turkish Lira)	Net Asset Value (million USD)	Net Asset Value of Pension Plans (as % of GDP)	Number of Open Accounts	Number of Pension Plans Participants	Stocks (%)	Public Debt Instruments (%)	Corporate Bonds (%)	Reverse Repo (%)	Money Market Instruments (%)	Foreign Securities (%)	Other (%)
2003	68	43	31	0.01	36,180	15,245	11.18	69.46	0.00	13.76	0.82	4.20	0.57
2004	81	296	221	0.07	1,040,217	314,010	13.32	72.44	0.00	9.07	3.33	1.84	0.00
2005	96	1,219	908	0.25	2,025,705	666,142	11.12	80.41	0.00	5.35	0.91	0.76	1.45
2006	102	2,821	1,997	0.50	2,807,557	1,062,279	8.59	73.03	0.00	14.43	2.50	0.69	0.75

Source: Capital Markets Board of Turkey (SPK), Developments in Turkish Capital Markets, Report 2007/I and Monthly Statistical Bulletin, July 2007. Annual GDP series in U.S. dollars are obtained from World Development Indicators. Net Assets=Portfolio Value + Liquid Assets + Accounts Receivable-Accounts Payable.

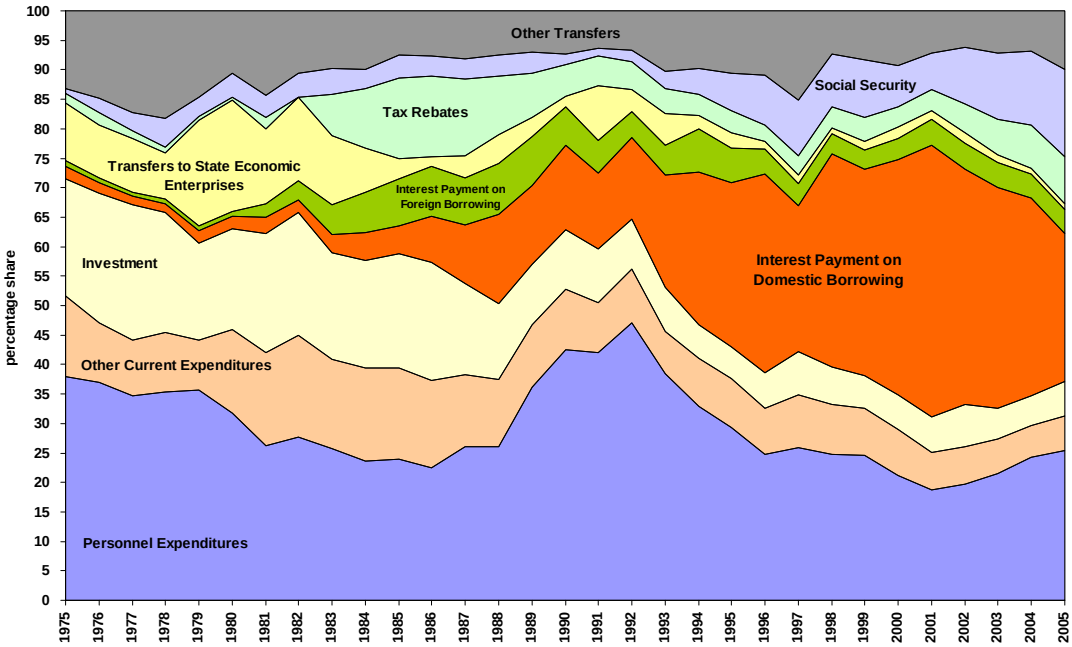
Table 6.21-b: Distribution of Pension Plan Participants by Age Categories

Years of Age	2003	(%)	2004	(%)	2005	(%)	2006	(%)
Below 25	827	5.42	27,302	8.69	54,480	8.18	78,778	7.43
25-34	5,342	35.04	131,907	42.01	273,557	41.07	422,562	39.85
35-44	4,998	32.78	106,110	33.79	222,494	33.40	356,447	33.62
45-55	3,723	24.42	44,558	14.19	103,172	15.49	176,018	16.60
56 and over	355	2.33	4,133	1.32	12,439	1.87	26,468	2.50
Total Pension Plan Investors	15,245	100	314,010	100	666,142	100	1,060,273	100
Share in Civilian Labor Force (%)	0.06		1.29		2.71		4.28	

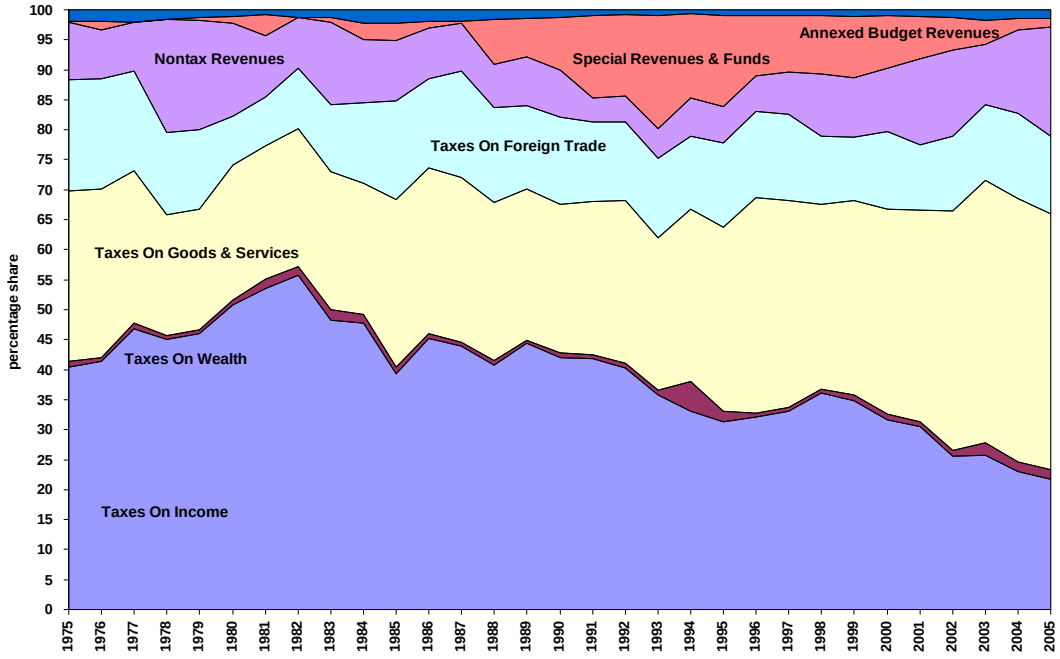
Source: Association of Capital Market Intermediary Institutions of Turkey (TSPAKB) Report on Capital Markets in Turkey, 2003-2006; State Planning Organization (DPT) Labor Force Statistics

Figure 6.1: Percentage Distribution of Consolidated Government Budget (1975-2005)

Expenditures

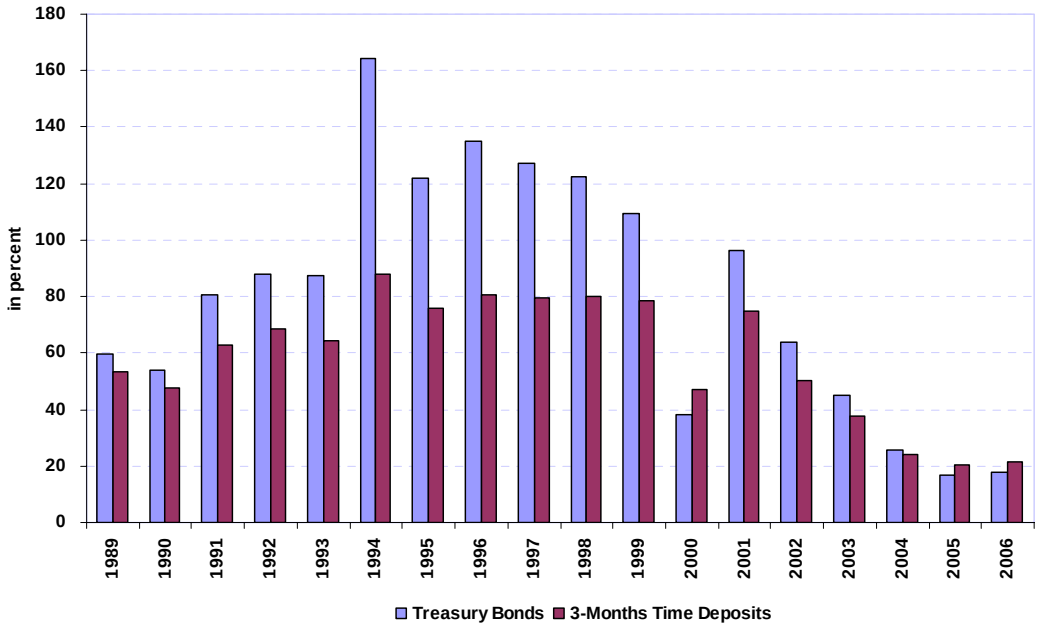


Revenues



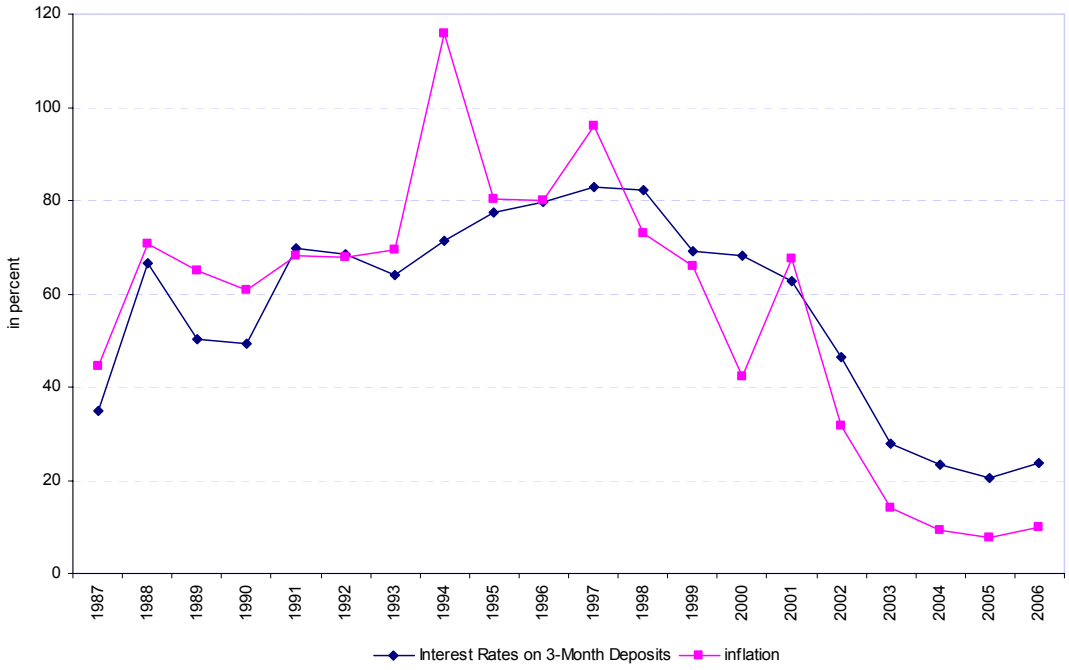
Source: State Planning Organization.

Figure 6.2-a: Average Annual Interest Rates



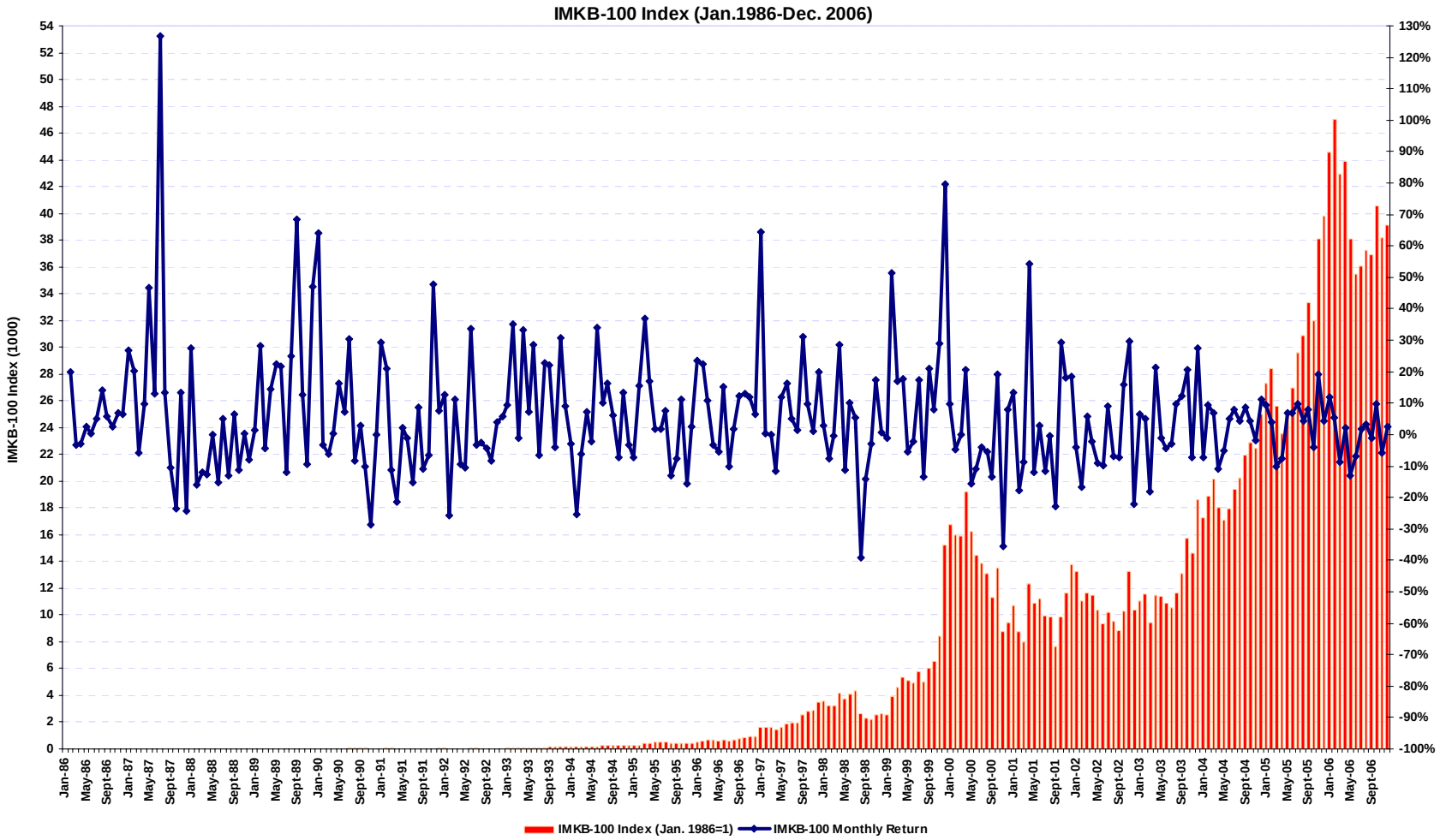
Notes: Annual interest rates on domestic borrowing using Treasury Bonds (DIBS) are obtained by using compounded interest rate over the year. Average annual interest rates for 3-month time deposits were obtained by averaging the quarterly interest rates over the year. No treasury auction took place on December 1999. Sources: State Planning Organization (DPT) and International Financial Statistics

Figure 6.2-b: Annual Changes in Consumer Price Index for All Items and Interest Rates on 3 Month-Time Deposits



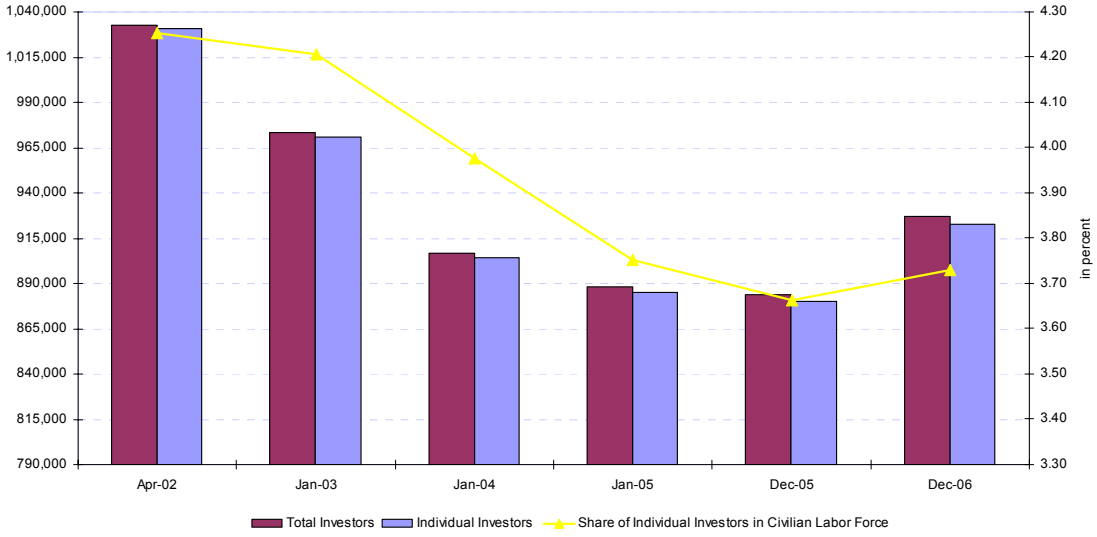
Source: OECD Quarterly Main Economic Indicators and International Financial Statistics

Figure 6.3: IMKB-100 Index and Monthly Returns



Notes: Events that correspond to the highest and the lowest monthly percentage return in a given year are listed in the Appendix 6.1.

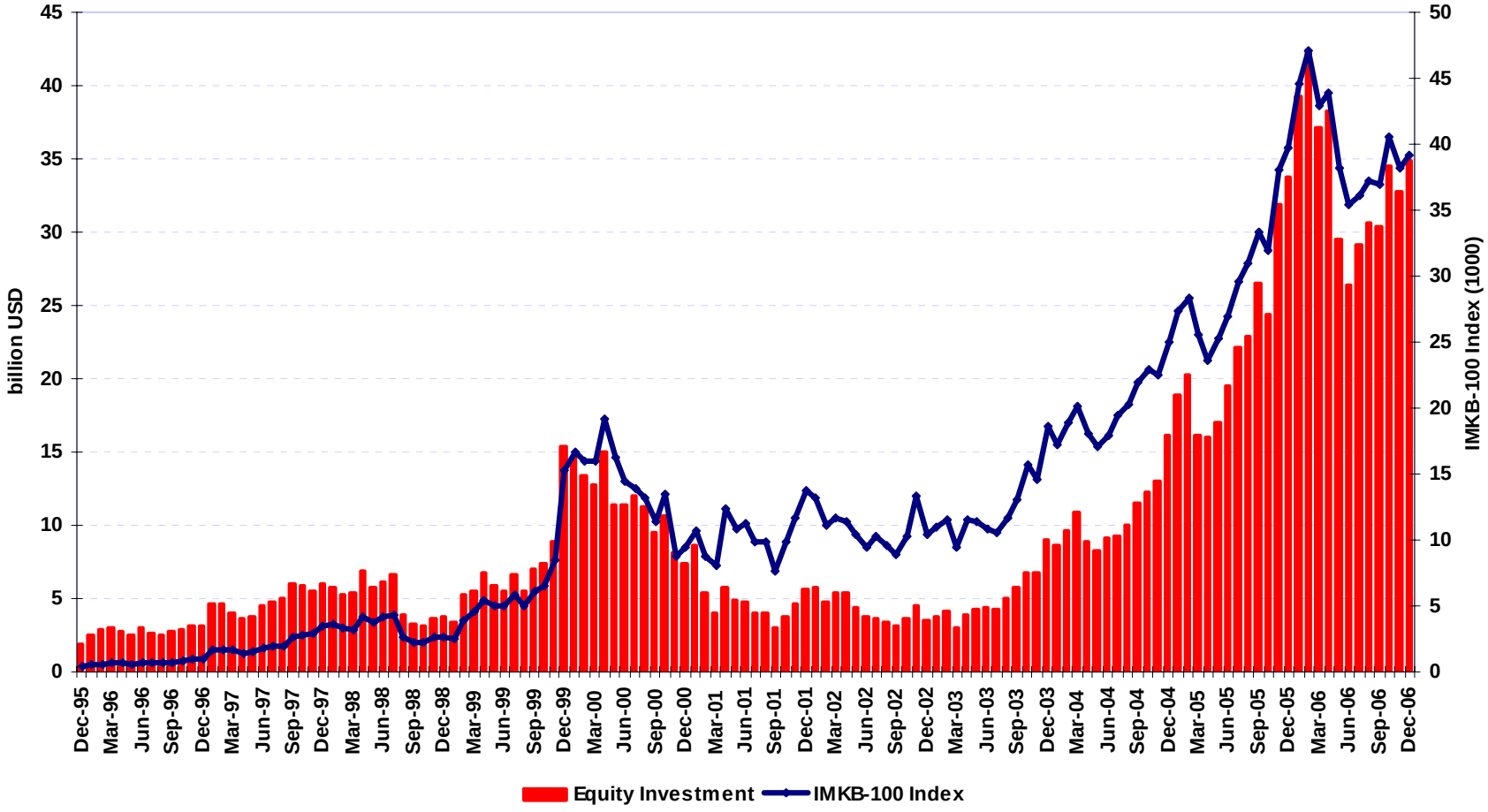
Figure 6.4: Total Number of Domestic and Foreign Active and Identified Investors



	Apr-02	Jan-03	Jan-04	Jan-05	Dec-06
Total Investors	1,032,776	973,439	906,718	887,958	927,100
Individual Investors	1,030,569	971,156	904,030	885,002	922,603
Share of Individual Investors in Civilian Labor Force	4.25	4.21	3.98	3.75	3.73

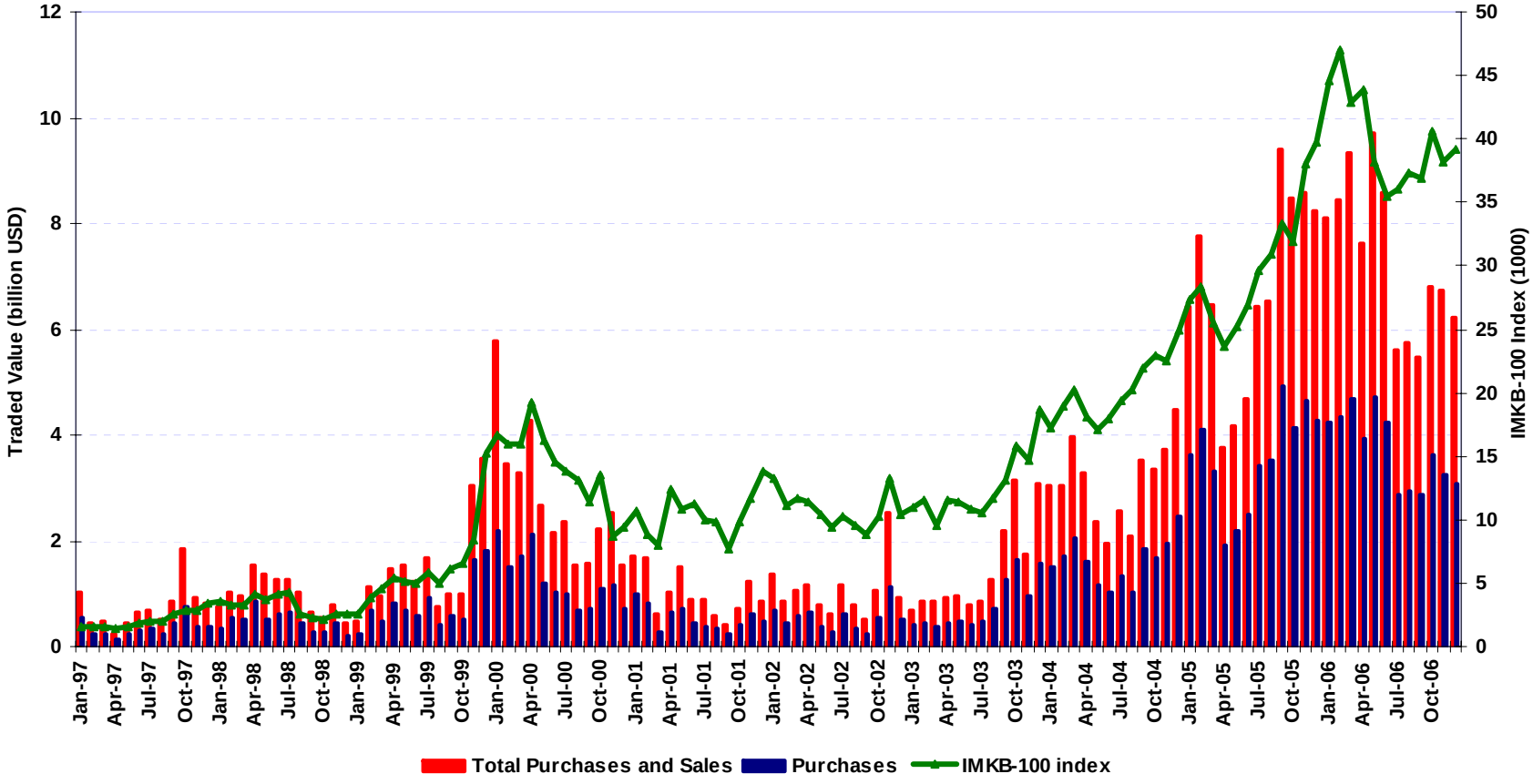
Source: Central Registry Agency (MKK) and Association of Capital Market Intermediary Institutions of Turkey (TSPAKB)

Figure 6.5: Market Value of Stock Units held by Foreign Banks, Brokerage Houses or Individuals under the Custody of Clearing and Settlement Center of the Istanbul Stock Exchange



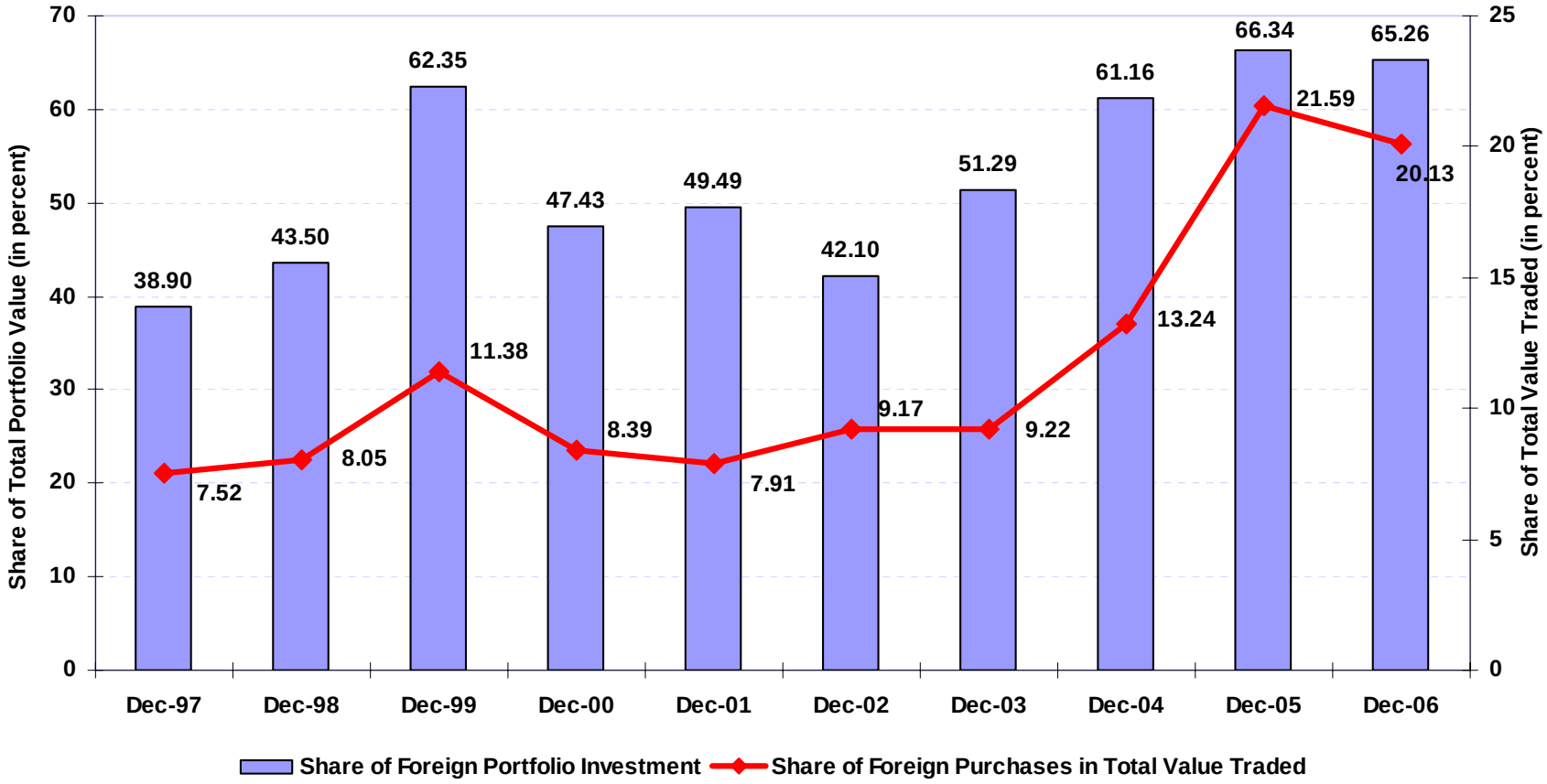
Source: IMKB, MKK and Takasbank

Figure 6.6: IMKB-100 Index and Value of the Stock Transactions Realized on Behalf and Account of Foreign Banks, Brokerage Houses or Individuals



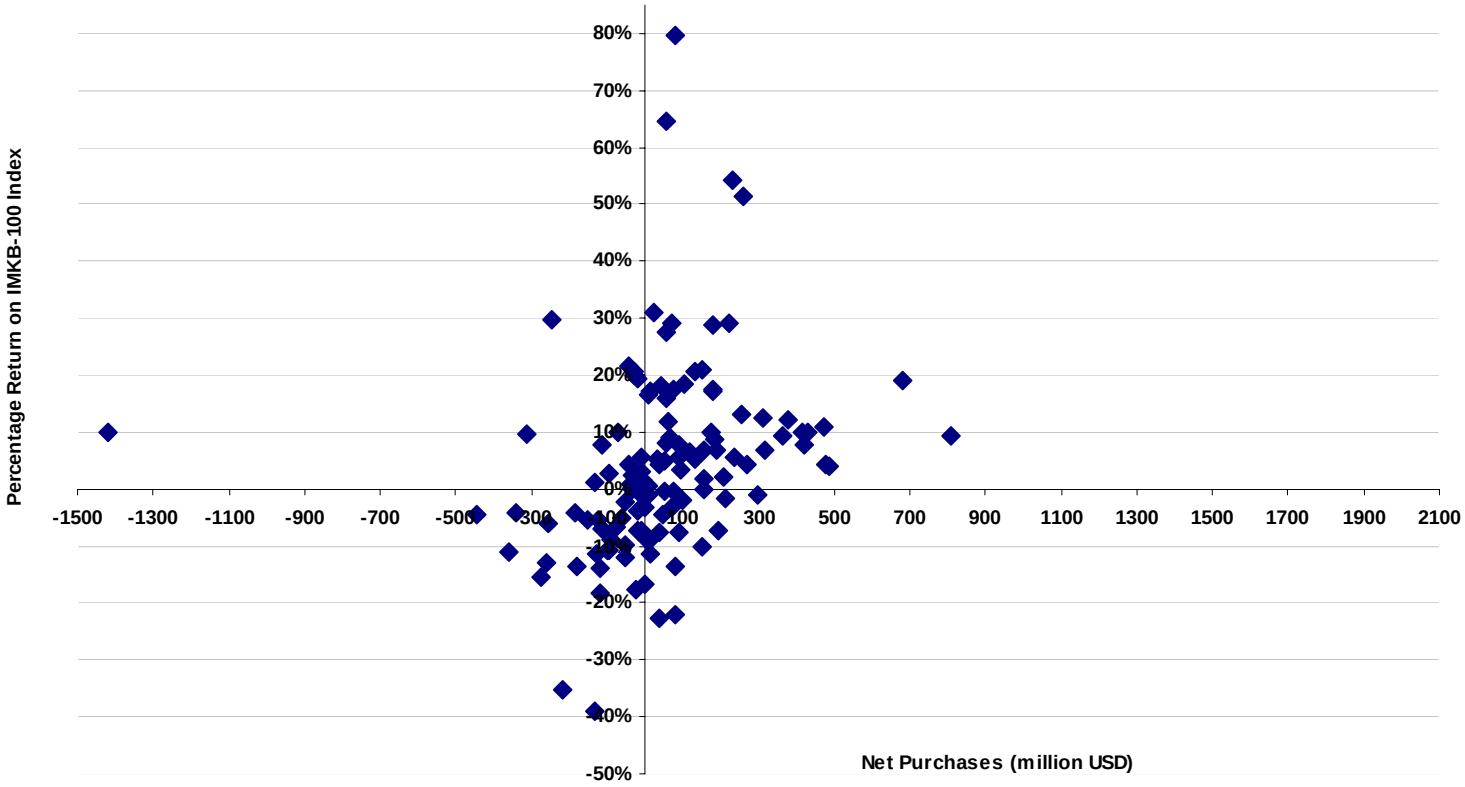
Source: Istanbul Stock Exchange (IMKB)

Figure 6.7: Share of Foreign Investors in Total Market Value of Stock Units Held Under the Custody of Clearing and Settlement Center of the Istanbul Stock Exchange and Annual Share of Foreign Purchases in Total Value Traded



Source: Total value traded in Istanbul Stock Exchange is obtained from IMKB. Value of the stock transactions realized on behalf and account of foreign banks, brokerage houses or individuals is obtained from IMKB. Share of foreign portfolio investment is calculated using data obtained from Association of Capital Market Intermediary Institutions of Turkey (TSPAKB) Investor Profile Reports (2001-2006) and TSPAKB Sermaye Piyasası'nda Gündem, September 2007.

Figure 6.8: Net Purchases by Foreign Banks, Brokerage Houses and Individuals and Monthly Return on IMKB-100 Index (January 1997-December 2006)



Chapter 7: Conclusion

The three essays in my dissertation analyze the effects of the globalization phenomenon on economic integration patterns and business cycles. This chapter summarizes the major findings of each essay, and evaluates the relevance of these results in the context of the recent global crisis following the sub-prime mortgage market meltdown in the United States. The chapter concludes with suggestions for methodological extensions and future research directions.

With the increasing globalization of the world economy, there has been a resurgence in the interest for understanding the propagation of business cycle fluctuations across national borders. My first essay looks at the major economic linkages explaining real GDP correlations for 47 countries during the 1970-2003 period using GMM-IV and simultaneous equations estimations. The main results of this essay show that trade integration especially in the form of intra-industry trade and similarities in economic structure are the most important determinants of output correlations. In addition, the findings indicate that direct impact of global financial integration on business cycle synchronization is highly non-linear. While synchronization increases for country pairs with high degrees of financial openness, on average, global financial integration has a positive but weak effect. Simultaneous equations estimation results show that financial globalization boosts trade integration and leads to convergence in economic structures, and therefore indirectly increases output synchronization.

My second essay examines the changing nature of growth spillovers between developed economies, the North, and developing countries, the South, driven by the globalization process. The study uses a comprehensive database of macroeconomic and

sectoral variables for 106 countries over the period 1960-2005. Unlike the traditional North-South literature, the South is decomposed into two groups of countries, labeled as the Emerging South and the Developing South. The study documents that the Emerging South economies have increasingly become major players in the global economy because of their rapid economic growth fueled by the dramatic changes in their sectoral structures, and international trade and financial linkages.

In light of these findings, the panel regression results show that although the North economies have continued to play a dominant role in explaining the growth dynamics in the rest of the world commensurate with their economic size, the impact of the Northern economic activity on the Emerging South has moderated during the globalization period (1986-2005). In contrast, the growth linkages between the North and Developing South have remained rather stable. The North and Emerging South economies are exhibiting more intensive intra-group growth spillovers during the globalization period.

My third essay looks at the effects of fluctuations in the stock market, housing, and financial wealth on the durables and non-durables consumption behaviour in the context of a particular emerging market economy, Turkey. The vector error correction models testing life-cycle and permanent income hypotheses are developed using quarterly data for the 1987-2006 period. This essay uses housing wealth series I constructed from primary sources. It is combined with databases on stock market capitalization and bank deposits as proxies for the stock market and financial wealth respectively. I find that in the long run, the non-durables consumption is not significantly affected by the stock market wealth in contrast to the durables consumption. An increase in the housing wealth raises the consumption of non-durables, but has no effect on the consumption of durables. Also, there

is a strong impact from eliminating liquidity constraints on consumption of both durables and non-durables. The strong elasticity of durables consumption with respect to bank credit may incorporate the collateral channel. Liquidity constrained households can have access to credit through their homes and therefore increase consumption spending.

The three essays are supported by two papers on the measurement of wealth in Turkey. The fourth essay looks at the housing market characteristics in Turkey and documents my novel methodology to construct the quarterly housing wealth series using primary sources. I compare my data against previous attempts with shorter time spans and lower frequency. My fifth essay analyzes the financial wealth allocation and characteristics of the financial system in Turkey during the 1987-2006 period. I describe the critical impacts of government policies and international capital flows on financial assets and markets.

The major results of my three essays have been supported with the recent developments in the world economy against the backdrop of the financial crisis and the economic downturn in the United States following the sub-prime mortgage market meltdown in late 2008 (see IMF, 2009a). The subsequent recession in the U.S. has been accompanied by declining GDP growth rates in most advanced and developing economies.

In particular, countries with the greatest trade exposure to the United States have suffered the largest declines when the import growth turned sharply negative during this recession. In addition, the depreciation of the dollar ha improved the net export position of the U.S. The spillovers have been substantial for regional trading partners such as Canada and Mexico. The recession also had a substantial impact on Asian economies with larger trade exposure to the United States such as Singapore, Malaysia, and Taiwan. Regional

exports and industrial production have declined substantially. Most intra-regional trade in Asia is occurring within vertically integrated regional supply chains that ship intermediate goods that are then assembled into final goods for shipment to the United States. This has made the effects of the U.S. and global slowdown more complex to trace. Trade linkages especially in the form of intra-industry trade have intensified the spillovers and created highly synchronized business cycles among integrated economies. These developments are consistent with the results from my first essay.

Another important observation about the effects of the current U.S. recession is that the magnitude of spillovers from the United States has been larger in those economies, which are more integrated in the global financial system. According to the IMF (2009b), emerging markets with higher foreign liabilities have been significantly affected by the financial stress in capital markets and systemic banking crises in advanced economies. For example, there is evidence that real economic activity in eastern European economies, which heavily relied on short-term bank-related or portfolio inflows have been severely hit by the "sudden stops" in external financing and tighter credit conditions. This is a consequence of the shifts in liquidity conditions and risk aversion by international investors. All of these developments are in line with the findings of the first essay that business cycle synchronization increases when economies become more integrated with the global financial system. In particular, the feedback loop between the financial and real sectors can become highly non-linear especially during periods of stress in money and credit markets.

In the context of the current recession in the United States, it has been debated whether or not the emerging market economies, especially in Asia, will be able to decouple

from a sharper-than-projected slowdown in the United States. One view on this question suggests that the emerging markets have become more vulnerable to the U.S. shocks through growing trade and financial linkages. Alternatively, there is another view that the impact on emerging markets will be minimal, cushioned by continued robust growth in Asia, particularly by China and India. While the latter assessment is partially implied by the findings of my second essay, in order to fully interpret the relevance of my results, it is important to distinguish the underlying circumstances driving the growth spillovers observed during the sample period of 1960-2005 and compare it to the current situation.

The "common shocks" that were truly global in nature such as abrupt oil price changes in 1974-75 or increases in real interest rates in industrial countries following the disinflationary monetary policies in the early 1980s, have on average, played a more important role in explaining output fluctuations during the 1960-85 period (see IMF, 2007). In the absence of such global common shocks, the prominence of regional factors capturing the common fluctuations within developed and emerging market countries have strengthened over time. In particular, increased intra-regional trade volumes and financial linkages, have been an important factor in explaining the degree of regional business cycle synchronization within North America, Europe and Asia during the globalization period. These findings are consistent with the results of my second essay.

Currently, the U.S. economy has been experiencing an unprecedented economic slowdown similar to the Great Depression in the 1930s (see Roubini, 2008). The current downturn in the United States has become highly synchronized with the rest of the world due to two major reasons: First, the U.S. import demand growth has turned sharply negative. Second, the recent fall in asset prices across equity, bond, and housing markets

after the sub-prime mortgage market collapse have increased the co-movements in asset markets across the world, and led to a simultaneous erosion of wealth in economies that are tightly integrated with the global financial system. Furthermore, asset values in the housing sector have deteriorated the balance sheets of financial institutions, leading to systemic banking failures and stress in money and credit markets. All of these spillovers have negatively affected the economic activity across the world.

Although the large emerging markets like China and India account for a significant share of the global GDP, their role in global trade is not yet sufficient to substitute the U.S. economy for another engine of global growth. Furthermore, financial stabilization may take longer given the complexities involved in restoring confidence in global financial institutions. Therefore, given the common shock nature of the current U.S. recession, decoupling has not occurred compared to the past U.S. slowdowns that were originating merely from the U.S. specific developments (see IMF, 2007).

However these results do not necessary imply that the decoupling view should be completely discredited. The largest emerging markets such as Brazil, India and China, may experience a rebound faster than the United States. There are four sources of support for this argument: First, structural changes and improvements in productivity due to ongoing global integration will continue for these economies. Second, in comparison to a decade ago, they have better macroeconomic fundamentals and sounder financial institutions. Third, the largest emerging markets can revitalize the global demand, especially in commodity exports, due to increasing consumption and investment opportunities. Fourth, they have relatively large domestic markets, and are not as dependent on foreign markets.

This process can lead to the continuation of divergence in GDP growth performance between the advanced economies and emerging markets (see The Economist, 2009). A potential decoupling in the near future can be consistent with the results of the second essay because the growth spillovers are examined in the medium-term by the use of 5-year averages of the variables.

In the future, essays presented in my dissertation can be extended in several ways:

The findings of my first essay can be significantly improved if more precise data on disaggregated categories of financial assets and liabilities can be introduced. Recently, new datasets have emerged that can be used for such purposes. Lane and Milesi-Ferretti (2006) have a dataset covering disaggregated external assets and liabilities of a large sample of countries over the 1970-2004 period. Imbs and Fratzscher (2008) recently gathered a novel international dataset on bilateral holdings of equity, bonds, foreign direct investment and bank loans between 23 source and 54 host countries during the 1999-2003 period. Bilateral foreign direct investment data is available from the UNCTAD since 1980. Data on global equity and bond holdings for 70 countries are available from the IMF's Coordinated Portfolio Investment Survey for 1997 and all years during the 2001-2007 period. Finally, the BIS database comprises an aggregate of the assets and liabilities of all banks in 32 reporting countries, vis-à-vis borrowing and lending institutions in more than 100 partner countries. Introduction of these datasets can allow for a comparison of distinct influences of alternative types of financial linkages on business cycle synchronization.

My second essay can be improved with a new methodology that quantifies the transmission of growth fluctuations in a dynamic framework. The current study examines the spillovers in the medium-term by using 5-year averages of the variables. A major

disadvantage of this methodology is that it dampens the potential impact of transitory and volatile idiosyncratic shocks, and non-linearities associated with shorter horizons. My research can be extended by employing a global vector auto regression (GVAR) model, which is particularly suitable to disentangle the dynamic spillover effects of unexpected changes in the growth disturbances of trade partners across countries and regions (see Galesi and Sgherri, 2009; Di Mauro, Smith, Dées and Pesaran, 2007; Calza and Dées, 2007). This methodology could overcome the key limitation of the panel regression approach, which allows for only relatively simple and linear interactions.

As for my third essay, the recent introduction of a new institutional and legal framework for mortgage markets in 2007 generates a valuable opportunity to analyze, whether or not fluctuations in the housing wealth will have even larger effects on consumption in Turkey. Furthermore I can provide evidence on how differently housing prices will respond to monetary policy changes and cyclical developments over time.

I have not found any empirical paper that explores the interaction between durables and non-durables consumption in business cycle frequencies in the context of the Turkish economy. A potential extension to my third essay could be achieved by the simultaneous estimation of the cointegrating relationship and elasticities of substitution between durables and non-durables consumption alongside the usual wealth effects in the context of the life-cycle and the permanent income hypotheses. This model can fully capture the complementarities and substitution among consumption categories (see Fleissig, 1997).

Given the limitations on the availability of data on asset prices for a large sample of emerging markets, one major weakness of my third essay is that the investigation of the stock market, housing and financial wealth effects is conducted only for Turkey without

having adequate cross-country comparison with similar economies. A recent study by the IMF (2008) has examined the relationship between stock market valuations and consumption for 22 emerging market economies during the 1985-2007 period, and found significant but small wealth effects. Another study by Peltonen, Sousa and Vansteenkiste (2009) has estimated the magnitude of housing, stock market, and money wealth effects on consumption for 14 emerging market economies during the 1990-2008 period.

My future research goal is to extend the third essay by using Blundell and Bond GMM estimation of non-stationary dynamic panel model, which differentiates between the long-run and short-run wealth effects on durables and non-durables consumption, with a larger number of countries and longer sample period. Introducing banking credit and real exchange rate or inflation variables into the dynamic panel data analysis provide interesting insights into the importance of liquidity conditions in determining consumption for a large sample of emerging market economies.

Another future research direction is to examine the patterns of allocation of financial wealth, stock market participation, and the profiles of domestic and foreign equity investors in other emerging market economies in order to understand the differences in stock market and financial wealth effects on consumption. The examination of the heterogeneity in the institutional characteristics of mortgage markets can also highlight the factors behind the differences in the magnitude of housing wealth and collateral effects.

Finally, there are only a limited number of studies that have systematically researched the determinants of housing prices in emerging markets (see Zhu, 2006; Égert and Mihaljek, 2007). Empirical findings on industrialized countries suggest that house price fluctuations can mainly be attributable to changes in households' disposable income,

inflation, real interest rates, availability of bank credit and the structure of mortgage finance markets (see European Central Bank, 2003; Zhu and Tsatsaronis, 2004; Terrones and Otrok, 2004). Another future research goal is to quantitatively examine whether the conventional determinants of housing prices play a role in the house price dynamics in various emerging market economies using time series methodologies such as structural vector autoregressive (SVAR) model.

References

Chapter 2:

Aizenman, Joshua, and Ilan Noy, 2004, "On the Two Way Feedback between Financial and Trade Openness," NBER Working Paper No. 10496 (Cambridge, Massachusetts: National Bureau of Economic Research).

Arroyo, Heliodoro Temprano, 2002, "Latin America's Integration Processes in the Light of the E.U.'s Experience with EMU" Economic Papers No. 173 (Brussels: European Commission, Directorate General for Economic and Financial Affairs).

Backus, David, Patrick Kehoe, and Finn E. Kydland, 1992, "International Real Business Cycles," *Journal of Political Economy,* Vol. 100 (August), pp. 745-775.

Baum, Christopher F., 2007a, "Checkreg3: Stata Module to Check Identification Status of Simultaneous Equations System." Available via the Internet: http://ideas.repec.org/c/boc/bocode/s456877.html

Baum, Christopher. F., Mark Schaffer, and Steven Stillman, 2007b, "Enhanced Routines for Instrumental Variables/GMM Estimation and Testing," Boston College Department of Economics Working Paper No. 667. Available via the Internet: http://fmwww.bc.edu/ec-p/WP667.pdf

Baxter, Marianne, and Alan C. Stockman, 1989, "Business Cycles and the Exchange Rate Regime: Some International Evidence," *Journal of Monetary Economics,* Vol.23 (May), pp. 377-400.

Baxter, Marianne, and Robert King, 1999, "Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series," *Review of Economics and Statistics,* Vol.81 (November), pp. 575–593.

Baxter, Marianne, and Michael Kouparitsas, 2005, "Determinants of Business Cycle Co-movement: A Robust Analysis," *Journal of Monetary Economics,* Vol. 52 (January), pp.113-157.

Baum, Christopher, Mark Schaffer, and Steven Stillman, 2003, "Instrumental Variables and GMM: Estimation and Testing," *Stata Journal,* Vol. 3 (March), pp.1-31.

Bergman, Michael, 2004, "How Similar are European Business Cycles?" Economic Policy Research Unit Working Paper Series No. 2004-13 (Copenhagen: Institute of Economics, University of Copenhagen).

Bordo, Michael, and Thomas Helbling, 2003, "Have National Business Cycles Become More Synchronized?" NBER Working Paper No. 10130 (Cambridge, Massachusetts: National Bureau of Economic Research).

Calderón, César, 2003, "Do Free Trade Agreements Enhance the Transmission of Shocks across Countries?" Working Paper No. 213 (Santiago: Central Bank of Chile).

_____, Alberto Chong, and Ernesto Stein, 2007, "Trade Intensity and Business Cycle Synchronization: Are Developing Countries any Different?" *Journal of International Economics*, Vol. 71 (March), pp. 2-21.

Calvo, Guillermo, Eduardo Fernández-Arias, Carmen Reinhart, and Ernesto Talvi, 2001, "Growth and External Financing in Latin America," IADB Working Paper No. 457 (Washington: Inter-American Development Bank).

Canova, Fabio, Matteo Ciccarelli, and Eva Ortega, 2007, "Similarities and Convergence in G-7 Cycles," *Journal of Monetary Economics*, Vol. 54 (April), pp.850-878.

Chinn, Menzie, and Hiro Ito, 2002, "Capital Account Liberalization, Institutions and Financial Development: Cross Country Evidence," NBER Working Paper No. 8967 (Cambridge, Massachusetts: National Bureau of Economic Research).

Clark, Peter, Natalia Tamirisa, Shang-Jin Wei, Azim Sadikov, and Li Zeng, 2004, *A New Look at Exchange Rate Volatility and Trade Flows*, IMF Occasional Paper No.235 (Washington: International Monetary Fund).

Clark, Todd, and Eric van Wincoop, 2001, "Borders and Business Cycles," *Journal of International Economics,* Vol. 55, pp. 59-85.

Coe, David, and Elhanan Helpman, 1995, "International R&D Spillovers," *European Economic Review,* Vol.39 (May), pp. 859-887.

Darvas, Zsolt; Andrew Rose and Gyorgy Szapáry, 2005, "Fiscal Divergence and Business Cycle Synchronization: Irresponsibility is Idiosyncratic," NBER Working Paper No. 11580 (Cambridge, Massachusetts: National Bureau of Economic Research).

Fanelli, Jose Maria, and Rozada Martin Gonzalez Escuela, 2004, "Business Cycles and Macroeconomic Policy Coordination in Mercosur" (paper presented at the Econometric Society Latin American Meetings, July 28-30, 2004, Santiago, Chile). Available via the Internet: http://repec.org/esLATM04/up.5956.1082748866.pdf

Fatás, Antonio, and Ilian Mihov (2001) "Government Size and Automatic Stabilizers: International and Intranational Evidence," *Journal of International Economics,* Vol.55 (October), pp.3-28.

_____, 2003, "The Case for Restricting Fiscal Policy Discretion" *Quarterly Journal of Economics*, Vol. 118 (November), pp.1419-1447.

Forbes, Kristin J., and Menzie D. Chinn, 2004, "A Decomposition of Global Linkages in Financial Markets over Time," *Review of Economics and Statistics*, Vol. 86 (August), pp. 705-722.

Frankel, Jeffrey A., and Andrew K. Rose, 1998, "The Endogeneity of the Optimum Currency Area Criteria," *Economic Journal*, Vol.108 (July), pp. 1009–1025.

Greene, William, 2008, *Econometric Analysis*, 6th edition, NJ: Pearson Prentice Hall.

Gruben, William, Jahyeong Koo, and Eric Millis, 2002, "How Much Does International Trade Affect Business Cycle Synchronization?" Working Paper No. 0203 (Dallas: Federal Reserve Bank of Dallas).

Harding, Don, and Adrian Pagan, 2002, "Dissecting the Cycle: A Methodological Investigation," *Journal of Monetary Economics*, Vol.49 (2), pp. 365-381.

Heathcote, Jonathan, and Fabrizio Perri, 2004, "Financial Globalization and Real Regionalization," *Journal of Economic Theory*, Vol. 119 (November), pp.207-243.

Helbling, Thomas, and Tamim Bayoumi, 2003, "Are They All in the Same Boat? The 2000-2001 Growth Slowdown and the G-7 Business Cycle Linkages," IMF Working Paper 03/46 (Washington: International Monetary Fund).

Herrero, Alicia Garcia, and Juan Ruiz, 2006, "How much do Trade and Financial Linkages Matter for Business Cycle Synchronization in a Small Economy?" (unpublished; Madrid: Bank of Spain). Available via the Internet:

http://www.cemla.org/pdf/redxi/red-xi-048.pdf

Imbs, Jean, 2001, "Co-Fluctuations," CEPR Discussion Papers No. 2267 (London: Center for Economic Policy Research).

_____, 2004, "Trade, Finance, Specialization and Synchronization," *Review of Economics and Statistics,* Vol. 86 (August), pp. 723-734.

_____, 2006, "The Real Effects of Financial Integration," *Journal of International Economics,* Vol. 68 (March), pp. 296-324.

Inklaar, Robert C., 2005, "Perspectives on Productivity and Business Cycles in Europe," Dissertation submitted for the University of Groningen. Available via the Internet: http://dissertations.ub.rug.nl/faculties/eco/2006/r.c.inklaar/

International Monetary Fund, 2001a, "International Linkages: Three Perspectives" in *IMF World Economic Outlook, October* (Washington: International Monetary Fund), pp.65-104.

_____, 2001b, "International Financial Integration and Developing Countries" in *IMF World Economic Outlook, October* (Washington: International Monetary Fund), pp.145-173.

_____, 2002a, "Recessions and Recoveries" in *IMF World Economic Outlook, April* (Washington: International Monetary Fund), pp.105-137.

_____, 2002b, "Trade and Financial Integration" in *IMF World Economic Outlook, September* (Washington: International Monetary Fund), pp.108-146.

Jansen, W. Jos, and Ad Stokman, 2004, "Foreign Direct Investment and International Business Cycle Co-movement," Working Paper Series No. 401 (Frankfurt: European Central Bank).

Kalemli-Ozcan, Sebnem, Bent Sørensen, and Oved Yosha, 2001, "Economic Integration, Industrial Specialization, and the Asymmetry of Macroeconomic Fluctuations," *Journal of International Economics,* Vol. 55 (October), pp. 107-137.

_____, 2003, "Risk Sharing and Industrial Specialization: Regional and International Evidence," *American Economic Review*, Vol. 93 (June), pp. 903-918.

Kaminsky, Graciela, Carmen Reinhart, and Carlos Végh, 2004, "When It Rains, It Pours: Pro-cyclical Capital Flows and Macroeconomic Policies," NBER Working Paper 10780 (Cambridge, Massachusetts: National Bureau of Economic Research).

Kenen, Peter (1969) "The Theory of Optimum Currency Areas: An Eclectic View" in *Monetary Problems in the International Economy* ed. by Robert Mundell and Alexander Swoboda, (Chicago: University of Chicago Press), pp. 41–60.

Kim, Soyoung, Sunghyun H. Kim, and Yunjong Wang, 2003, "International Capital Flows and Business Cycles in the Asia Pacific Region" KIEP Working Paper No. 03-03 (Seoul: Korea Institute for International Economic Policy).

Kim, Sunghyun H., Ayhan M. Kose, and Michael Plummer, 2003, "Dynamics of Business Cycles in Asia: Differences and Similarities," *Review of Development Economics,* Vol. 7 (August), pp. 462-477.

Kodres, Laura, and Matthew Pritsker, 2002, "A Rational Expectations Model of Financial Contagion," *Journal of Finance,* Vol. 57 (April), pp. 769-799.

Kose, Ayhan, and Kei-Mu Yi, 2001, "International Trade and Business Cycles: Is Vertical Specialization the Missing Link?" *American Economic Review, Papers and Proceedings,* Vol.91 (May), pp. 371-375.

_____, 2002, "The Trade Co-movement Problem in International Macroeconomics," Staff Reports No. 155 (New York: Federal Reserve Bank of New York).

Kose, M. Ayhan, Christopher Otrok, and Charles Whiteman, 2003, "International Business Cycles: World, Region and Country-Specific Factors," *American Economic Review, V*ol.93 (November), pp. 1216-1239.

_____, 2005, "Understanding the Evolution of World Business Cycles," IMF Working Paper 05/211 (Washington: International Monetary Fund).

Kose, Ayhan, Eswar Prasad, and Marco Terrones, 2003a, "How Does Globalization Affect the Synchronization of Business Cycles?" *American Economic Review, Papers and Proceedings,* Vol.93 (May), pp. 57-62.

_____, 2003b, "Financial Integration and Macroeconomic Volatility," *IMF Staff Papers,* Vol. 50, Special Issue, pp. 119-142.

Kouparitsas, Michael, 2003, "International Business Cycles under Fixed and Flexible Exchange Rate Regimes," Working Paper No. 2003-28 (Chicago: Federal Reserve Bank of Chicago).

Krugman, Paul, 1993, "Lessons of Massachusetts for EMU" in *The Transition to Economic and Monetary Union in Europe* ed. by Francesco Giavazzi and Fransisco Torres, (New York: Cambridge University Press), pp. 241–261.

Lane, Philip R. and Gian-Maria Milesi-Ferretti, 2001, "The External Wealth of Nations: Measures of Foreign Assets and Liabilities for Industrial and Developing Countries," *Journal of International Economics,* Vol. 55 (December), pp. 263-294.

_____, 2003, "International Financial Integration," IMF Working Paper 03/86 (Washington: International Monetary Fund).

Lumsdaine, Robin, and Eswar Prasad, 2003, "Identifying the Common Component of International Economic Fluctuations: A New Approach," *The Economic Journal*, Vol.113 (January), pp.101-127.

Nicita, Alessandro, and Marcelo Olarreaga, 2006, "Trade and Production Database 1976-2004," *World Bank Economic Review*, Vol. 21, No. 1, pp.165-71. Available via the Internet: http://www.worldbank.org/research/trade

Otto, Glenn, Graham Voss, and Luke Willard, 2003, "A Cross Section Study of the International Transmission of Business Cycles" (unpublished).

Available via the Internet:

http://wwwdocs.fce.unsw.edu.au/economics/staff/GOTTO/OWVDraft2003.pdf

Prasad, Eswar, Kenneth Rogoff, Shang-Jin Wei, and M. Ayhan Kose, 2003, *Effects of Financial Globalization on Developing Countries: Some Empirical Evidence,* IMF Occasional Paper No. 220 (Washington: International Monetary Fund).

Shea, John, 1997, "Instrument Relevance in Multivariate Linear Models: A Simple Measure," *Review of Economics and Statistics,* Vol. 79 (May), pp. 348-352.

Shin, Kwanho, and Yunjong Wang, 2003, "Trade Integration and Business Cycle Synchronization in East Asia," *Asian Economic Papers,* Vol.2, No.3, pp. 1-20.

Stock, James, Jonathan Wright, and Motohiro Yogo, 2002, "A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments," *Journal of Business and Economic Statistics,* Vol. 20 (October), pp. 518-528.

Stock, James, and Mark Watson, 2005, "Understanding Changes in International Business Cycle Dynamics," *Journal of the European Economic Association*, Vol.3 (September), pp.968-1006.

Tamirisa, Natalia, 1999, "Exchange and Capital Controls as Barriers to Trade," *IMF Staff Papers,* Vol.46 (March), pp. 69-88.

Thellesen, Jens Christian Hybschmann, 2003, "Explaining Synchronized Output Fluctuations among OECD Countries," CEBR Student Paper No. 2003-06 (Copenhagen: Center for Economic and Business Research, University of Aarhus).

Wooldridge, Jeffrey M., 2002, *Econometric Analysis of Cross-Section and Panel Data*, Cambridge MA: MIT Press.

Chapter 3

Ahmed, Shaghil, and Prakash N. Loungani, 2000, "Business Cycles in Emerging Market Economies," *Monetary Affairs*, Vol. 13 (January-June), pp. 87–111.

Akın, Çiğdem, 2006, "Multiple Determinants of Business Cycle Synchronization," Working Paper, George Washington University.

Arora, Vivek, and Athanasios Vamvakidis, 2004, "How Much Do Trading Partners Matter for Economic Growth?" IMF Working Paper 04/26 (Washington: International Monetary Fund).

_____, 2006, "The Impact of U.S. Economic Growth on the Rest of the World: How Much Does it Matter?" *Journal of Economic Integration,* Vol.21(March), pp.21-39.

Asian Development Bank, 2007, "Uncoupling Asia: Myth and Reality," in *Asian Development Outlook*, pp. 66-81.

Aykut, Dilek, and Andrea Goldstein, 2007, "Developing Country Multinationals: South-South Investment Comes of Age," in *Industrial Development for the 21st Century: Sustainable Development Perspectives* (New York: United Nations), pp. 85–116.

Aziz, Jahangir, Steven V. Dunaway, and Eswar Prasad, 2006, *China and India Learning from Each Other: Reforms and Policies for Sustained Growth* (Washington: International Monetary Fund).

Baxter, Marianne, and Michael A. Kouparitsas, 2005, "Determinants of Business Cycle Comovement: A Robust Analysis," *Journal of Monetary Economics,* Vol. 52 (January) pp. 113–157.

Beenstock, Michael, 1988, "An Econometric Investigation of North-South Interdependence," in *Macroeconomic Interactions between North and South*, ed. by David A. Currie and David Vines (New York: Cambridge University Press), pp. 32–62.

Bekaert, Geert, Campbell R. Harvey, and Christian Lundblad, 2005, "Does Financial Liberalization Spur Economic Growth?" *Journal of Financial Economics,* Vol. 77 (July), pp. 3–55.

Burgstaller, Andre, and N. Saavedra-Rivano, 1984, "Capital Mobility and Growth in a North-South Model," *Journal of Development Economics,* Vol. 15, pp. 213–237.

Burstein, Ariel, Christopher J. Kurz, and Linda Tesar, 2008, "Trade, Production Sharing, and the International Transmission of Business Cycles," NBER Working Paper 13731 (Cambridge: National Bureau of Economic Research)

Calderón, César, Norman Loayza, and Klaus Schmidt-Hebbel, 2005, "Does Openness Imply Greater Exposure?" World Bank Policy Research Working Paper 3733 (Washington: World Bank).

Callen, Tim, 2007, "PPP versus the Market: Which Weight Matters?" *Finance & Development,* Vol. 44 (March), pp. 50–51.

Canova, Fabio, 2005, "The Transmission of U.S. Shocks to Latin American Economies," *Journal of Applied Econometrics,* Vol. 20, pp. 229–251.

Canova, Fabio, Matteo Ciccarelli, and Eva Ortega, 2007, "Similarities and Convergence in G-7 Cycles," *Journal of Monetary Economics*, Vol. 54, pp. 850–878.

Canzoneri, Matthew B., Robert E. Cumby, and Behzad T. Diba, 2005, "The Need for International Policy Coordination: What's Old, What's New, What's Yet to Come?" *Journal of International Economics***,** Vol. 66, pp. 363–384.

Chui, Michael, Paul Levine, S. Mansoob Murshed, and Joseph Pearlman, 2002, "North-South Models of Growth and Trade," *Journal of Economic Surveys*, Vol. 16, pp. 123–143.

Clark, Todd, and Eric van Wincoop, 2001, "Borders and Business Cycles," *Journal of International Economics,* Vol. 55, pp. 59–85.

Coleman, John W., 2007, "Accommodating Emerging Giants," Working Paper, (Durham: Duke University).

Cui, Li, and Murtaza Syed, 2007, "The Shifting Structure of China's Trade and Production," IMF Working Paper 07/214 (Washington: International Monetary Fund).

Currie, David, and David Vines, 1988, *Macroeconomic Interactions between North and South*, (New York: Cambridge University Press).

Darvas, Zsolt, Andrew Rose, and György Szapáry, 2005, "Fiscal Divergence and Business Cycle Synchronization: Irresponsibility is Idiosyncratic," NBER Working Paper 11580 (Cambridge: National Bureau of Economic Research).

Dées, Stéphane, and Isabel Vansteenkiste, 2007, "The Transmission of U.S. Cyclical Developments to the Rest of the World," ECB Working Paper 798 (Frankfurt: European Central Bank).

Eichengreen, Barry, and Ashoka Mody, 1998, "Interest Rates in the North and Capital Flows to the South: Is there a Missing Link?" *International Finance,* Vol. 1 (October), pp. 35–57.

Findlay, Ronald, 1980, "The Terms of Trade and Equilibrium Growth in the World Economy," *American Economic Review,* Vol. 70 (June), pp. 291–299.

Frankel, Jeffrey A., and Andrew K. Rose, 1998, "The Endogeneity of the Optimum Currency Area Criteria," *Economic Journal*, Vol. 108 (July), pp. 1009–1025.

Gaulier, Guillaume, Francoise Lemonie, and Deniz Unal-Kesenci, 2007, "China's Emergence and The Organization of Trade Flows in Asia," *China Economic Review*, Vol. 18, pp. 209–243.

He, Dong, Lillian Cheung and Jian Chang, 2007, "Sense and Nonsense on Asia's Export Dependency and the Decoupling Thesis," Hong Kong Monetary Authority Research Memorandum 06/2007, April 2007.

Helbling, Thomas, Peter Berezin, M. Ayhan Kose, Michael Kumhof, Doug Laxton, and Nikola Spatafora, 2007, "Decoupling the Train? Spillovers and Cycles in the Global Economy" in *World Economic Outlook, April* (Washington: International Monetary Fund), pp. 121–160.

Hoffmaister, Alexander, Mahmood Pradhan, and Hossein Samiei, 1998, "Have North-South Growth Linkages Changed?" *World Development,* Vol. 26 (May), pp. 791–808.

Hori, Masahiro, 2007, "The Evolution of Trade in Emerging Asia," in *Regional Economic Outlook Asia and Pacific, October* (Washington: International Monetary Fund), pp. 41-55.

Hsiao, Frank S. T., Mei-chu W. Hsiao, and Akio Yamashita, 2003, "The Impact of the U.S. Economy on the Asia-Pacific Region: Does It Matter?" *Journal of Asian Economics*, Vol. 14, pp. 219–241.

Hummels, David, Jun Ishii, and Kei-Mu Yi, 2001, "The Nature and Growth of Vertical Specialization in World Trade," *Journal of International Economics,* Vol. 54 (June), pp. 75–96.

Imbs, Jean, 2004, "Trade, Finance, Specialization and Synchronization," *Review of Economics and Statistics,* Vol. 86 (August), pp. 723–734.

_____, 2006, "The Real Effects of Financial Integration," *Journal of International Economics,* Vol. 68 (March), pp. 296–324.

International Monetary Fund, 2007, "Global Prospects and Policies," in *World Economic Outlook*, *October* (Washington: International Monetary Fund).

Kaminsky, Graciela L., and Carmen M. Reinhart, 1999, "The Twin Crisis: The Causes of Banking and Balance-of-Payment Problems," *American Economic Review,* Vol. 89 (June), pp. 473–500.

Kehoe, Timothy J., and Kim J. Ruhl, 2003, "How Important is the New Goods Margin in International Trade?" Research Department Staff Report No. 324 (Minneapolis: Federal Reserve Bank of Minneapolis).

Kose, M. Ayhan, and Kei-Mu Yi, 2001, "International Trade and Business Cycles: Is Vertical Specialization the Missing Link?" *American Economic Review, Papers and Proceedings,* Vol. 91 (May), pp. 371–375.

_____, 2006, "Can the Standard International Business Cycle Model Explain the Relation between Trade and Co-movement?" *Journal of International Economics,* Vol. 68 (March), pp. 267–295.

Kose, M. Ayhan, Christopher Otrok, and Charles Whiteman, 2003, "International Business Cycles: World, Region and Country-Specific Factors," *American Economic Review,* Vol. 93 (November), pp. 1216-39.

_____, 2008, "Understanding the Evolution of World Business Cycles," *Journal of International Economics,* vol. 75 (May), pp. 110-130.

Kose, M. Ayhan, Eswar Prasad, and Marco E. Terrones, 2003, "How Does Globalization Affect the Synchronization of Business Cycles?" *American Economic Review, Papers and Proceedings,* Vol. 93 (May), pp. 57–62.

Kose, M. Ayhan, Eswar Prasad, Kenneth Rogoff and Shang-Jin Wei, 2006, "Financial Globalization: A Reappraisal," IMF Working Papers 06/189, (Washington: International Monetary Fund).

Kose, M. Ayhan, Christopher Otrok, and Eswar Prasad, 2007, "Twin Peaks in Global Business Cycle Convergence," (unpublished; Washington: International Monetary Fund).

Kouparitsas, Michael A., 1998, "North-South Business Cycles," FRBC Working Paper No. 96-9 (Chicago: Federal Reserve Bank of Chicago).

_____, 2001, "Evidence of the North-South Business Cycles," *Economic Perspectives,* Federal Reserve Bank of Chicago, Vol. 25, No.1, pp. 24–45.

Kumakura, Masanaga, 2006, "Trade and Business Cycle Co-movements in Asia-Pacific," *Journal of Asian Economics***,** Volume 17, Issue 4, pp. 622-645.

Meyer, Laurence H., Brian M. Doyle, Joseph E. Gagnon, and Dale W. Henderson, 2004, "International Coordination of Macroeconomic Policies: Still Alive in the New Millennium?" in David Vines and Christopher L. Gilbert eds., *The IMF and Its Critics: Reform of Global Financial Architecture* (Cambridge, New York, and Melbourne: Cambridge University Press), pp. 59–105.

Lane, Philip R., and Gian Maria Milesi-Ferretti, 2006, "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004," IMF Working Paper 06/69 (Washington: International Monetary Fund).

Lenain, Patrick, and Alain de Serres, 2002, "Is the Euro Area Converging or Diverging? Implications for Policy Coordination," *The World Economy*, Vol. 25, pp. 1501–1519.

Levine, Ross, and David Renelt, 1992, "A Sensitivity Analysis of Cross-Country Growth Regressions," *American Economic Review*, Vol. 82, No. 4, pp. 942–963.

Lewis, Arthur, 1979, "The Slowing Down of the Engine of Growth," Nobel Prize Lecture, in Assar Lindbeck, ed. *Nobel Lectures-Economics 1969-1980*, (World Scientific Publishing Co., Singapore, 1992).

Loayza, Norman, Humberto Lopez, and Angel Ubide, 2001, "Comovements and Sectoral Interdependence: Evidence for Latin America, East Asia, and Europe," *IMF Staff Papers,* Vol. 48 No.2 (Washington: International Monetary Fund), pp. 367–396.

Nicita, Alessandro, and Marcelo Olarreaga, 2006, "Trade and Production Database 1976–2004," *World Bank Economic Review*, Vol. 21, No. 1, pp. 165–171.

Obstfeld, Maurice, and Kenneth Rogoff, 2001, "Global Implications of Self-Oriented National Monetary Rules," Center for International and Development Economics Research, University of California, Berkeley Paper No. C01-120.

Oudiz, Gilles, Jeffrey Sachs, Olivier J. Blanchard, Stephen N. Marris, and Wing T. Woo, 1984, "Macroeconomic Policy Coordination among the Industrial Economies," *Brookings Paper on Economic Activity,* Vol. 1984, No.1, pp. 1–75.

Prasad, Eswar, Kenneth Rogoff, Shang-Jin Wei, and M. Ayhan Kose, 2003, "Effects of Financial Globalization on Developing Countries: Some Empirical Evidence," IMF Occasional Paper No. 220 (Washington: International Monetary Fund).

Prasad, Eswar, 2004, **"**China's Growth and Integration into the World Economy: Prospects and Challenges," IMF Occasional Paper No. 232 (Washington: International Monetary Fund).

Qureshi, Zia, 1996, "Globalization: New Opportunities, Tough Challenges" *Finance & Development* Vol. 33, No: 1, pp. 30-33.

Rana, Pradumna B., 2006, "Economic Integration in East Asia: Trends, Prospects, and a Possible Roadmap," ADB Working Paper Series on Regional Economic Integration No. 2.

_____, 2007, "Economic Integration and Synchronization of Business Cycles in East Asia," *Journal of Asian Economics***,** Volume 18, Issue 5, pp. 711-725.

Reinhart, Carmen, and Vincent R. Reinhart, 2001, "What Hurts Most: G-3 Exchange Rate or Interest Rate Volatility?" in Sebastian Edwards and Jeffrey Frankel, eds., *Preventing Currency Crises in Emerging Markets* (Chicago: University of Chicago Press for the NBER), pp. 73–99.

Reisen, Helmut, Grandes, Martin, and Pinaud, Nicolas, 2005, "Macroeconomic Policies: New Issues of Interdependence," OECD Development Center Working Paper No. 241 (Paris: Organization for Economic Cooperation and Development).

Sachs, Jeffrey, and Andrew Warner, 1995, "Economic Reform and the Process of Global Integration," *Brookings Papers on Economic Activity*, Vol. 1995, No.1, pp. 1–118.

Shin, Kwanho, and Yunjong Wang, 2004, "Trade Integration and Business Cycle Co-Movements: The case of Korea with other Asian Countries," *Japan and the World Economy*, Vol. 16, pp. 213–230.

Tseng, Wanda S., and David G. Cowen, 2005, *India's and China's Recent Experience with Reform and Growth* (Palgrave Macmillan).

Wacziarg, Romain, and Karen Horn Welch, 2003, "Trade Liberalization and Growth: New Evidence," NBER Working Paper 10152 (Cambridge: National Bureau of Economic Research).

Weiss, John, 2005, "Export Growth and Industrial Policy: Lessons from the East Asian Miracle Experience," Working Paper, Asian Development Bank Institute.

Wilson, Dominic, and Roopa Purushothaman, 2003, "Dreaming with BRICs: The Path to 2050," Goldman Sachs, Global Economics Paper No. 50

Winters, L. Alan, 2004, "Trade Liberalization and Economic Performance: An Overview," *Economic Journal*, Vol. 114, No. 493 (February), pp. F4–F21.

World Bank, 2006, "Financial Integration among Developing Countries," in *Global Development Finance* 2006: *The Development Potential of Surging Capital Flows* (Washington: World Bank), pp. 107–136.

Yang, Yongzheng, 2003, "China's Integration into the World Economy: Implications for Developing Countries," IMF Working Paper 03/245 (Washington: International Monetary Fund).

Yi, Kei-Mu, 2003, "Can Vertical Specialization Explain the Growth of World Trade?" *Journal of Political Economy,* Vol. 111 (February), pp. 52–102.

Zebregs, Harm, 2004a, "Intraregional Trade in Emerging Asia," IMF Policy Discussion Paper 04/1 (Washington: International Monetary Fund).

_____, 2004b, "Is Emerging Asia Becoming an Engine of World Growth?" in *World Economic Outlook, April* (Washington: International Monetary Fund), pp. 34–35.

Aghion, Philippe, Philippe Bacchetta, and Abhijit Banerjee, 2004, "Financial Development and Instability of Open Economies," NBER Working Paper No. 10246 (Cambridge: National Bureau of Economic Research).

Ahumada, Hildegart A, and Maria Lorena Garegnani, 2003, "Wealth Effects in the Consumption Function of Argentina: 1980-2000," Anales de la 37th Reunión Annual de la Asociación Argentina de Economia Politica. Available via the Internet: http://www.cemla.org/pdf/redviii/argentina_Ahumada_Garegnani.pdf

Akçin, Ogün and Emre Alper, 1999, "Aggregate Consumption and Permanent Income: An Empirical Investigation for Turkey," *METU Studies in Development*, Vol.26(1), pp.1-23.

Akın, Çiğdem, 2008a, "Allocation of Financial Wealth in Turkey," Working Paper, George Washington University.

Akın, Çiğdem, 2008b, "Housing Market Characteristics and Estimation of Housing Wealth in Turkey," Working Paper, George Washington University.

Akkoyunlu, Şule, 2002, "Modeling Consumers' Expenditure in Turkey, 1962-1994," paper presented at First OxMetrics User Conference at Cass Business School, September 2003. Available via the Internet:

www.cass.city.ac.uk/conferences/oxmetrics2003/Sakkoyun.pdf

Alper, C. Emre and İsmail Sağlam, 2001, "The Transmission of Sudden Capital Outflow: Evidence from Turkey," *Eastern European Economics,* Vol. 39 (2), pp. 29-48.

Ando, Albert and Franco Modigliani (1963) "The 'Life Cycle' Hypothesis of Saving: Aggregate Implications and Tests", *American Economic Review,* Vol. 53 (1), pp.55-84.

Aron, Janine and John Muellbauer, 2006, "Housing Wealth, Credit Conditions, and Consumption" University of Oxford Centre for the Study of African Economies Working Paper No.252.

Aydede, Yiğit, 2007, "Aggregate Consumption Function and Public Social Security: The First Time Series Study for a Developing Country, Turkey," *Applied Economics*, pp. 1-20.

Aylward, Anthony and Jack Glen, 2000, "Some International Evidence on Stock Prices as Leading Indicators of Economic Activity," *Applied Financial Economics*, Vol. 10 (February), pp. 1-14.

Başçı, Erdem, 2005, "Credit Growth in Turkey: Drivers and Challenges," Bank of International Settlement Papers No. 28.

Başçı, Erdem, Özgür Özel, and Çağrı Sarıkaya, 2007, "The Monetary Transmission Mechanism in Turkey: New Developments," Research and Monetary Policy Department Working Paper No: 07/04 (Ankara: Central Bank of the Republic of Turkey).

BBC Country Profiles: Chronology of Key Events in Turkey http://news.bbc.co.uk/nolpda/ukfs_news/hi/newsid_1023000/1023189.stm?(none)

Bekaert, Geert, and Campbell R. Harvey, 2002, "Chronology of Important Financial, Economic and Political Events in Emerging Markets," Available via the Internet: http://www.duke.edu/%7Echarvey/Country_risk/chronology/chronology_index.htm

Bertaut, Carol C., 2002, "Equity Prices, Household Wealth, and Consumption Growth in Foreign Industrial Countries: Wealth Effects in the 1990s," International Finance Discussion Papers No. 724 (Washington: Board of Governors of the Federal Reserve System).

Binay, Şükrü and Ferhan Salman, 2008, "A Critique of Turkish Real Estate Market," Turkish Economic Association Discussion Paper 2008/8. Available via the Internet: http://www.tek.org.tr/dosyalar/critique_6may2008.pdf.

Boone, Laurence, Claude Giorno, and Peter Richardson, 1998, "Stock Market Fluctuations and Consumption Behavior: Some Recent Evidence," OECD Economics Department Working Papers No. 208 (Paris: Organization for Economic Cooperation and Development).

Boone, Laurence and Nathalie Girourard, 2002, "The Stock Market, the Housing Market and Consumer Behaviour," OECD Economic Studies, No. 35 2002/2, pp.175-200 (Paris: Organization for Economic Cooperation and Development).

Boratav, Korkut and Erinç Yeldan, 2006, "Turkey, 1980-2000: Financial Liberalization, Macroeconomic (In)Stability, and Patterns of Distribution," in Lance Taylor ed. *External Liberalization in Asia, Post-Socialist Europe, and Brazil* (Oxford University Press), pp. 417-456.

Cardarelli, Roberto, Deniz Igan, and Alessandro Rebucci, 2008, "The Changing Housing Cycle and the Implications for Monetary Policy" in *World Economic Outlook, April* (Washington: International Monetary Fund), pp. 103-132.

Case, Karl E., John M. Quigley, and Robert J. Shiller, 2005, "Comparing Wealth Effects: The Stock Market versus the Housing Market," *Advances in Macroeconomics*, Vol. 5 Issue 1, pp. 1-32.

Catte, Pietro, Nathalie Girouard, Robert Price, and Christophe André, 2004, "Housing Markets, Wealth, and the Business Cycle," OECD Economics Department Working Papers, No. 394 (Paris: Organization for Economic Cooperation and Development).

Central Bank of Republic of Turkey, 2002, *Impact of Globalization on Turkish Economy.* Available via the Internet: www.tcmb.gov.tr/yeni/evds/yayin/kitaplar/global.pdf

Ceritoğlu, Evren, 2003, "Consumption, Income and Liquidity Constraints: The Case of Turkish Economy," Master of Science Thesis submitted to the Department of Economics of Graduate School of Social Sciences (Ankara: Middle East Technical University).

Cheng, Arnold C. S. and Michael K. Fung, 2007, "Financial Market and Housing Wealth Effects on Consumption: A Permanent Income Approach," *Applied Economics*, pp.1-10.

Cheung, Yin-Wong and Lilian K. Ng, 1998, "International Evidence on the Stock Market and Aggregate Economic Activity," *Journal of Empirical Finance*, Vol. 5 (September), pp. 281-296.

Çimenoğlu, Ahmet and Nurhan Yentürk, 2005, "Effects of International Capital Inflows on the Turkish Economy," *Emerging Markets Finance and Trade,* Vol. 41(1), pp. 90-109.

Çulha, Ali Aşkın, 2006, "A Structural VAR Analysis of the Determinants of Capital Flows into Turkey," *Central Bank Review*, Vol. 6 (2), pp. 11-35.

De Gregorio, José, Pablo E. Guidotti, and Carlos A. Végh, 1998, "Inflation Stabilisation and the Consumption of Durable Goods," *The Economic Journal,* Vol. 108(January), pp. 105-131.

Dornbusch, Rudiger, Yung Chul Park, and Stijn Claessens, 2000, "Contagion: Understanding How It Spreads," *The World Bank Research Observer*, Vol. 15 (2), pp. 177-197.

Duygan, Burcu, 2005, "Aggregate Shocks, Idiosyncratic Risk, and Durable Goods Purchases: Evidence from Turkey's 1994 Financial Crisis," European University Institute.

Dvornak, Nikola and Marion Kohler, 2007, "Housing Wealth, Stock Market Wealth and Consumption: A Panel Analysis for Australia," *The Economic Record*, Vol.83 (261), pp. 117-130.

Edison, Hali, 2002, "Three Essays on How Financial Markets Affect Real Activity" in *World Economic Outlook, April* (Washington: International Monetary Fund), pp. 74-85.

Enders, Walter, 2003, *Applied Econometric Time Series,* 2nd Edition, Wiley Series in Probability and Statistics.

Engle, Robert F., and Clive W.J. Granger, 1987, "Co-integration and Error Correction: Representation, Estimation, and Testing," *Econometrica,* Vol.55, No. 2, pp. 251-276.

Friedman, Milton, 1957, *A Theory of the Consumption Function*, Princeton University Press, Princeton.

Funke, Norbert, 2002,"Stock Market Developments and Private Consumer Spending in Emerging Markets," IMF Working Paper 02/238 (Washington: International Monetary Fund).

Girouard, Nathalie and Sveinbjörn Blöndal, 2001, "House Prices and Economic Activity," OECD Economics Department Working Paper No. 279 (Paris: Organization for Economic Cooperation and Development).

Greene, William, 2008, *Econometric Analysis*, 6th edition, NJ: Pearson Prentice Hall.

Gylfason, Thorvaldur, 1981, "Interest Rates, Inflation, and the Aggregate Consumption Function," *The Review of Economics and Statistics,* Vol.63 (May), pp. 233-245.

Hargis, Kent, 2002, "Forms of Foreign Investment Liberalization and Risk in Emerging Stock Markets," *Journal of Financial Research,* Vol.25 (March), pp. 19-38.

Henry, Olan T., Nilss Olekalns, and Jonathan Thong, 2004, "Do Stock Market Returns Predict Changes to Output? Evidence from a Nonlinear Panel Data Model," *Empirical Economics,* Vol. 29 (September), pp. 527–540.

Hurvich, Clifford M. and Chih-Ling Tsai, 1989, "Regression and Time Series Model Selection in Small Samples," *Biometrika*, Vol. 76 (2), pp. 297-307.

Hylleberg, Svend, Robert F. Engle, Clive W.J. Granger, and Byung Sam Yoo, 1990, "Seasonal Integration and Cointegration," *Journal of Econometrics,* Vol. 44, Issue 1-2, pp. 215-238.

İnsel, Aysu, Mehmet Ali Soytaş, and Seda Gündüz, 2004, "The Direction, Timing and Causality Relationships between the Cyclical Components of Real and Financial Variables during the Financial Liberalization Period in Turkey," Turkish Economic Association Discussion Paper 2004/1.

IMF World Economic and Financial Surveys, Global Financial Stability Report, October 2008*,* "Determinants of Emerging Market Equity Prices," in *Financial Stress and Deleveraging: Macrofinancial Implications and Policy*, Chapter 4, pp. 145-146 (Washington: International Monetary Fund).

Johansen, Søren, 1988, "Statistical Analysis of Cointegration Vectors," *Journal of Economic Dynamics and Control,* Vol. 12, pp. 231-254.

Johansen, Søren, and Katarina Juselius, 1990, "Maximum Likelihood Estimation and Inference on Cointegration with Applications to the Demand for Money," *Oxford Bulletin of Economics and Statistics,* Vol. 52 (2), pp.169-210.

Juster, Thomas F. and Paul Wachtel, 1972, "Inflation and the Consumer," *Brookings Papers on Economic Activity*, Issue 1, pp.71-121.

Karolyi, G. Andrew, 2004, "The Role of American Depositary Receipts in the Development of Emerging Equity Markets," *Review of Economics and Statistics*, Vol.86 (August), pp.670-690.

Lall, Subir, Roberto Cardarelli, and Irina Tytell, 2006, "How Do Financial Systems Affect Economic Cycles?" in *World Economic Outlook, September* (Washington: International Monetary Fund), pp.105-138.

Liu, Xiaohui and Chang Shu, 2004a, "Consumption and Stock Markets in Greater China," *Applied Economics Letters*, Vol. 11(May), pp.365-368.

_____, 2004b, "Consumption and Stock Markets in Asian Economies," *International Review of Applied Economics*, Vol. 18 (October), pp. 483-496.

Ludvigson, Sydney and Charles Steindel, 1999, "How Important is the Stock Market Effect on Consumption?" *Federal Reserve Board of New York Economic Policy Review*, Vol. 5 (July), pp. 29-51.

Ludwig, Alexander and Torsten Sløk, 2004, "The Relationship between Stock Prices, House Prices and Consumption in OECD Countries," *Topics in Macroeconomics*, Vol. 4(1) Article 4.

Mauro, Paolo, 2003, "Stock Returns and Output Growth in Emerging and Advanced Economies," *Journal of Development Economics,* Vol. 71(June), pp. 129-153.

Mishkin, Frederic S., 2007, "Housing and Monetary Policy Transmission," paper presented at the Federal Reserve Bank of Kansas City 31st Economic Policy Symposium, "Housing and Housing Finance and Monetary Policy," August 31-September 1.

Muellbauer, John, 2007, "Housing, Credit and Consumer Expenditure," paper presented at the Federal Reserve Bank of Kansas City 31st Economic Policy Symposium, "Housing, Housing Finance and Monetary Policy," August 31-September 1.

Özcan, Kıvılcım Metin, Aslı Günay, and Seda Ertaç, 2003, "Determinants of Private Savings Behaviour in Turkey," *Applied Economics*, Vol. 35(12), pp. 1405-1416.

Poterba, James M., Andrew A. Samwick, Andrei Shleifer, and Robert J. Shiller, 1995, "Stock Ownership Patterns, Stock Market Fluctuations, and Consumption," *Brookings Papers on Economic Activity*, Vol. 1995(2), pp. 295-372.

Poterba, James M., 2000, "Stock Market Wealth and Consumption," *The Journal of Economic Perspectives*, Vol. 14 (2), pp. 99-118.

Romer, Christina, 1990, "The Great Crash and the Onset of the Great Depression," *The Quarterly Journal of Economics*, Vol. 105 (August), pp. 597-624.

Standard and Poor's Emerging Markets Database and IFC-Standard and Poor's Global Stock Markets Factbook (various years).

Starr-McCluer, Martha, 2002, "Stock Market Wealth and Consumer Spending," *Economic Inquiry, Oxford University Press*, Vol. 40(January), pp. 69-79.

Terrones, Marco E. and Enrique Mendoza, 2004, "Are Credit Booms in Emerging Markets a Concern?" in *World Economic Outlook, April* (Washington: International Monetary Fund), pp.147-166.

Türkan, Ercan, 2008, "Özel Tüketim Talebinin İzlenmesinde Kartlı Alışveriş: Yeni Bir Tüketim Endeksi Önerisi," Central Bank of Republic of Turkey Working Paper. Available via the Internet: http://www.tcmb.gov.tr/yeni/iletisimgm/ErcanTurkan_ette.pdf

Ulengin, Burç and Nurhan Yentürk, 2001, "Impacts of Capital Inflows on Aggregate Spending Categories: The Case of Turkey," *Applied Economics*, Vol. 33 (10), pp. 1321 – 1328.

Van Rijckeghem, Caroline and Murat Üçer, 2008, "The Evolution and Determinants of the Turkish Private Saving Rate: What Lessons for Policy?" Paper Presented at TÜSIAD-Koç University Economic Research Forum Conference on Micro-Macro Perspectives on Private Savings in Turkey in June 11, 2008.

Voyvoda, Ebru and Erinç Yeldan, 2005, "Turkish Macroeconomics under the IMF Program: Stangulation of the Twin-Targets, Lopsided Growth and Persistent Fragilities," Working Paper. Available via the Internet: http://www.bagimsizsosyalbilimciler.org/Yazilar_Uye/VYDec05.pdf.

Wickens, Michael, 2008, "Decentralized Economy" in *Macroeconomic Theory: A Dynamic General Equilibrium Approach,* Princeton University Press.

Yükseler, Zafer and Ercan Türkan, 2007, "Türkiye'de Hane Halkı: İşgücü, Gelir, Harcama ve Yoksulluk Açısından Analizi," Tartışma Metni 2007/04, Türkiye Ekonomi Kurumu. Available via the Internet: http://www.tek.org.tr/dosyalar/YUKSELER-TURKAN.pdf

_____, 2008, "Türkiye'de Hane Halkı: İşgücü, Gelir, Harcama ve Yoksulluk Açısından Analizi," Tüsiad-T/2008-03/455. Available via the Internet: http://www.tusiad.org/tusiad_cms.nsf/LHome/D60740BE86A268C0C2257413002BECBE/$FILE/HH_GENEL_SON%20.pdf

Chapter 5

Akkoyunlu, Şule, 2002, "Modeling Consumers' Expenditure in Turkey, 1962-1994," paper presented at First OxMetrics User Conference at Cass Business School, September 2003. Available via the Internet:

www.cass.city.ac.uk/conferences/oxmetrics2003/Sakkoyun.pdf

Asım Erdilek, Zaman August 13, 2007 "The emergence of the Turkish mortgage market " Available via the Internet:

http://www.todayszaman.com/tz-web/yazarDetay.do?haberno=119228

Aydede, Yiğit, 2007, "Saving and Social Security Wealth: A Case of Turkey," Networks Financial Institute Working Paper 2007-WP-03.

Başlevent, Cem and Meltem Dayıoğlu, 2005, "The Effect of Squatter Housing on Income Distribution in Urban Turkey," *Urban Studies,* Vol. 42 (January), pp. 31-45.

Binay, Şükrü and Ferhan Salman, 2008, "A Critique of Turkish Real Estate Market," Turkish Economic Association Discussion Paper 2008/8. Available via the Internet:

http://www.tek.org.tr/dosyalar/critique_6may2008.pdf.

Catte, Pietro, Nathalie Girouard, Robert Price, and Christophe André, 2004, " Housing Markets, Wealth, and the Business Cycle," OECD Economics Department Working Papers, No. 394 (Paris: Organization for Economic Cooperation and Development).

Case, Karl E., John M. Quigley, and Robert J. Shiller, 2005, "Comparing Wealth Effects: The Stock Market versus the Housing Market," *Advances in Macroeconomics*, Vol. 5 Issue 1, pp. 1-32.

Çanga, Ahmet, Ebru Çor, Gülay Kızıltaş Karademir, Alper Özkan, Pınar Türker-Devecigil, and Tolunay Yılmaz, 2002, "2000-2010 Türkiye Konut İhtiyacı Araştırması," T.C. Başbakanlık Konut Müsteşarlığı. Available via the Internet: http://www.konut.gov.tr/html/a_konutihtiyaci.html

Demir, Hülya, Vildan Kurt, and Volkan Çağdaş, 2003, "Housing Financing in Turkey," paper presented at the FIG Regional Conference in Marrakech, Morocco in December, 2003.

Demir, Hülya and Vildan Kurt Palabıyık, 2005, "Konut Ediniminde Uzun Vadeli İpotek Kredisi Sistemi, " *Jeodezi,Jeoinformasyon ve Arazi Yönetimi Dergisi,* 2005/92.

Erbaş, S. Nuri and Frank E. Nothaft, 2005, "Mortgage Markets in Middle East and North African Countries: Market Development, Poverty Reduction, and Growth," Journal of Housing Economics, Vol.14, pp. 212-241.

Erol, Işıl and Kanak Patel, 2004, "Housing Policy and Mortgage Finance in Turkey During the Late 1990s Inflationary Period," *International Real Estate Review,* Vol. 7 (1), pp. 98-120.

Housing Development Administration, "An Overview of the Main Principles of Underlying Housing Policy in Turkey." Available via the Internet: http://www.toki.gov.tr/english/overview.asp

Kayıket, Aslı, 2003, "The Process of Intergenerational Transmission of Housing Wealth," Master of Science Thesis, METU Department of City and Regional Planning. Available via the Internet: http://etd.lib.metu.edu.tr/upload/1043058/index.pdf

Pamuk, Ayşe, 1996, "Convergence Trends in Formal and Informal Housing Markets: the Case of Turkey," *Journal of Planning Education and Research*, Vol. 16, pp. 103-113.

Sanders, Anthony B., 2005, "Barriers to Homeownership and Housing Quality: The impact of International Mortgage Market," *Journal of Housing Economics*, Vol. 14(3), pp. 147-152.

Sarı, Ramazan, Bradley T. Ewing, and Bahadır Aydın, 2007, "Macroeconomic Variables and the Housing Market in Turkey," *Emerging Markets Finance and Trade*, Vol. 43 (5), pp. 5-19.

State Planning Organization (DPT), 2001, "Special Commission Report on Housing (Konut Özel İhtisas Komisyonu Raporu)", *8th Five Year Development Plan,* DPT 2594-ÖİK 606 ISBN 975-19-2759-5.

State Planning Organization (DPT), 2004, "8th Five Year Development Plan, 2001-2005, (Sekizinci Beş Yıllık Kalkınma Plan, 2001-2005)." Available via the Internet:

http://ekutup.dpt.gov.tr/program/2004.pdf.

T.C. Başbakanlık Konut Müsteşarlığı (Undersecretariat of Housing), Türkiye Konut Sahipliği Çalışması (Study of Home Ownership in Turkey), February 2003. Available via the Internet: http://www.konut.gov.tr/html/a_evsahipligi.html

T.C. Başbakanlık Konut Müsteşarlığı (Undersecretariat of Housing) 2000 Yılı Bina Stoğunun Yaş İtibariyle Değerlendirilmesi (Evoluation of Building Stock in 2000 by Age), April 2003.

Available via the Internet: http://www.konut.gov.tr/html/a_2000_yid.html

Tuhral, Meriç, 2005, "Real Estate Development Process in Turkey— with Some Differences from Sweden," Department of Infrastructure, Division of Building and Real Estate Economics Master of Science Thesis No. 313 (Stockholm: Royal Institute of Technology). Available via the Internet:

http: //www.infra.kth.se/byfa/publikationer/examensarbeiten/2005/313.pdf

Özsan, Onur and Cem Karakaş, 2005, "Housing Finance Practices and Development of a Secondary Mortgage Market in Turkey," *Housing Finance International,* March issue.

Özsan, Onur and Cem Karakaş, 2005, "Turkey: Rapid Progress towards a Secondary Mortgage Market," *Housing Finance International,* December issue.

Warnock, Veronica Cacdac and Francis E. Warnock, 2008, "Markets and Housing Finance" forthcoming in *Journal of Housing Finance.*

Yetgin, Feyzullah and Natalija Lepkova, 2007, "A Comparative Analysis on Housing Policies in Turkey and Lithuania," *International Journal of Strategic Property Management*, March issue.

Yükseler, Zafer, 2003, "2002 Hanehalkı Bütçe Anketi: Gelir Dağılımı ve Tüketim Harcamalarına İlişkin Sonuçların Değerlendirilmesi," Tartışma Metni 2003/06, Türkiye Ekonomi Kurumu. Available via the Internet:

http://www.tek.org.tr/dosyalar/HANE2002.pdf

_____, 2004, "1994, 2002 ve 2003 Yılları Hanehalkı Gelir ve Tüketim Harcamaları Anketleri: Anket Sonuçlarına Farklı Bir Bakış," Tartışma Metni 2004/23, Türkiye Ekonomi Kurumu. Available via the Internet:

http://www.tek.org.tr/dosyalar/Z-YUKSELER-03ANKET.pdf

_____, and Ercan Türkan, 2007, "Türkiye'de Hane Halkı: İşgücü, Gelir, Harcama ve Yoksulluk Açısından Analizi," Tartışma Metni 2007/04, Türkiye Ekonomi Kurumu. Available via the Internet:

http://www.tek.org.tr/dosyalar/YUKSELER-TURKAN.pdf

_____, and Ercan Türkan, 2007, "Türkiye'de Hane Halkı: İşgücü, Gelir, Harcama ve Yoksulluk Açısından Analizi," Tartışma Metni 2007/04, Türkiye Ekonomi Kurumu. Available via the Internet:

http://www.tek.org.tr/dosyalar/YUKSELER-TURKAN.pdf

Chapter 6

Beck, Thorsten, Ross Levine, and Normal Loayza, 1999, "Finance and the Sources of Growth," *Journal of Financial Economics*, Vol. 58, Issue 1-2, pp. 261-300.

Boratav, Korkut and Erinç Yeldan, February 2006, "Turkey, 1980-2000: Financial Liberalization, Macroeconomic Instability and Patterns of Distribution" Chapter 14 in Lance Taylor (ed.) *External Liberalization in Asia, Post-Socialist Europe, and Brazil,* New York: Oxford University Press, pp. 417-455.

Boyd, John H., Ross Levine, and Bruce D. Smith, 2001, "The impact of inflation on financial sector performance, "*Journal of Monetary Economics*, Vol. 47 (2), pp. 221-248.

Cizre-Sakallıoğlu, Ümit, and Yeldan, Erinç, 2000, "Politics, Society and Financial Liberalization: Turkey in the 1990s", *Development and Change*, Vol. 31(1), pp. 481–508

Çimenoğlu, Ahmet and Nurhan Yentürk, 2005, "Effects of International Capital Inflows on the Turkish Economy," *Emerging Markets Finance and Trade,* Vol. 41(1), pp. 90-109.

Geert Bekaert, Campbell R. Harvey, and Christian T. Lundblad, 2003, "Equity Market Liberalization in Emerging Markets" in *Finance and Real Economic Activity*, Proceedings of the Twenty-Seventh Annual Economic Policy Conference of the Federal Reserve Bank of St. Louis July-August 2003.

Levine, Ross, 1997, "Financial Development and Economic Growth: Views and Agenda", *Journal of Economic Literature*, Vol. 35, pp. 688-726

Levine, Ross, 2003, "More on Finance and Growth: More Finance, More Growth?" in *Finance and Real Economic Activity*, Proceedings of the Twenty-Seventh Annual Economic Policy Conference of the Federal Reserve Bank of St. Louis July-August 2003.

Hauner, David, 2006, "Fiscal Policy and Financial Development," IMF Working Paper WP/06/26. (Washington DC: International Monetary Fund)

Huybens, Elisabeth, and Smith, Bruce, 1998, "Financial Market Frictions, Monetary Policy, and Capital Accumulation in a Small Open Economy", *Journal of Economic Theory*, Vol. 81, pp. 353-400.

Huybens, Elisabeth, and Smith, Bruce, 1999, "Inflation, Financial Markets, and Long-Run Real Activity", *Journal of Monetary Economics*, Vol. 43, pp. 283-315.

Ize, Alain and Eduardo Levy-Yeyati, 1998, "Dollarization of Financial Intermediation: Causes and Policy Implications" IMF Working Paper WP/98/28 (Washington DC: International Monetary Fund)

World Bank, 2003, *Non-Bank Financial Institutions and Capital Markets in Turkey*, World Bank Country Study (Washington: The World Bank).

Calza, Alessandro and Stephane Dées, 2007, "The Euro Area in the Global Economy: Its Sensitivity to the International Environment and Its Influence on Global Economic Developments", in *The External Dimension of the Euro Area: Assessing the Linkages*, ed. by Flippo Di Mauro and Robert Anderton, Cambridge University Press.

Di Mauro, Filippo, Vanessa Smith, Stephane Dées and M. Hashem Pesaran, 2007, "Exploring the International Linkages of the Euro Area: a Global VAR Analysis," Journal of Applied Econometrics, vol. 22(1), pp. 1-38.

The Economist, "The Emerging Economies Decoupling 2.0," May 21, 2009. Available via the Internet: http://www.economist.com/displaystory.cfm?story_id=13697292

Égert, Balázs and Dubravko Mihaljek, 2007, "Determinants of House Prices in Central and Eastern Europe, BIS Working Papers No. 236 September (Basel: Bank for International Settlements).

European Central Bank, 2003, "Structural Factors in the E.U. Housing Markets," published report (Frankfurt: European Central Bank). Available via the Internet: http://www.ecb.int/pub/pdf/other/euhousingmarketsen.pdf

Fleissig, Adrian R, 1997, "The Consumer Consumption Conundrum: An Explanation," *Journal of Money, Credit & Banking*, Vol. 29 (2), pp.177-191.

Galesi, Alessandro and Silvia Sgherri, 2009, "Regional Financial Spillovers Across Europe: A Global VAR Analysis," IMF Working Paper WP/09/23 (Washington: International Monetary Fund).

Imbs, Jean and Marcel Fratzscher, 2008, "Risk Sharing, Finance and Institutions in International Portfolios," *Journal of Financial Economics*, Forthcoming. Available via the Internet: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1313628

International Monetary Fund, 2007, "Decoupling the Train? Spillovers and Cycles in the Global Economy," in *World Economic Outlook, April,* (Washington: International Monetary Fund), pp. 121-160.

International Monetary Fund, 2008*,* "Spillovers to Emerging Equity Markets" in *World Economic and Financial Surveys, Global Financial Stability Report, October* (Washington: International Monetary Fund), pp. 145-147.

International Monetary Fund, 2009a, "Crisis and Recovery" in *World Economic Outlook, April*, (Washington: International Monetary Fund), pp. 1-104.

International Monetary Fund, 2009b, "Assessing the Systemic Implications of Financial Linkages," in *World Economic and Financial Surveys: Global Financial Stability Report, April* (Washington: International Monetary Fund), pp. 73-110.

Lane, Philip and Gian Maria Milesi-Ferretti, 2006, The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004, IMF Working Paper No. 06/69 (Washington: International Monetary Fund).

Peltonen, Tuomas A., Ricardo M. Sousa and Isabel S. Vansteenkiste, 2009, "Wealth Effects in Emerging Market Economies," Working Paper Series No. 1000 / January (Frankfurt: European Central Bank).

Roubini, Nouriel, "The Worst Economic and Financial Crisis in Decades," August 20, 2008. Available via the Internet: http://www.rgemonitor.com/

Terrones, Marco and Christopher Otrok, 2004, "Three Current Policy Issues" in *World Economic Outlook, September* (Washington: International Monetary Fund), pp.71-89.

Zhu, Haibin and Kostas Tsatsaronis, 2004, "What Drives Housing Price Dynamics: Cross-Country Evidence," BIS Quarterly Review, March (Basel: Bank for International Settlements).

Zhu, Haibin, 2006, "The Structure of Housing Finance Markets and House Prices in Asia," BIS Quarterly Review, December (Basel: Bank for International Settlements).

Appendices

Chapter 2:

Appendix 2.1: Data Sources and Descriptions

Variable	Explanations:
Real GDP	Annual GDP at constant 1990 prices in units of national currency. United Nations online available at http://unstats.un.org/unsd/snaama/SelectionBasicFast.asp. 1970-2003.
Bilateral Exports	Total merchandise export from country i to j. Export data is annual and in nominal terms converted to U.S. dollars. IMF Direction of Trade Statistics, 1970-2003.
Bilateral Imports	Total merchandise import from country i to j. Import data is annual and in nominal terms converted to U.S. dollars IMF Direction of Trade Statistics, 1970-2003.
Total Exports	Total merchandise export from country i. Export data is annual and in nominal terms converted to U.S. dollars. IMF Direction of Trade Statistics, 1970-2003.
Total Imports	Total merchandise import from country i. Import data is annual and in nominal terms converted to U.S. dollars. IMF Direction of Trade Statistics, 1970-2003.
Nominal GDP	Annual nominal GDP measured in U.S. dollars. World Bank World Development Indicators 1970-2003.
Bilateral Nominal Exports and Imports of Product k	Bilateral annual intra-industry trade between country i and country j for 81 industries using four-digit (ISIC) classification. Trade and Production Database by Nicita and Olarreaga (2006) online available at http://www.worldbank.org/research/trade. Dataset is originally constructed from UN Comtrade Database. An earlier version of the data (1976-99) is used in the paper.
Free Trade Area Membership	Year that a free trade agreement or customs union is notified to GATT/WTO and becomes effective. World Trade Organization.

Agriculture, Value Added (% of GDP)	Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing as well as cultivation of crops and livestock production. World Development Indicators, 1970-2003.
Industry, Value Added (% of GDP)	Industry refers to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37) comprising value added in mining, manufacturing, gas, construction, electricity and water. World Development Indicators, 1970-2003.
Services, Value Added (% of GDP)	Services correspond to ISIC divisions 50-99 and include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate. World Development Indicators, 1970-2003.
Gross Private Capital Flows (% of GDP)	Gross private capital flows are the sum of the absolute values of direct, portfolio, and other investment inflows and outflows recorded in the balance of payments financial account, excluding changes in the assets and liabilities of monetary authorities and general government. World Development Indicators, 1970-2003.
Chinn and Ito Capital Account Openness Index	Chinn and Ito focus on the four basic indicators contained in the AREAER, namely the existence of multiple exchange rates, restrictions on current account transactions, restrictions on capital account transactions, and a variable indicating the requirement of the surrender of export proceeds. For controls on capital transactions, they use the share of a five-year window that capital controls were not in effect. Then, they construct an index for capital "openness" by taking standardized principal component of four indicators. This index takes on higher values the more open the country is to cross-border capital transactions. Menzie Chinn's web site online available at http://www.ssc.wisc.edu/~mchinn/readme_KAOPEN.pdf 1977-2000.
Agricultural Raw Materials Exports (% of merchandise exports)	Agricultural raw materials comprise SITC section 2 (crude materials except fuels) excluding divisions 22, 27 (crude fertilizers and minerals excluding coal, petroleum and precious stones), and 28 (metallic-ferous ores and scrap). World Development Indicators, 1970-2003.

Food Exports (% of merchandise exports)	Food comprises the commodities in SITC sections 0 (food and live animals), 1 (beverages and tobacco), 4 (animal and vegetable oils and fats) and SITC division 22 (oil seeds, nuts and kernels). World Development Indicators, 1970-2003.
Ores and Metals Exports (% of merchandise exports)	Ores and metals comprise the commodities in SITC sections 27 (crude fertilizer, minerals); 28 (metalliferous ores, scrap); and 68 (non-ferrous metals). World Development Indicators, 1970-2003.
Manufactures Exports (% of merchandise exports)	Manufactures comprise commodities in SITC sections 5 (chemicals), 6 (basic manufactures), 7 (machinery and transport equipment), and 8 (miscellaneous manufactured goods), excluding division 68 (non-ferrous metals). World Development Indicators, 1970-2003.
Government Final Consumption Expenditure	General government final consumption expenditure includes government current expenditures for purchases of goods and services including compensation of employees as well as most expenditures on national defense and security. World Development Indicators, 1970-2003.
Nominal Exchange Rate	Quarterly exchange rates between country i and U.S. dollar. IMF International Financial Statistics, 1970-2003.
CPI	Quarterly Consumer Price Index IMF International Financial Statistics, 1970-2003.
Real Oil Price	Nominal annual average crude oil price deflated by world CPI at 2000. IMF International Financial Statistics, 1970-2003.
Fuel Exports and Imports (% of merchandise exports)	Fuels comprise SITC section 3 (mineral fuels). World Development Indicators, 1970-2003.
Merchandise Exports	Merchandise exports show the f.o.b. value of goods provided to the rest of the world valued in U.S. dollars. Data are in current U.S. dollars. World Development Indicators, 1970-2003.
Merchandise Imports	Merchandise imports show the c.i.f. value of goods received from the rest of the world valued in U.S. dollars. Data are in current U.S. dollars. World Development Indicators, 1970-2003.

Distance	Distance in kilometers between capital cities of two countries http://www.indo.com/distance/index.html
Population	Total Population World Development Indicators, 1970-2003.
GDP per capita	Penn Real GDP per capita (in U.S. dollars using 1996 constant prices. World Tables 6.1, 1970-2003.

Chapter 3

Appendix 3.1: Summary Statistics
(Obtained from the Sample Used in the Benchmark GDP Growth Regression)

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	803	3.90	2.88	-7.12	18.24
Industry	754	4.45	5.03	-15.35	40.63
Services	753	4.16	4.00	-15.93	60.79
Agriculture	757	2.50	3.35	-10.07	28.16
Northern GDP	803	3.16	1.13	1.05	7.36
Emerging South GDP	803	5.36	1.53	-0.82	10.96
Northern Industry	803	2.66	1.78	0.09	9.75
Emerging South Industry	803	5.99	2.31	-1.78	15.51
Northern Services	803	3.32	1.02	0.56	7.39
Emerging South Services	803	5.58	1.78	0.05	17.08
Northern Agriculture	803	1.53	1.53	-2.15	7.60
Emerging South Agriculture	803	2.86	1.36	-6.27	11.71
log (Initial Percapita GDP)	803	8.30	1.13	5.92	10.46
Population Growth	803	1.92	1.13	-5.15	8.11
Investment / GDP	803	20.94	8.46	3.12	73.11
Government Spending / GDP	803	16.98	8.47	0.94	63.88
log (100 + Inflation)	803	4.75	0.34	4.57	8.80
Secondary Education (15+)	803	23.10	17.25	0.00	73.10
Ave_sachswarner	755	0.56	0.48	0.00	1.00
FDI-Portfolio Inflows	631	22.42	34.14	0.0003	440.98
Manufacturing Exports	707	39.28	30.67	0.27	96.27
Oil Price	803	13.05	21.32	-5.28	63.80

Appendix 3.2-a: Coefficient Estimates of the Benchmark GDP Growth Regressions Using Output-Weighted Indices

	GDP			
Variable	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)
Northern GDP	0.645***	0.842***	0.43	0.611***
	[0.14]	[0.21]	[0.28]	[0.21]
Northern GDP * D pre-globalization	0.137	-0.466*	0.601	0.0521
	[0.17]	[0.23]	[0.43]	[0.27]
Emerging South GDP	0.512***	-0.0204	0.992***	0.598***
	[0.12]	[0.11]	[0.23]	[0.19]
Emerging South GDP * D pre-globalization	-0.0261	0.15	-0.162	0.00918
	[0.11]	[0.14]	[0.25]	[0.19]
Observations	803	198	192	413
R-squared	0.25	0.57	0.44	0.23

Notes: The dependent variable is 5-year average of real GDP growth. The North and Emerging South GDP refer to the 5-year averages of the output-weighted GDP growth indices of the respective groups. Coefficient estimates regarding standard growth variables are not reported but available from the authors upon request. Heteroscedasticity consistent robust standard errors from the pooled OLS regression are reported in parenthesis. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

	GDP			
Variable	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)
Northern GDP	0.699***	0.681**	0.406	0.611***
	[0.14]	[0.25]	[0.27]	[0.21]
Northern GDP * D pre-globalization	-0.00226	-0.583**	0.539	0.0521
	[0.17]	[0.26]	[0.46]	[0.27]
Emerging South GDP	0.614***	-0.0812	0.974***	0.598***
	[0.12]	[0.11]	[0.22]	[0.19]
Emerging South GDP * D pre-globalization	0.0723	0.241*	-0.14	0.00918
	[0.11]	[0.14]	[0.25]	[0.19]
Observations	803	198	192	413
R-squared	0.26	0.55	0.45	0.23

Notes: The dependent variable is 5-year average of real GDP growth. The North and Emerging South GDP refers to the 5-year averages of the output-weighted growth indices of the respective groups. Each of the North and Emerging South countries has a respective country-specific output-weighted group-wide GDP index calculated by adjusting the PPP weights for the rest of the corresponding group. Coefficient estimates regarding standard growth variables are not reported but available from the authors upon request. Heteroscedasticity consistent robust standard errors from the pooled OLS regression are reported in parenthesis. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Appendix 3.2-b: Coefficient Estimates of the Benchmark Sectoral Growth Regressions

	Industry			
Variable	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)
Northern Industry	0.572***	0.627**	0.404	0.490*
	[0.16]	[0.24]	[0.24]	[0.27]
Northern Industry * D pre-globalization	0.199	-0.346	0.416	0.165
	[0.2]	[0.24]	[0.29]	[0.35]
Emerging South Industry	0.160*	-0.024	0.204	0.075
	[0.09]	[0.11]	[0.14]	[0.13]
Emerging South Industry * D pre-globalization	0.0848	0.0684	-0.0244	0.149
	[0.094]	[0.081]	[0.11]	[0.17]
Observations	754	191	184	379
R-squared	0.25	0.53	0.42	0.21

	Services			
Variable	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)
Northern Services	0.542***	0.651***	0.118	0.426*
	[0.13]	[0.18]	[0.18]	[0.23]
Northern Services * D pre-globalization	0.195	-0.413*	0.568**	0.0798
	[0.18]	[0.23]	[0.2]	[0.28]
Emerging South Services	0.0833	-0.247*	0.329**	-0.0251
	[0.095]	[0.13]	[0.16]	[0.13]
Emerging South Services * D pre-globalization	0.0184	0.132	-0.167	0.138
	[0.098]	[0.099]	[0.12]	[0.16]
Observations	753	191	184	378
R-squared	0.17	0.56	0.37	0.15

	Agriculture			
Variable	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)
Northern Agriculture	0.0382	0.0703	0.0709	0.0197
	[0.075]	[0.12]	[0.1]	[0.13]
Northern Agriculture * D pre-globalization	-0.321**	0.0276	-0.101	-0.517***
	[0.13]	[0.28]	[0.2]	[0.18]
Emerging South Agriculture	0.164	0.276	-0.342	0.269
	[0.14]	[0.39]	[0.41]	[0.16]
Emerging South Agriculture * D pre-globalization	0.122	-0.0287	0.309	0.0332
	[0.1]	[0.27]	[0.22]	[0.15]
Observations	757	191	184	382
R-squared	0.09	0.1	0.1	0.1

Notes: The dependent variables are 5-year averages of annual industry, services and agriculture value-added growth at constant local currency. Coefficient estimates regarding standard growth variables are not reported but available from the authors upon request. The North and Emerging South sectoral activity refer to the 5-year average growth of the country specific trade-weighted indices of the respective groups. Heteroscedasticity consistent robust standard errors from the pooled OLS regressions are reported in parenthesis. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Appendix 3.3: Controlling Outliers in the Benchmark Growth Regressions

	GDP			
Variable	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)
Northern GDP	0.646***	0.736***	0.436*	0.436**
	[0.13]	[0.13]	[0.26]	[0.2]
Northern GDP * D pre-globalization	-0.0908	-0.524***	0.289	-0.104
	[0.14]	[0.18]	[0.27]	[0.21]
Emerging South GDP	0.203***	-0.180**	0.375***	0.135
	[0.065]	[0.083]	[0.12]	[0.1]
Emerging South GDP * D pre-globalization	0.0816	0.234**	-0.0849	0.0995
	[0.079]	[0.1]	[0.15]	[0.12]
Observations	803	198	192	413
R-squared	0.26	0.62	0.42	0.2

	Industry			
Variable	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)
Northern Industry	0.616***	0.711***	0.431	0.441
	[0.16]	[0.16]	[0.29]	[0.27]
Northern Industry * D pre-globalization	0.0389	-0.307	0.249	0.0446
	[0.18]	[0.2]	[0.31]	[0.31]
Emerging South Industry	0.215***	-0.0662	0.251*	0.185
	[0.067]	[0.085]	[0.13]	[0.11]
Emerging South Industry * D pre-globalization	0.0844	0.101	-0.00233	0.105
	[0.073]	[0.085]	[0.13]	[0.13]
Observations	754	191	184	379
R-squared	0.26	0.62	0.4	0.22

	Services			
Variable	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)
Northern Services	0.602***	0.644***	0.227	0.476**
	[0.14]	[0.14]	[0.29]	[0.22]
Northern Services * D pre-globalization	0.205	-0.295	0.431	0.0926
	[0.14]	[0.19]	[0.28]	[0.22]
Emerging South Services	0.205***	-0.187**	0.338**	0.159
	[0.073]	[0.093]	[0.14]	[0.11]
Emerging South Services * D pre-globalization	-0.0572	0.0698	-0.155	0.0221
	[0.08]	[0.1]	[0.16]	[0.12]
Observations	753	191	184	378
R-squared	0.26	0.58	0.36	0.2

	Agriculture			
Variable	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)
Northern Agriculture	0.048	0.0401	0.0146	0.0333
	[0.082]	[0.21]	[0.13]	[0.13]
Northern Agriculture * D pre-globalization	-0.201*	0.143	-0.0116	-0.349**
	[0.12]	[0.3]	[0.2]	[0.18]
Emerging South Agriculture	0.206*	0.508	0.108	0.247
	[0.12]	[0.4]	[0.28]	[0.16]
Emerging South Agriculture * D pre-globalization	0.0368	-0.234	0.0701	-0.0326
	[0.097]	[0.29]	[0.2]	[0.14]
Observations	757	191	184	382
R-squared	0.12	0.13	0.09	0.11

Notes: The dependent variables are 5-year averages of annual GDP and sectoral value-added growth at constant local currency. Coefficient estimates regarding standard growth variables are not reported but available from the authors upon request. The North and Emerging South GDP and sectoral activity refer to 5-year average growth of the country specific trade-weighted indices of the respective groups. Robust standard errors are estimated using iteratively re-weighted least squares procedure that uses Huber weights and Tukey bi-weights in order to control for outliers. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent and 1 percent levels respectively.

Appendix 3.4-a: Coefficient Estimates of the Full Model for the GDP Growth Regressions

	GDP				GDP			
Variable	Whole Sample	North	Emerging South	Developing South	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Northern GDP	0.654***	0.701***	0.325**	0.539***	0.610***	0.818***	0.3	0.291*
	[0.11]	[0.19]	[0.15]	[0.17]	[0.11]	[0.19]	[0.21]	[0.17]
Northern GDP * D pre-globalization	0.0539	-0.658*	0.498**	-0.157	-0.0517	-0.609**	0.642**	-0.339
	[0.15]	[0.34]	[0.23]	[0.22]	[0.19]	[0.27]	[0.28]	[0.25]
Emerging South GDP	0.199***	-0.223**	0.297**	0.149	0.237***	-0.109	0.341**	0.194*
	[0.067]	[0.097]	[0.12]	[0.11]	[0.08]	[0.097]	[0.12]	[0.11]
Emerging South GDP * D pre-globalization	0.0413	0.282	-0.122	0.112	0.027	0.286*	-0.238	0.077
	[0.1]	[0.19]	[0.16]	[0.17]	[0.12]	[0.16]	[0.17]	[0.19]
Ave_sachswarner	1.506***	1.428***	0.583	1.664***				
	[0.38]	[0.48]	[0.63]	[0.4]				
FDI-Portfolio Inflows					0.00239	0.00876**	-0.00674	0.00792
					[0.0037]	[0.0032]	[0.0047]	[0.013]
Manufacturing Exports	0.0151**	0.000739	0.0158*	0.00301	0.0146**	0.00381	0.0142	0.000584
	[0.0058]	[0.0093]	[0.0085]	[0.0088]	[0.0061]	[0.009]	[0.0094]	[0.01]
Oil Price	0.00978**	0.00403	0.00659	0.0218***	0.0122**	-0.00281	0.00963	0.0274***
	[0.0047]	[0.0071]	[0.0099]	[0.0069]	[0.0049]	[0.0065]	[0.01]	[0.0073]
Observations	679	192	187	300	589	171	163	255
R-squared	0.3	0.62	0.45	0.25	0.27	0.5	0.46	0.26

Notes: The dependent variable is 5-year average of real GDP growth. Heteroscedasticity consistent robust standard errors from the pooled OLS regression are reported in parenthesis. Coefficient estimates from the standard growth variables are not reported but available from the authors upon request. The North and Emerging South GDP refer to the 5-year averages of the country specific trade-weighted GDP growth indices of the respective groups. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

Appendix 3.4-b: Coefficient Estimates of the Full Model for the Industry and Services Growth Regressions

	Industry				Industry			
Variable	Whole Sample	North	Emerging South	Developing South	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Northern Industry	0.716***	0.568**	0.452*	0.720**	0.641***	0.804***	0.408	0.516
	[0.16]	[0.21]	[0.22]	[0.29]	[0.18]	[0.24]	[0.24]	[0.33]
Northern Industry * D pre-globalization	0.0562	-0.501*	0.543	-0.249	-0.00118	-0.660**	0.898**	-0.562
	[0.21]	[0.28]	[0.33]	[0.36]	[0.31]	[0.31]	[0.4]	[0.48]
Emerging South Industry GDP	0.203**	-0.067	0.104	0.198	0.250**	0.0673	0.248	0.304**
	[0.089]	[0.1]	[0.14]	[0.16]	[0.098]	[0.12]	[0.15]	[0.14]
Emerging South Industry * D pre-globalization	0.13	0.154	-0.00734	0.261	0.0935	0.297**	-0.19	0.21
	[0.11]	[0.13]	[0.15]	[0.22]	[0.14]	[0.14]	[0.16]	[0.23]
Ave_sachswarner	1.759***	0.317	1.235	2.165***				
	[0.55]	[0.68]	[0.93]	[0.7]				
FDI-Portfolio Inflows					0.00299	0.0196***	-0.0189***	0.0183
					[0.0081]	[0.0048]	[0.0061]	[0.021]
Manufacturing Exports	0.0262***	0.00729	0.0334	0.0203	0.0257***	0.00443	0.0338	0.00823
	[0.0089]	[0.015]	[0.02]	[0.013]	[0.0092]	[0.012]	[0.02]	[0.016]
Oil Price	0.0117	-0.00124	0.0182	0.0260*	0.0113	-0.014	0.0205	0.0232
	[0.0086]	[0.0089]	[0.018]	[0.014]	[0.0092]	[0.0083]	[0.017]	[0.015]
Observations	652	187	179	286	578	168	160	250
R-squared	0.3	0.57	0.46	0.23	0.26	0.48	0.47	0.22

	Services				Services			
Variable	Whole Sample	North	Emerging South	Developing South	Whole Sample	North	Emerging South	Developing South
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Northern Services	0.512***	0.595***	0.126	0.309	0.437***	0.726***	0.0614	0.0477
	[0.14]	[0.17]	[0.17]	[0.29]	[0.15]	[0.2]	[0.19]	[0.29]
Northern Services * D pre-globalization	0.254	-0.465*	0.654***	0.0836	0.117	-0.471**	0.813***	-0.208
	[0.15]	[0.23]	[0.23]	[0.24]	[0.19]	[0.21]	[0.23]	[0.27]
Emerging South Services GDP	0.125	-0.252*	0.305*	0.0426	0.104	-0.195	0.310*	-0.0342
	[0.09]	[0.12]	[0.16]	[0.13]	[0.11]	[0.13]	[0.16]	[0.16]
Emerging South Services * D pre-globalization	-0.0194	0.17	-0.224	0.126	-0.021	0.208**	-0.280*	0.119
	[0.094]	[0.11]	[0.16]	[0.15]	[0.11]	[0.092]	[0.15]	[0.17]
Ave_sachswarner	1.449***	1.531**	-0.0943	2.004***				
	-0.46	[0.57]	[0.72]	[0.5]				
FDI-Portfolio Inflows					0.00128	0.00748**	-0.00513	0.00533
					[0.003]	[0.0027]	[0.0044]	[0.0086]
Manufacturing Exports	0.0145**	-0.0019	0.0125	0.0139*	0.0180***	-0.000253	0.013	0.0171**
	-0.0057	[0.0082]	[0.0089]	[0.0071]	[0.0061]	[0.0089]	[0.0089]	[0.0075]
Oil Price	0.0161**	0.00408	0.0118	0.0384***	0.0198***	-0.0057	0.0126	0.0492***
	-0.0062	[0.0069]	[0.0086]	[0.012]	[0.0068]	[0.0059]	[0.01]	[0.013]
Observations	652	187	179	286	578	168	160	250
R-squared	0.22	0.58	0.38	0.23	0.2	0.5	0.41	0.21

Notes: The dependent variables are 5-year averages of annual industry and services value-added growth at constant local currency. Heteroscedasticity consistent robust standard errors from the pooled OLS regressions are reported in parenthesis. Coefficient estimates from the standard growth variables are not reported but available from the authors upon request. The North and Emerging South sectoral activity refer to the 5-year averages of the country specific trade-weighted sectoral growth indices of the respective groups. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent and 1 percent levels respectively.

Appendix 3.5-a: Regional Extensions of the Benchmark and Full Regression Models (GDP and Industry Growth)

	GDP			GDP		
Variable	Asia-Pacific			Latin America and the Caribbean		
	(1)	(2)	(3)	(1)	(2)	(3)
Northern GDP	0.366	0.505**	0.42	0.516**	0.657**	0.393*
	[0.23]	[0.23]	[0.29]	[0.23]	[0.23]	[0.22]
Northern GDP * D pre-globalization	0.643**	0.590**	0.822**	-0.507*	-0.16	-0.354
	[0.22]	[0.23]	[0.32]	[0.29]	[0.46]	[0.48]
Emerging South GDP	0.347*	0.432**	0.445**	0.33	0.356	0.378
	[0.18]	[0.19]	[0.18]	[0.24]	[0.26]	[0.26]
Emerging South GDP * D pre-globalization	-0.270*	-0.199	-0.314	0.41	0.144	0.135
	[0.14]	[0.15]	[0.19]	[0.28]	[0.47]	[0.46]
Ave_sachswarner		1.257			1.563**	
		[0.83]			[0.68]	
FDI-Portfolio Inflows			-0.00523			0.00254
			[0.01]			[0.019]
Manufacturing Exports		0.0170**	0.016		-0.0116	-0.0247
		[0.0078]	[0.0096]		[0.011]	[0.016]
Oil Price		0.00501	0.00535		0.0187	0.0182
		[0.012]	[0.015]		[0.015]	[0.016]
Observations	123	113	103	206	180	155
R-squared	0.36	0.38	0.34	0.34	0.42	0.36

	Industry			Industry		
Variable	Asia-Pacific			Latin America and the Caribbean		
	(1)	(2)	(3)	(1)	(2)	(3)
Northern Industry	0.345	0.601	0.366	0.382	0.654*	0.427
	[0.39]	[0.46]	[0.39]	[0.35]	[0.37]	[0.4]
Northern Industry * D pre-globalization	0.840*	0.608	1.113**	-0.341	-0.187	-0.288
	[0.46]	[0.49]	[0.5]	[0.46]	[0.46]	[0.6]
Emerging South Industry	0.315	0.434**	0.503***	0.473**	0.500**	0.520**
	[0.21]	[0.18]	[0.16]	[0.23]	[0.19]	[0.22]
Emerging South Industry * D pre-globalization	-0.184	-0.0474	-0.222	0.268	0.215	0.0985
	[0.15]	[0.22]	[0.2]	[0.3]	[0.34]	[0.36]
Ave_sachswarner		1.721			2.012**	
		[1.32]			[0.93]	
FDI-Portfolio Inflows			-0.023			0.00957
			[0.013]			[0.034]
Manufacturing Exports		0.0306	0.031		0.00763	-0.0132
		[0.024]	[0.021]		[0.021]	[0.027]
Oil Price		0.00636	0.0113		0.0418**	0.0321
		[0.024]	[0.027]		[0.016]	[0.021]
Observations	115	109	102	204	180	155
R-squared	0.25	0.28	0.32	0.28	0.39	0.3

Notes: The dependent variables are 5-year averages of real GDP and industry value-added growth. Heteroscedasticity consistent robust standard errors from the pooled OLS regression are reported in parenthesis. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively. The Asia-Pacific and Latin America and the Caribbean samples are obtained by including all the Emerging South and Developing South economies in each geographical region. The first column of the tables refers to the standard benchmark growth regressions. Columns 2 and 3 refer to the full growth model with the 5-year averages of the de-jure trade openness, FDI-Portfolio liabilities to GDP ratio and oil price change added to the benchmark specification. The North and Emerging South GDP and industry activity refer to 5-year average growth of the country specific trade-weighted indices of the respective groups. Coefficient estimates regarding export structure, openness and common shock variables as well as the globalization and the pre-globalization impact of the North and Emerging South growth are reported. Coefficient estimates from other standard growth variables are not reported but they are available from the authors upon request.

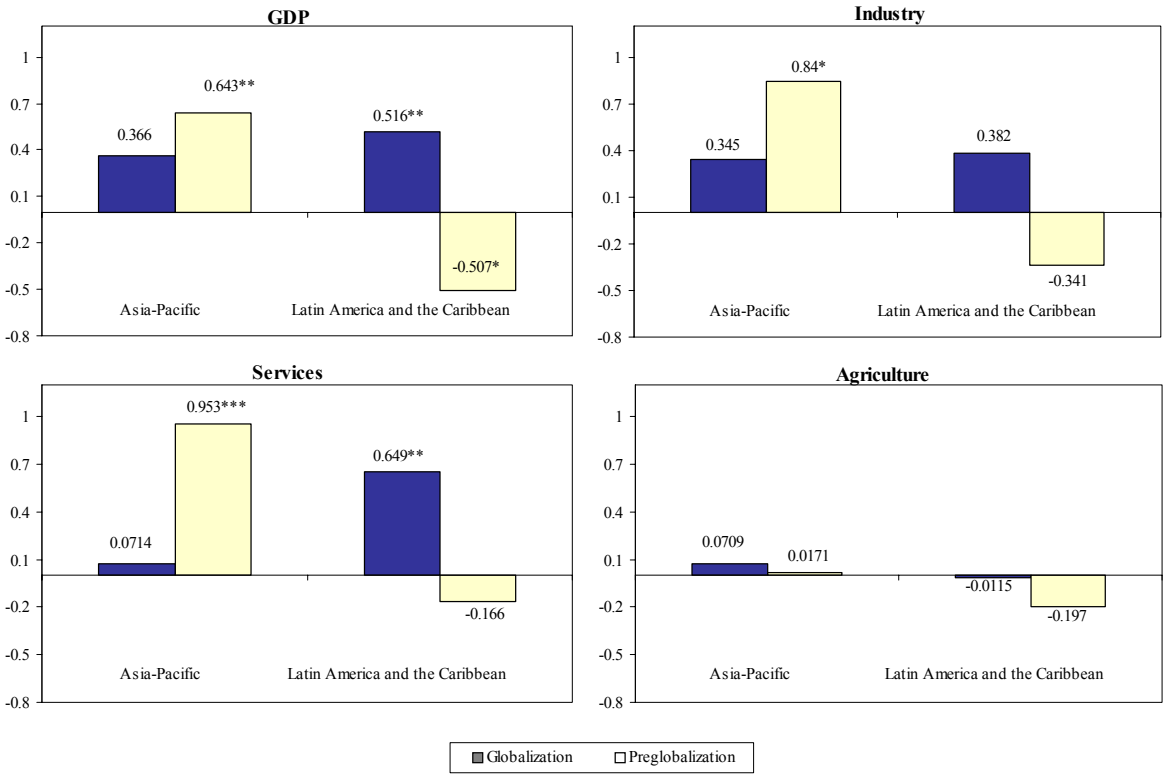
Appendix 3.5-b: Regional Extensions of the Benchmark and Full Regression Models (Services and Agriculture Growth)

	Services			Services		
Variable	Asia-Pacific			Latin America and the Caribbean		
	(1)	(2)	(3)	(1)	(2)	(3)
Northern Services	0.0714	0.209	-0.0148	0.649**	0.539*	0.448
	[0.25]	[0.23]	[0.28]	[0.29]	[0.31]	[0.31]
Northern Services * D pre-globalization	0.953***	0.952***	1.193***	-0.166	0.501	0.28
	[0.3]	[0.29]	[0.34]	[0.28]	[0.39]	[0.45]
Emerging South Services	0.351	0.431*	0.381	0.171	0.413	0.32
	[0.2]	[0.21]	[0.22]	[0.21]	[0.26]	[0.26]
Emerging South Services * D pre-globalization	-0.338**	-0.334**	-0.443**	0.181	-0.313	-0.243
	[0.12]	[0.14]	[0.16]	[0.21]	[0.34]	[0.38]
Ave_sachswarner		0.955			1.307*	
		[0.85]			[0.71]	
FDI-Portfolio Inflows			-0.0029			-0.00205
			[0.011]			[0.014]
Manufacturing Exports		0.0115	0.0111		-0.0007	-0.00455
		[0.0095]	[0.013]		[0.013]	[0.013]
Oil Price		0.0131	0.014		0.0274*	0.0317*
		[0.0098]	[0.013]		[0.015]	[0.017]
Observations	115	109	102	204	180	155
R-squared	0.34	0.33	0.33	0.27	0.3	0.3

	Agriculture			Agriculture		
Variable	Asia-Pacific			Latin America and the Caribbean		
	(1)	(2)	(3)	(1)	(2)	(3)
Northern Agriculture	0.0709	0.0813	0.113	-0.0115	-0.00511	-0.0389
	[0.1]	[0.12]	[0.13]	[0.13]	[0.14]	[0.12]
Northern Agriculture * D pre-globalization	0.0171	0.0243	-0.208	-0.197	-0.255	-0.104
	[0.32]	[0.38]	[0.54]	[0.19]	[0.18]	[0.21]
Emerging South Agriculture	-0.231	-0.267	-0.328	0.764**	0.593	0.663*
	[0.41]	[0.41]	[0.45]	[0.37]	[0.37]	[0.33]
Emerging South Agriculture * D pre-globalization	0.306	0.358	0.547	-0.329	-0.275	-0.475
	[0.27]	[0.33]	[0.36]	[0.25]	[0.24]	[0.32]
Ave_sachswarner		0.967*			0.105	
		[0.53]			[0.73]	
FDI-Portfolio Inflows			-0.00405			-0.00399
			[0.0031]			[0.013]
Manufacturing Exports		-0.000366	0.00		-0.0215*	-0.0218
		[0.013]	[0.011]		[0.011]	[0.013]
Oil Price		-0.00847	-0.017		0.00206	0.0142
		[0.01]	[0.011]		[0.0095]	[0.011]
Observations	118	109	102	204	180	155
R-squared	0.09	0.13	0.14	0.15	0.19	0.15

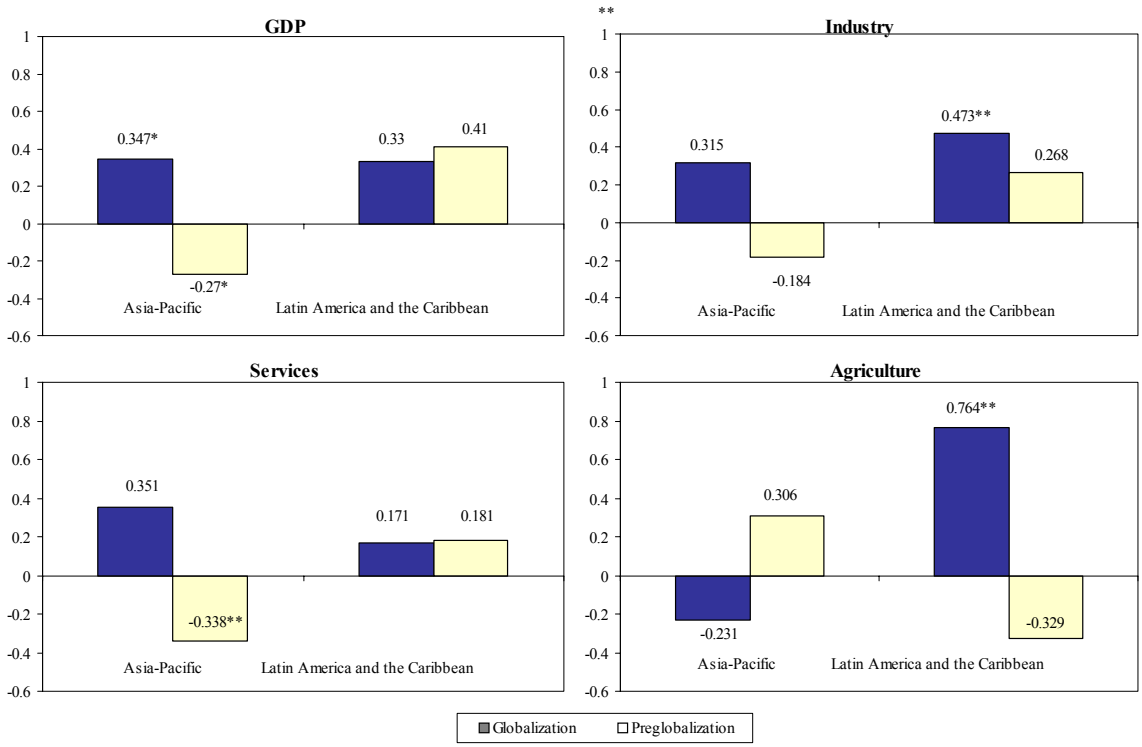
Note: The dependent variables are 5-year averages of annual services and agriculture value-added growth at constant local currency. Heteroscedasticity consistent robust standard errors from the pooled OLS regression are reported in parenthesis. The symbols *, ** and *** indicate statistical significance at the 10 percent, 5 percent and 1 percent levels respectively. The Asia-Pacific and Latin America and the Caribbean samples are obtained by including all the Emerging South and Developing South economies in each geographical region. First column of the tables refer to the standard benchmark growth regressions. Columns 2 and 3 refer to the full growth model with 5 year averages of the trade openness, FDI-Portfolio liabilities to GDP ratio and oil price change added to the benchmark specification. The North and Emerging South services and agriculture activity refer to 5-year average growth of the country specific trade-weighted indices of the respective groups. Coefficient estimates regarding structure, openness and common shock variables as well as the globalization and the pre-globalization impact of the North and Emerging South growth are reported. Coefficient estimates from other standard growth variables are not reported but available from the authors upon request.

Appendix 3.5-c:
Figure A: Growth Impact of the North
(Coefficient Estimates from the Benchmark Regressions)



Notes: The benchmark pooled OLS coefficient estimates showing the globalization and pre-globalization effects of the North and Emerging South GDP growth on the Asia-Pacific and Latin America and the Caribbean regions are taken from the first column of the tables in Appendix 3.5-a and 3.5b and the corresponding regressions using sectoral growth rates.

Appendix 3.5-c:
Figure B: Growth Impact of the Emerging South
(Coefficient Estimates from the Benchmark Regressions)



Notes: See Figure A.

Appendix 3.6: List of Countries

North (23)

East Asia and Pacific
Australia, Japan, New Zealand
North America
Canada, United States
Europe
Austria, Belgium, Switzerland, Denmark, Spain, Finland, France, United Kingdom, Germany,
Greece, Ireland, Iceland, Italy, Luxembourg*, Netherlands, Norway, Portugal, Sweden

Emerging South (23)

Latin America and the Caribbean
Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela.
South Asia, East Asia and the Pacific
China, Hong Kong, India, Indonesia, Korea, Malaysia, Pakistan, Philippines, Singapore, Thailand
Europe
Turkey
Middle East and North Africa
Egypt, Israel, Jordan, Morocco*
Sub-Saharan Africa
South Africa

Developing South (60)

Middle East and North Africa
Algeria, Tunisia, Syrian Arab Republic
South Asia, East Asia and the Pacific
Bangladesh, Nepal, Sri Lanka, Papua New Guinea
Latin America and the Caribbean
Barbados, Bolivia, Ecuador, El Salvador, Guatemala, Paraguay, Costa Rica, Dominican Republic,
Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Trinidad and Tobago**, Uruguay
Sub-Saharan Africa
Benin, Botswana, Burkina Faso*, Burundi*, Cameroon, Cape Verde*, Central African Republic,
Chad*, Comoros*, Congo, Dem. Rep., Congo, Rep., Cote d'Ivoire*, Equatorial Guinea*, Ethiopia*, Gabon*, Gambia, Ghana, Guinea*, Guinea-Bissau, Kenya, Lesotho, Madagascar*, Malawi, Mali, Mauritania, Mauritius, Mozambique, Niger, Nigeria*, Rwanda, Senegal, Seychelles**, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

Notes: * and ** indicate the countries that are not included in the benchmark and the full model regressions due to incomplete data.

Appendix 3.7: Data Sources and Descriptions

Variable	Explanations
GDP	Gross Domestic Product - constant 2000 U.S. dollars - constant PPP 2000 International dollars - constant local currency unit Primary Data Source is World Development Indicators. Missing Data is constructed using growth rates from World Economic Outlook Penn World Tables 6.1 Annual data available for 1960-2005.
PPP-per capita GDP **'log (Initial per capita GDP)"**	Annual Gross Domestic Product at constant PPP 2000 International dollars divided by Total Population For the panel estimation logarithm of the per capita GDP value in PPP terms at the initial year of the 5 year period used. Data is available for 1960-2005.
Gross Fixed Capital Formation (Investment) **"Investment / GDP"**	Gross fixed capital formation formerly gross domestic fixed investment includes land improvement, plant, machinery, equipment purchases and construction of roads, railways, schools, offices, hospitals, private residential dwellings and commercial and residential buildings. constant 2000 U.S. dollars constant local currency unit percentage value of constant LCU gross fixed capital formation over LCU GDP For the panel estimation 5 year averages used. Primary Data Source is World Development Indicators. Missing Data is constructed using growth rates from following data sources: World Economic Outlook (WEO) Penn World Tables 6.1 Data is available for 1960-2005.

Household Consumption	Household final consumption expenditure is the market value of all goods and services, including durable products purchased by households. constant 2000 U.S. dollars constant local currency unit Primary Data Source is World Development Indicators. Missing Data is constructed using growth rates from World Economic Outlook (WEO) Penn World Tables 6.1 Annual data is available for 1960-2005.
General Government Final Consumption Expenditure (Government Spending) **"Government Spending / GDP"**	General government final consumption expenditure includes government current expenditures for purchases of goods and services including compensation of employees as well as most expenditures on national defense and security. constant 2000 U.S. dollars constant local currency unit percentage value of constant LCU government spending over LCU GDP For the panel estimation 5 year averages used. Primary Data Source is World Development Indicators. Missing Data is constructed using growth rates from following data sources: World Economic Outlook (WEO) Penn World Tables 6.1 United Nations Statistical Database online available at http://unstats.un.org/unsd/snaama/SelectionBasicFast.asp at constant 1990 prices in units of national currency. Data is available for 1960-2005.

Exports	Exports of Goods and Services constant 2000 U.S. dollars constant local currency unit Primary Data Source is World Development Indicators. Missing Data is constructed using growth rates from following data sources: World Economic Outlook (WEO) United Nations Statistical Database online available at http://unstats.un.org/unsd/snaama/SelectionBasicFast.asp. at constant 1990 prices in units of national currency. Historical Volumes of UN Yearbook of National Accounts Statistics Expenditure on National Product Exports and Imports at constant prices of various years. Data is available for 1960-2005.
Imports	Imports of Goods and Services constant 2000 U.S. dollars constant local currency unit Primary Data Source is World Development Indicators. Missing Data is constructed using growth rates from following data sources: World Economic Outlook (WEO) United Nations Statistical Database online available at http://unstats.un.org/unsd/snaama/SelectionBasicFast.asp. at constant 1990 prices in units of national currency Historical Volumes of UN Yearbook of National Accounts Statistics Expenditure on National Product Exports and Imports at constant prices of various years. Historical Volumes of National Accounts Statistics of OECD countries using Exports and Imports data at constant prices of various years. Data is available for 1960-2005.

Trade Openness	(Exports + Imports) / GDP Authors' calculation using the ratio of constant 2000 U.S. dollar values of sum of exports and imports of goods and services over constant 2000 U.S. dollar GDP.
Agriculture, value added	Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing as well as cultivation of crops and livestock production. constant 2000 U.S. dollars constant local currency unit Primary Data Source is World Development Indicators. Missing Data is constructed using growth rates from following data sources: United Nations Statistical Database online available at http://unstats.un.org/unsd/snaama/SelectionBasicFast.asp. at constant 1990 prices in units of national currency Historical Volumes of UN Yearbook of National Account Statistics using data from GDP by kind of economic activity at constant prices of various years. Historical Volumes of National Accounts Statistics of OECD countries using data from GDP by kind of economic activity at constant prices of various years. Data is available for 1960-2005.
Industry, value added	Industry refers to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37) comprising value added in mining, manufacturing, construction, electricity, water, and gas. constant 2000 U.S. dollars constant local currency unit Primary Data Source is World Development Indicators. Missing Data is constructed using growth rates from following data sources: Industry constructed from United Nations database using sum of mining, manufacturing and construction at constant 1990 prices in national currency.

	United Nations Statistical Database online available at http://unstats.un.org/unsd/snaama/SelectionBasicFast.asp Historical Volumes of UN Yearbook of National Account Statistics using data from GDP by kind of economic activity at constant prices of various years. Historical Volumes of National Accounts Statistics of OECD countries using data from GDP by kind of economic activity at constant prices of various years. Data is available for 1960-2005.
Services, value added	Services correspond to ISIC divisions 50-99 and include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate. constant 2000 U.S. dollars constant local currency unit Primary Data Source is World Development Indicators. Missing Data is constructed using growth rates from following data sources: Services constructed from United Nations database using sum of wholesale, retail trade, restaurants and hotels, transport, storage and communication and others) at constant 1990 prices in National currency. United Nations Statistical Database online available at http://unstats.un.org/unsd/snaama/SelectionBasicFast.asp Historical Volumes of UN Yearbook of National Account Statistics using data from GDP by kind of economic activity at constant prices of various years. Historical Volumes of National Accounts Statistics of OECD countries using data from GDP by kind of economic activity at constant prices of various years. Data is available for 1960-2005.

Bilateral Exports	Total merchandise export from country i to j. Export data is annual and in nominal terms converted to U.S. dollars. IMF Direction of Trade Statistics Data is available for 1960-2005.
Bilateral Imports	Total merchandise import from country i to j. Import data is annual and in nominal terms converted to U.S. dollars. IMF Direction of Trade Statistics Data is available for 1960-2005.
Total Exports	Total merchandise export from country i. Export data is annual and in nominal terms converted to U.S. dollars. IMF Direction of Trade Statistics Data is available for 1960-2005.
Total Imports	Total merchandise import from country i. Import data is annual and in nominal terms converted to U.S. dollars. IMF Direction of Trade Statistics Data is available for 1960-2005.
CPI **"Inflation"**	Consumer price index Annual inflation measured as the percentage change of the consumer price index. For the panel estimation log (100+ 5 year average of % Inflation) used. World Economic Outlook Data is annual and available for 1960-2005.
Oil Price **"Oil Price"**	Average 3 spot price index of crude oil Changes in the real oil price are calculated as an annual percentage change in the index value. For the panel estimation 5 year averages of % oil price changes used. IMF International Financial Statistics Data is annual and available for 1960-2005.
Population Growth **"Population Growth"**	Total Population Population Growth measured as the annual percentage change. For the panel estimation 5 year averages of % population growth used. World Development Indicators Data is available for 1960-2005.

Human Capital Education **"Secondary Education (15+)"**	Level of human capital measured as the total percentage of the total population aged 15 and over with the secondary school attainment. For the panel estimation 5 year averages of education measure used. Robert J. Barro and Jong Wha Lee (April 2000) "International Data on Education Attainment" Center for International Development Working Paper No.42 http://www.cid.harvard.edu/ciddata/ciddata.html Data is available for the years 1960, 1965, 1970, 1975, 1980, 1985, 1990, 1995 and 2000.
Fuel exports and imports (% of merchandise exports and imports) **"Primary Fuels"**	Fuels comprise SITC section 3 (mineral fuels). World Development Indicators Data is available for 1960-2004.
Agricultural raw materials exports and imports (% of merchandise exports and imports)	Agricultural raw materials comprise SITC section 2 (crude materials except fuels) excluding divisions 22, 27 (crude fertilizers and minerals excluding coal, petroleum and precious stones), and 28 (metallic-ferous ores and scrap). World Development Indicators Data is available for 1960-2004.
Food exports and imports (% of merchandise exports and imports)	Food comprises the commodities in SITC sections 0 (food and live animals), 1 (beverages and tobacco), 4 (animal and vegetable oils and fats) and SITC division 22 (oil seeds, nuts and kernels). World Development Indicators Data is available for 1960-2004.
Ores and metals exports and imports (% of merchandise exports and imports)	Ores and metals comprise the commodities in SITC sections 27 (crude fertilizer, minerals nes); 28 (metalliferous ores, scrap); and 68 (non-ferrous metals). World Development Indicators Data is available for 1960-2004.
"Primary Non-Fuels"	Defined as agricultural raw materials, food, ores and metals.

Manufactures exports and imports (% of merchandise exports) **"Manufacturing"**	Manufactures comprise commodities in SITC sections 5 (chemicals), 6 (basic manufactures), 7 (machinery and transport equipment), and 8 (miscellaneous manufactured goods), excluding division 68 (non-ferrous metals). World Development Indicators Data is available for 1960-2004.
Merchandise exports	Merchandise exports show the f.o.b. value of goods provided to the rest of the world valued in U.S. dollars. Data are in current U.S. dollars. World Development Indicators Data is available for 1960-2004.
Merchandise imports	Merchandise imports show the c.i.f. value of goods received from the rest of the world valued in U.S. dollars. Data are in current U.S. dollars. World Development Indicators Data is available for 1960-2004.
"Manufacturing Exports"	For the panel estimation 5 year averages of % shares of the manufactures exports in merchandise exports used. World Development Indicators.
Porfolio Assets **Portfolio Liabilities** **FDI Assets** **FDI Liabilities** **Debt Assets** **Debt Liabilities** **GDP**	For definitions, methodology and sources: Lane, Philip R. and Milesi-Ferretti, Gian Maria (March 2006) "The External Wealth of Nations: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004" IMF Working Paper No. 06/69 Data set online available at http://www.imf.org/external/pubs/cat/longres.cfm?sk=18942.0 All data are annual and reported in millions of current U.S. dollars. Available for 1970-2004.
"FDI-Portfolio Inflows"	(FDI Liabilities + Portfolio Liabilities) / GDP *100 For the panel estimation, 5 year averages used. Authors' calculation from Milesi-Ferretti and Lane dataset

Bilateral Intra-Industry Trade Intensity	Period average of the Grubel-Lloyd Index constructed using bilateral annual exports and imports of product k between country i and country j for 81 industries using four-digit (ISIC) classification. Trade and Production Database by Nicita and Olarreaga (2006) online available at http://www.worldbank.org/research/trade. Dataset is originally constructed from UN Comtrade Database. Data is available for 1976-2004. (An earlier version of the dataset (1976-99) is used in this paper) $Intratrade_{\tau}(i,j) = \frac{1}{T}\sum_{t}\ (1 - \frac{\sum_{k}\left\|X^{k}_{i,j,t} - M^{k}_{i,j,t}\right\|}{\sum_{k}(X^{k}_{i,j,t} + M^{k}_{i,j,t})})$
Sachs-Warner Trade Liberalization Measure **"Ave_sachswarner"**	Sachs and Warner Trade Liberalization Measure is a dummy variable. A country is classified as closed if it displayed at least one of the following criteria for openness: 1-Average Tariff Rates of 40% or more 2-Non-tariff barriers covering 40% or more of trade 3-A black market exchange rate that is depreciated by 20% or more relative to official exchange rate 4-A state monopoly on major exports 5-A socialist economic system Dummy variables from 1950-1992 is constructed by Sachs and Warner (1995) and updated for the 1990-1999 period with the years of full liberalization for each country by Wacziarg and Welch (2003). For the panel estimation, 5 year period averages of the dummy variable used to indicate the fraction of years the country has an open trading regime. Data is available online at http://www.stanford.edu/~wacziarg/papersum.html http://www.bris.ac.uk/Depts/Economics/Growth/Sachs.hm
Dates of official financial liberalization based on stock market liberalization and removal of restrictions on foreign investment	Bekaert and Harvey (2002) constructed chronology of important financial, economic and political events for industrialized and developing countries. Dataset is available in: Bekaert, Geert, Campbell R. Harvey, and Christian Lundblad, 2005, "Does Financial Liberalization Spur Economic Growth?" *Journal of Financial Economics,* Vol. 77 (July), pp. 3–55.

Chapter 4

Appendix 4.1: Data Sources and Descriptions

Variable	Explanations
Components of the Private Final Consumption Expenditure	1987:Q1-2006:Q4 (Quarterly, Current Prices, New TL) Source: TÜİK (Turkish State Statistics Office). -Total Private Final Consumption Expenditure -Food and Beverages -Durable Goods -Semi Durable & Non-Durable Goods -Energy, Transportation and Communication -Services -Ownership of Dwellings
Logarithm of Real Per Capita Non-Durables Consumption ***gcfinexldr***	Logarithm of the per capita non-durables consumption constructed by total private final consumption expenditure minus the durables goods consumption deflated by consumer price index with 2000 base year and divided by population.
Logarithm of Real Per Capita Durables Consumption ***gcdr***	Logarithm of the real per capita durables consumption deflated by consumer price index with 2000 base year and divided by population.
Gross Domestic Product	1987:Q1-2006:Q4 (Quarterly, Current Prices, New TL) Source: TÜİK (Turkish State Statistics Office).
Expenditure Components of Gross Domestic Product	1987:Q1-2006:Q4 (Quarterly, Current Prices, New TL) Source: TÜİK (Turkish State Statistics Office). - Private Final Consumption Expenditure (C) - Private Gross Fixed Capital Formation (I) - Exports of Goods and Services (X) - Imports of Goods and Services (M)

Government Fiscal Balance	1987:Q1-2006:Q4 (Quarterly, Current prices, New TL) Source: GDS, C186GB State Planning Organization (DPT) definition: (Government Revenue-Government Expenditure) **Government Revenues:** Tax Revenues (Taxes on Income, Taxes on Wealth, Taxes on Goods and Services and Taxes on Foreign Trade); Non Tax Revenues; Special Revenues & Funds and Annexed Budget Revenues. **Government Expenditures:** Current (Compensation of Employees and Purchases of Goods and Services); Investment); Investment; Transfers (Interest Payments for Domestic Borrowing, Interest Payments for Foreign Borrowing; Transfers to State Economic Enterprises; Tax Rebates; Social Security Transfers; Other Transfers)
Net Factor Incomes Received from the Rest of the World	1987:Q1-2006:Q4 (Quarterly, Current prices, New TL) Source: OECD Quarterly Accounts TÜİK (Turkish State Statistics Office).
Consumption of Fixed Capital (Depreciation)	1987:Q1-2006:Q4 (Quarterly, Current Prices, New TL) Source: OECD Quarterly Accounts (TÜİK) Turkish State Statistics Office.
Logarithm of Real Per Capita Net Private Disposable Income *gyd*	Net Private Disposable Income (NPrDI) series are constructed using the following series: NPrDI = C + I – Government Savings + Net Exports + NFI – Depreciation where constituent series are: - Private Final Consumption Expenditure (C) - Private Gross Fixed Capital Formation (I) - (minus) Government Fiscal Balance as a proxy for Government Savings (Government Revenue – Government Expenditure) - Exports of Goods and Services (X) - (minus) Imports of Goods and Services (M) - Net Factor Incomes Received from the Rest of the World - (minus) Consumption of Fixed Capital as a proxy for Depreciation NPrDI series are deflated by the consumer price index with 2000 base year and divided by population. Logarithm of the per capita net private disposable income gives the *gyd* series used in the econometric estimation.

Completed or Partially Completed New Buildings and New Additions According to Occupancy Permits	1965-2005 (Annual) Source: TÜİK (Turkish State Statistics Office) -Number of Buildings -Floor Area (m2) -Value, TL -Number of Dwelling Units Data pertaining to building construction statistics are collected from municipalities of provinces, districts and sub-districts. Occupancy permits must be obtained for completed buildings. Buildings without permits in sub-districts, villages and squatter houses in large cities are excluded. http://www.die.gov.tr/TURKISH/SONIST/INSAAT/insaat.html http://www.die.gov.tr/konularr/yapiRuhsati03.htm http://www.die.gov.tr/TURKISH/SONIST/INSAAT/OZET/insozet.htm
Residential Construction According to Occupancy Permits	1993:Q1-2007:Q2 (Quarterly) Source: DPT (State Planning Organization) - Number of Residential Buildings - Area m2 - Value, TL Main Economic Indicators: Fixed Capital Investment. http://ekutup.dpt.gov.tr/tg/index.asp?yayin=teg&yil=0&ay=0
Production of dwellings (m2)	1986:Q4-2006:Q4 (Quarterly) Source: OECD Main Economic Indicators 186.PRCNDW01.ML
Total Number of Dwellings in 1984 and 2000	1984 and 2000 Building Census Source: TÜİK (Turkish State Statistics Office) and the Undersecretariat of Housing. - Total Number of Dwellings in Urban Areas (Cities and Towns) in 2000 -Total Number of Dwellings in Urban Areas with Construction Permits in 2000 -Total Number of Dwellings in Urban Areas with Occupancy Permits in 2000

Logarithm of Per Capita Real Housing Wealth *who*	See Akın (2008b) for a detailed explanation of the methodology used in constructing housing wealth series.
(Total) Time, Savings and Foreign Currency Deposits	1986:Q4-2006:Q4 (Quarterly, Current Prices, New TL) Source: International Financial Statistics 18625.ZF
Logarithm of Per Capita Real Time, Savings and Foreign Currency Deposits *deptsvfx*	Logarithm of time, savings and foreign currency deposits deflated by consumer price index with 2000 base year and divided by population.
Istanbul Stock Exchange Market Capitalization	1986:Q4-2006:Q4 (Quarterly, Current Prices, New TL) Monthly total market values of the companies traded on Istanbul Stock Exchange are averaged for each quarter. Source: IMKB Annual Factbook 2006
Logarithm of Real Per Capita Istanbul Stock Exchange Capitalization *isemcap*	Logarithm of the Istanbul Stock Exchange market capitalization deflated by consumer price index with 2000 base year and divided by population.
(Total) Domestic Credit by Deposit Banks to Private Sector	1986:Q4-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System TP.KM.C11.1
Logarithm of Per Capita Real Domestic Credit by Deposit Banks to Private Sector *bnkcred*	Logarithm of domestic deposit banks credit to private sector deflated by consumer price index with 2000 base year and divided by population.
3 Months' Time Deposits Rate	1987:Q1-2006:Q4 (Quarterly) Percent per Annum Source: International Financial Statistics 18660L. ZF
Real 3 Months' Time Deposits Rate **Fisher Equation** **R= (1+*i*)/(1+Π)-1**	Quarterly annualized inflation calculated by taking the percentage changes of the consumer price index of all items from the same quarter of the previous year.
Consumer Price Index -All Items	1987:Q1-2006:Q4 (Quarterly) Index publication base \ 2000Y Source: OECD Main Economic Indicators 186.CPALTT01.IXOB
Population	1987:Q1-2006:Q4 (Quarterly) Source: OECD Analytical Database 186.POP

CPI Based Real Effective Exchange Rate **Logarithm of CPI Based Real Effective Exchange Rate *rer***	1987:Q1-2006:Q4 (Quarterly) CPI Based Real effective Exchange Rates Index publication base \2000Y (2000=100) $REER = \prod_{j \neq i} \left[\frac{P_i R_i}{P_j R_j} \right]^{W_{ij}}$ The real effective exchange rate (REER) is obtained by weighted geometric average of the nominal exchange rate of Turkish Lira in U.S. dollars deflated by the consumer price index of trade partners relative to the nominal exchange rate of the trade partners in U.S. dollars deflated by the consumer price index of Turkey. P_i is Turkey's price index, R_i is nominal exchange rate of Turkish Lira in U.S. dollars, P_j is price index of country j, R_j is nominal exchange rate of country j's currency in U.S. dollars, W_{ij} is country j's weight for Turkey calculated by using the trade. The weights are based on trade in manufactures, primary commodities and tourism services. The CPI based real effective exchange rate index uses the IMF weights for 19 countries including Germany, USA, Italy, France, United Kingdom, Japan, Netherlands, Belgium, Switzerland, Austria, Spain, Canada, Korea, Sweden, Taiwan, Iran, Brazil, China and Greece. An increase in the index denotes an appreciation of the Turkish Lira whereas a decrease denotes depreciation. Source: OECD Main Economic Indicators 186.CCRETT01.IXOB
Gross National Product	1987:Q1-2006:Q4 (Quarterly, Current Prices, New TL) Source: TÜİK (Turkish State Statistics Office).
Portfolio Investment Equity Securities (Liabilities)	1986:Q4-2006:Q4 (Quarterly, Current Prices, U.S. dollars) Source: International Financial Statistics 18678BMDZF
Portfolio Investment Debt Securities Liabilities	1986:Q4-2006:Q4 (Quarterly, Current Prices, U.S. dollars) Source: International Financial Statistics 18678BNDZF
Foreign Bank Loans (Liabilities)	1986:Q4-2006:Q4 (Quarterly, Current Prices, U.S. dollars) Source: International Financial Statistics 18678BUDZF

Period Average of Market Exchange Rate	1986:Q4-2006:Q4 (Quarterly) National Currency per U.S. dollar Source: International Financial Statistics 186.RF.ZF.
Total Credit by Deposit Banks	1993:Q3-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System TP.KM.B33.1
Total Credit by Deposit Banks to Households	1993:Q3-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey TP.KM.B09.1
Consumer Credit by Deposit Banks to Households	1993:Q3-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey TP.KM.B10.1
Individual Credit Cards by Deposit Banks	1993:Q3-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey TP.KM.B14.1
Market Value of Stock Units held by Foreign Banks/Brokerage Houses or Individuals under the Custody of Clearing and Settlement Center of the Istanbul Stock Exchange (Takasbank) **Value of the Stock Transactions Realized on Behalf and Account of Foreign Banks/Brokerage Houses or Individuals**	Data obtained from Istanbul Stock Exchange, Portfolio Investments in Turkey. Available via the Internet: http://www.ise.org/members/portfolio.htm Data obtained from Central Registry Agency (MKK), Custody Information Report by Domestic and Foreign Customers. Available via the Internet: http://www.mkk.com.tr/MkkComTr/en/yayin/rap_yillik.jsp Data obtained from Clearing and Settlement Center of the Istanbul Stock Exchange (Takasbank) Report on Stock Units Held by Domestic-Foreign Investors. Available via the Internet: http://www.takasbank.com.tr/YerYabBakDagRap/ (December 1995-December 2006) IMKB-100 Index and Total Value Traded in the Istanbul Stock Exchange (U.S. dollar based) Data Available via the Internet: http://www.ise.org/data.htm Value of the Stock Transactions Realized on Behalf and Account of Foreign Banks/Brokerage Houses or Individuals (January 1997-August 2007). Data Available via the Internet: http://www.ise.org/data.htm (January 1997- December 2006)

Chapter 5

Appendix 5.1: Data Sources and Descriptions

Variable	Explanations
Consumer Credit for Housing in New Turkish Lira	2000:Q2-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System TP.KM.J004.1 and TP.KM.J0040.1
Consumer Credit for Automobiles in New Turkish Lira	2000:Q2-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System TP.KM.J005.1
Individual Credit Cards in New Turkish Lira	2000:Q2-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System TP.KM.J012.1
Other Consumer Credit in New Turkish Lira	2000:Q2-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System TP.KM.J006.1
Consumer Credit for Housing in Foreign Currency	2000:Q2-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System TP.KM.J008.1 and TP.KM.J0080.1
Consumer Credit for Automobile in Foreign Currency	2000:Q2-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System TP.KM.J009.1
Individual Credit Cards in Foreign Currency	2000:Q2-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System TP.KM.J013.1
Other Consumer Credit in Foreign Currency	2000:Q2-2006:Q4 (Quarterly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System TP.KM.J010.1
New Turkish Lira per American Dollar Selling Rate	1993:Q3-2006:Q4 Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System TP.DK.USD.S.YTL.1

Consumer Price Index	1986:Q4-2006:Q4 (Quarterly) Index publication base \ 2000Y Source: OECD Main Economic Indicators 186.CPALTT01.IXOB
Consumer Credit for Housing in New Turkish Lira	2006:M2-2006:M12 (Monthly, Current Prices, New TL) Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System Maturities: 1-12 Months TP.VK03.1; 13-36 Months TP.VK04.1; 37-60 Months TP.VK05.1; 61-120 Months TP.VK06.1; 121-180 Months TP.VK07.1; 181-240 Months TP.VK08.1; 241 and over Months TP.VK09.1
Consumer Credit for Housing in Foreign Currency	2006:M2-2006:M12 Source: The Central Bank of Republic of Turkey, Electronic Data Delivery System Maturities: 1-12 Months TP.VK24.1; 13-36 Months TP.VK25.1; 37-60 Months TP.VK26.1; 61-120 Months TP.VK27.1; 121-180 Months TP.VK28.1; 181-240 Months TP.VK29.1; 241 and over Months TP.VK30.
Completed or Partially Completed New Buildings and New Additions According to Occupancy Permits **-Number of Buildings** **-Floor Area (m2)** **-Value, TL** **-Number of Dwelling Units**	1965-2005 (Annual) Source: TÜİK (Turkish State Statistics Office) Data pertaining to building construction statistics are collected from municipalities of provinces, districts and sub-districts. Occupancy permits must be obtained for completed buildings. Buildings without permits in sub-districts, villages and squatter houses in large cities are excluded. http://www.die.gov.tr/TURKISH/SONIST/INSAAT/insaat.html http://www.die.gov.tr/konularr/yapiRuhsati03.htm http://www.die.gov.tr/TURKISH/SONIST/INSAAT/OZET/insozet.htm
Residential Construction According to Occupancy Permits **- Number of Residential Buildings** **- Area m2** **- Value, TL**	1993:Q1-2007:Q2 (Quarterly) Source: DPT (State Planning Organization) Main Economic Indicators: Fixed Capital Investment. http://ekutup.dpt.gov.tr/tg/index.asp?yayin=teg&yil=0&ay=0

Total Number of Dwellings in 1984 and 2000 - Total Number of Dwellings in Urban Areas (Cities and Towns) in 2000 -Total Number of Dwellings in Urban Areas with Construction Permits in 2000 -Total Number of Dwellings in Urban Areas with Occupancy Permits in 2000	1984 and 2000 Building Census Source: TÜİK (Turkish State Statistics Office) and The Undersecretariat of Housing.
Production of dwellings (m2)	1986:Q4-2006:Q4 (Quarterly) Source: OECD Main Economic Indicators 186.PRCNDW01.ML
Population	1987:Q1-2006:Q4 (Quarterly) Source: OECD Analytical Database 186.POP

Chapter 6

Appendix 6.1: Chronology of Major Legal, Economic, Political and Financial Events in Turkey

Jan-1986	Commencement of stock trading at the Istanbul Stock Exchange.
Apr-1987	Turkey's application to the European Economic Community.
July-1988	Foreign investors and investment funds were admitted to the Turkish Capital Market and were allowed to become partners in Turkish companies without pre-approval.
June-1989	Foreign investment funds approved by the Treasury were allowed to set up securities portfolios. The income from such portfolios would be tax free.
Aug-1989	IFC Liberalization Date. Issuance of Decree 32, which allows foreign institutional and individual investors to purchase or sell any type of registered securities and repatriate the capital and profits without any restrictions. Decree also allows Turkish citizens to buy foreign securities.
Sept-1989 **	Highest monthly percentage return of 1989.
Dec-1989	Turkish Investment Fund, Inc. launched on the NYSE.
Feb-1990	Liberalization of Capital Flows. Residents were allowed to invest abroad up to 5 million U.S. dollars through banks and special finance institutions domiciled in Turkey. Non-residents were allowed to purchase securities through intermediary institutions operating in Turkey. Residents were allowed to secure foreign credits provided that they use banks or special finance institutions as intermediaries.
July-1990	First American Depository Receipt was issued.
Nov-1990*	Lowest monthly percentage return of 1990. Withdrawal of capital by foreign investors due impending Gulf War following Iraqi invasion of Kuwait.
June-1991	Initiation of Bonds and Bills Market and commencement of Outright Purchases and Sales Transactions. Residents in Turkey were permitted to sell the securities, issued by companies in Turkey, abroad freely and issue securities and guarantees in foreign currency. Banks were allowed to extend foreign exchange credits to other banks without maturity restrictions.
Nov-1991**	Highest monthly percentage return of 1991. Coalition government was formed between DYP and Social Democrat Populist party following general elections and received vote of confidence.

Feb-1992	Commencement of trading of Corporate Bonds and Revenue-sharing Certificates in Bonds and Bills Market.
Feb-1992*	Lowest monthly percentage return of 1992. Tight Lira market, higher inflation and increases in bank deposit and treasury bill rates contributed to a drop in share prices.
Dec-1992	A tax decree introducing preferential tax rates on investments in mutual funds and investment trusts having a 25 percent equity content helped produce a 5.75percent return on Istanbul Stock Exchange.
Feb-1993**	Highest monthly percentage return of 1992. Declines in short-term T-bill and bank deposit interest rates, expectations for lower inflation rate during the year, and good financial results moved the share prices higher.
Apr-1993	Death of President Özal led to the Turkish parliament approving prime minister Süleyman Demirel as the new Turkish president. The subsequent approval of Ms. Tansu Çiller as prime minister and her pro-capital markets economic policy increased the institutional interest in stock market. Index increased by the end of the second quarter as a result of downward trend in inflation rates, good financial results for majority of listed companies and announcement by the privatization administration that twenty previously state-owned enterprises would be sold to domestic and foreign institutional and strategic investors. Foreign capital flows increased in 1993.
Jan-1994	Moody's and Standard & Poors downgraded Turkey's foreign debt rating. Exchange rate worries triggered panic selling by domestic and foreign institutional investors and resulted in net loss in Istanbul Stock Exchange.
Feb-1994*	Lowest monthly percentage return of 1994. Massive selling due to fear of currency devaluation.
Mar-1994	Central Bank abandoned its interventionist policy and began to gradually devalue Lira.
Apr-1994	Three-month austerity program was announced. Lira was devalued by 65percent Higher taxes and privatization program were introduced.
June-1994**	Highest monthly percentage return of 1994. IMF increased Turkey's credit line following the adoption of austerity program. Constitutional court announced its initial position favoring privatization bill. As a result, investors acquired large government-held stakes and privatization candidates. Privatization program was approved by the Constitutional Court on September 8.

Mar-1995**	Highest monthly percentage return of 1995. Signing of Customs Union agreement with the European Union. Lower T-bill rates, good corporate results, declining inflation, progress on privatization, reduced political uncertainty after general elections together with optimism over the customs union boosted investor interest in the industrial and export-oriented stocks in May and June.
Jul-1995	Istanbul Stock Exchange Settlement and Custody Bank (Takasbank) was created.
Nov-1995*	Lowest monthly percentage return of 1995. Collapse of the coalition government and resignation of prime minister Tansu Çiller. Weakness in Lira, rising interest rates and worries about high debt repayment burden in early 1996 led to investment capital flowing out of the stock exchange. Speculations about the Islamist Refah Party becoming the winner of the early elections in December.
Jan-1996**	Highest monthly percentage return of 1996. Stocks continued to surge in January, February and March due to efforts to form a coalition government DYP and ANAP. Coalition was formed in March.
Jul-1996*	Lowest monthly percentage return of 1996. DYP-ANAP coalition collapsed in June and the Islamist Refah Party ascended to power.
Aug-1996	Stocks of state owned distributor Petrol Ofisi and petrochemical refinery Petkim increased after the government made a statement that these two companies would be on the list for full-sale after completing the first phase of the state telecom company, Turkish Telecom.
Sept-1996	Refah Party government declared a program to reduce large public deficits by generating 10 billion U.S. dollars through sale of state property, introduction of new withholding tax on Treasury paper and securitization of major state infrastructure projects.
Nov-1996	Capital Markets Board decision to require the intermediary institutions to weekly advise the Istanbul Stock Exchange the total volume of trades they conducted in the name of foreign banks, brokerage houses and persons.
Jan-1997**	Highest monthly percentage return of 1997. Constitutional Court finally rejected the opposition by parliamentarians against the sell-off of Turkish Telecom. The partial privatization is expected to generate 3.5 billion U.S. dollars for the government in 1997.
Jun-1997	The Islamist Refah Party government stepped out of the government due to the pressures by the secularist military. The return to power of former pro-market prime minister Mesut Yılmaz was welcomed by the investors.

Jul-1997	Istanbul Stock Exchange International Market Depository Receipts Market, International Bonds and Bills Market and Foreign Mutual Funds Market started their operation.
Dec-1997	Government announced a shock program to control inflation in 1998.
Jan-1998	The Constitutional Court ruled that Refah Party violated the secularist constitution.
Apr-1998**	Highest monthly percentage return of 1998. Prime minister Yilmaz agreed to early elections in March 1999.
May-1998	Secondary public offering for İş Bankası raised 616 million U.S. dollars by the Privatization Board. Foreign investors started withdrawing from emerging markets following Asian crisis.
Aug-1998*	Lowest monthly percentage return of 1998. Russian crisis created massive shift of funds from ISE to developed markets because portfolio managers carried Turkish and Russian equities in the same basket.
Sept-1998	Government introduced a tax legislation lowering stock holding period from one year to 3 months to be exempt from capital gain taxes. The legislation also exempted foreign investors, fund portfolios and released insurance companies from reserve requirements if they invest their funds in the Turkish stock market.
Oct-1998	Tension between Syria and Turkey over Damascus's support for Kurdish rebels.
Dec-1998	President Süleyman Demirel appointed Bülent Ecevit, leader of the Democratic Left Party to form an interim government until general elections in April 1999.
Feb-1999	Stock market increased sharply because Abdullah Öcalan, leader of the Kurdish separatist rebel group, was arrested, which raised the hopes of an end to the 15 year long conflict.
Apr-1999	Prime minister Bülent Ecevit's party won the largest number of seats in the parliament. Three-party coalition with MHP and ANAP was formed.
Aug-1999*	Lowest monthly percentage return of 1999. Earthquake hit the country with the epicenter in industrial region İzmit. Nearly 17.000 were killed.

Nov-1999	A second earthquake occurred. However international aid from the IMF in the form of 500 million U.S. dollars emergency fund, and help from the World Bank, E.U. and Japan improved the chances for fast recovery. The three-party coalition made progress over 2000 budget increasing the likelihood of securing IMF stand-by agreement.
Dec-1999**	Highest monthly percentage return of 1999. IMF agreed to provide a 4 billion U.S. dollars two year stand-by loan for fighting inflation and 3 billion U.S. dollars three year loan from the World Bank for structural and financial reforms. The European Union invited Turkey to become an E.U. member candidate in December 10, 1999.
Jan-2000	Turkey expected to raise 7.6 billion U.S. dollars from privatization. International arbitration law was passed.
Feb-2000	Dispute started with Greece over off-shore mineral rights and territorial waters.
Mar-2000	Efforts to extend President Süleyman Demirel's term were rejected by the parliament.
Apr-2000**	Highest monthly percentage return of 2000. Turkey's long-term currency rating was upgraded. The successful privatization of cellular licenses boosted the market after İşbank and Telecom Italia offered 2.5 billion U.S. dollars for the first GSM license. Secondary public offering for Tüpraş (state petro-chemical plant) raised 1.14 billion U.S. dollars by the Privatization Board.
May 2000	Ahmet Necdet Sezer was elected Turkey's president.
Jul-2000	IMF pressured for the delayed sale of Turkish Telecom created tensions with the MHP in the coalition. Turkey failed to agree with the E.U. and the U.S. over the alleged Armenian Genocide Bill. Turkey also signed 20 billion U.S. dollars gas deal with Iran despite strong opposition by the U.S. Türkcell was charged with securities fraud over handling of its 1.9 billion U.S. dollars IPO.
Nov-2000*	Lowest monthly percentage return of 2000. Banking crisis was triggered by the liquidity problems and rumors of takeover. Investors pulled out 7 billion U.S. dollars in two weeks pushing the overnight interest to more than 1000percent.
Dec-2000	Crisis was contained with an IMF package of 10 billion U.S. dollars and new macroeconomic reform package.

Feb-2001	Public quarrel between president Ahmet Necdet Sezer and prime minister Bülent Ecevit over corruption probes triggered liquidity crisis followed by cabinet resignations. Central Bank lost 3.5 billion U.S. dollars in foreign currency reserves. Turkey's stabilization program based on crawling peg regime ended with 60percent devaluation of Lira. Free float regime was introduced. The governor of the Central Bank and undersecretary of the Treasury resigned. Standard & Poors revised country's outlook to negative.
Apr-2001**	Highest monthly percentage return of 2001. Signs of banking sector recovery and good corporate earnings by Petrol Ofisi increased the stock market. The IMF approved an additional 8 billion U.S. dollars loan package in May.
Sept-2001*	Lowest monthly percentage return of 2001. September 11 terrorist attacks in the U.S. Central Bank lowered interest rates to 59percent and Turkey swapped 60 billion U.S. dollars of bonds held by domestic banks and funds for new securities at lower value. Standard & Poors lowered debt ratings.
Oct-2001	Financial crisis was contained with 10 billion U.S. dollars funding from the IMF in exchange for Turkey's agreement to open its airspace to US antiterrorism forces, strengthen banking system and accelerate privatization.
March-2002	Secondary public offering for Petrol Ofisi (state petroleum and gas retail distribution company) raised 168 million U.S. dollars by the Privatization Board.
Jul-2002	Political turmoil started over pressures for early elections as Foreign Minister Cem resigned.
Aug-2002	Parliament approves the death sentence to be abolished except in war times and ban on Kurdish education and broadcasting to be lifted as part of reforms aimed at securing E.U. membership.
Nov-2002**	Highest monthly percentage return of 2002. Islamist-based AKP won landslide victory in general elections. Deputy leader Abdullah Gül appointed as the prime minister. Party promises to abide by secular principles of the constitution.
Dec-2002	Constitutional change allowed Recep Tayyip Erdoğan to run for parliament and become prime minister.
March 2003*	Lowest monthly percentage return of 2003. AKP leader Erdoğan wins seat in the parliament and become prime minister. Parliament decides not to allow deployment of US forces ahead of war in Iraq passing Turkish territory but allows US the use of air space.

Nov-2003	25 people were killed and more than 200 injured when two car bombs exploded near Istanbul's main synagogue. Suicide bombings at the British consulate and HSBC bank killed 28 people.
Dec-2004**	Highest monthly percentage return of 2004. The European Union leaders agreed to open talks in 2005 on Turkey's E.U. accession. Secondary public offering for THY (Turkish Airlines) raised 194 million U.S. dollars by the Privatization Board.
Jan-2005	New Lira currency introduced as six zeroes were removed from old Lira, ending an era in which bank notes were denominated in millions.
Oct-2005	E.U. membership negotiations officially launched after intense bargaining.
Nov-2005**	Highest monthly percentage return of 2005. Multi-billion dollar Blue Stream pipeline carrying Russian gas under the Black Sea to Turkey opened.
May-2006*	Lowest monthly percentage return of 2003. Gunman opens fire in Turkey's highest court killing prominent judge. Thousands protest against what is perceived as Islamist fundamentalist attack. Secondary Public Offering for THY (Turkish Airlines) raised 202 million U.S. dollars by the Privatization Board.
Dec-2006	The European Union partially freezes Turkey's membership talks because of Ankara's failure to open ports and airports to Cypriot traffic.

Sources: Bekaert, Campbell, and Harvey (2002), Standard & Poors Emerging Markets Fact Books (1990-2002), BBC Country Profiles: Chronology of key events in Turkey, Istanbul Stock Exchange. * and ** indicate the lowest and the highest monthly percentage return in that given year respectively.

Appendix 6.2: Data Sources and Descriptions

Association of Capital Market Intermediary Institutions of Turkey (TSPAKB)
Capital Markets Factsheet. Available via the Internet:
http://www.tspakb.org.tr/english/databank.htm

Association of Capital Market Intermediary Institutions of Turkey (TSPAKB),
Equity Ownership in Turkey. Available via the Internet:
http://www.tspakb.org.tr/english/index_eng.htm

Association of Capital Market Intermediary Institutions of Turkey (TSPAKB),
"Turkey Capital Markets Report, 2001-2006: Investor Profile and Analysis."
Available via the Internet: http://www.tspakb.org.tr/

Association of Capital Market Intermediary Institutions of Turkey (TSPAKB),
"Turkey Capital Markets Report, 2001-2006: Capital Markets."
Available via the Internet: http://www.tspakb.org.tr/

Association of Capital Market Intermediary Institutions of Turkey (TSPAKB)
Sermaye Piyasası'nda Gündem, September 2007.

BBC Country Profiles: Chronology of Key Events in Turkey
http://news.bbc.co.uk/nolpda/ukfs_news/hi/newsid_1023000/1023189.stm?(none)

Beck, Thorsten, Asli Demirgüç-Kunt, and Ross Levine
"A New Database on Financial Development and Structure, 2007"
Available via the Internet: www.worldbank.org

Bekaert, Geert, and Campbell R. Harvey, 2002,
"Chronology of Important Financial, Economic and Political Events in Emerging Markets"
Available via the Internet:
http://www.duke.edu/percent7Echarvey/Country_risk/chronology/chronology_index.htm

Capital Markets Board of Turkey (SPK), Annual Reports (2000-2006)
Available via the Internet: http://www.cmb.gov.tr/news/news.htm?tur=annualreport

Capital Markets Board of Turkey (SPK), Developments in Turkish Capital Markets,
Report 2007-I.
Available via the Internet: http://www.cmb.gov.tr/news/news.htm?tur=annualreport

Capital Markets Board of Turkey (SPK), Monthly Statistical Bulletin, July 2007.
Available via the Internet: http://www.spk.gov.tr/istatistikler/index.html

Closing Values of IMKB-100 Stock Market Indices.
Available via the Internet: http://www.ise.org/data.htm

Data on Outstanding Securities obtained from Monthly Statistical Bulletins of Capital Markets Board of Turkey (SPK) (various years).
Available via the Internet:http://www.spk.gov.tr/HaberDuyuru/aylikbulten/aylikbulten.html

Data on Historical Consolidated Portfolio Structure of Mutual Funds
(December 1987-July 2007) obtained from Monthly Statistical Bulletins of Capital Markets Board of Turkey (SPK), July 2007.
Available via the Internet:
http://www.spk.gov.tr/HaberDuyuru/aylikbulten/2007/aylik_istatistik_bulteni_2007_7.html

Data on Historical Consolidated Portfolio Structure of Pension Plans
(December 2003-June 2007) obtained from Monthly Statistical Bulletins of Capital Markets Board of Turkey (SPK), July 2007.
Available via the Internet:
http://www.spk.gov.tr/HaberDuyuru/aylikbulten/2007/aylik_istatistik_bulteni_2007_7.html

Data on Total Net Asset Values of Mutual Funds in Emerging Markets obtained from Investment Company Institute.
Available via the Internet: http://www.icifactbook.org/fb_data.html#section7

Data on Initial and Secondary Public Offerings in Istanbul Stock Exchange.
Available via the Internet: http://www.imkb.gov.tr/halka_arz.htm

Data on Quarterly U.S. Dollar Net (Liabilities-Assets) Portfolio Investment Equity Securities, Portfolio Investment Debt Securities and Foreign Bank Loans obtained from International Financial Statistics.

Data on Domestic and Foreign Debt Stock obtained from State Planning Organization.

Data on Percentage Distribution of Consolidated Government Budget obtained from State Planning Organization.

Federation of European Securities Exchanges Share Ownership Structure in Europe 2007: United Kingdom (London Stock Exchange, 1963-2004). Available via the Internet:
www.fese.eu/_lib/files/FESEpercent20Sharepercent20Ownershippercent20Structurepercent20inpercent20Europepercent202006.pdf

IMKB-100 Index and Total Value Traded in the Istanbul Stock Exchange (U.S. dollars based) Data Available via the Internet: http://www.ise.org/data.htm

Major Developments since the Inception of the ISE.
Available via the Internet: http://www.ise.org/about/majordev.htm

Market Value of Stock Units held by Foreign Banks/Brokerage Houses or Individuals under the Custody of Clearing and Settlement Center of the Istanbul Stock Exchange (Takasbank) (December 1995-August 2007).

- Data obtained from Istanbul Stock Exchange, Portfolio Investments in Turkey. Available via the Internet: http://www.ise.org/members/portfolio.htm

- Data obtained from Central Registry Agency (MKK), Custody Information Report by Domestic and Foreign Customers. Available via Internet: http://www.mkk.com.tr/MkkComTr/en/yayin/rap_yillik.jsp

- Data obtained from Clearing and Settlement Center of the Istanbul Stock Exchange (Takasbank) Report on Stock Units Held by Domestic-Foreign Investors. Available via the Internet: http://www.takasbank.com.tr/YerYabBakDagRap/

Value of the Stock Transactions Realized on Behalf and Account of Foreign Banks/Brokerage Houses or Individuals (January 1997-August 2007). Data Available via the Internet: http://www.ise.org/data.htm

Standard and Poor's Emerging Markets Database and IFC-Standard and Poor's Global Stock Markets Factbooks (1990-2002).

State Planning Organization (DPT), Developments in Financial Markets, January 2005, December 2006 and August 2007. Available via the Internet: http://ekutup.dpt.gov.tr/

State Planning Organization (DPT), Main Economic Indicators 1950-2006: Money and Banking–Total Financial Assets. Available via the Internet: http://ekutup.dpt.gov.tr/ekonomi/gosterge/tr/1950-06/esg.htm

World Federation of Exchanges, "Market Concentration: 10 Most Capitalized and Most Traded Domestic Companies," in *Annual Report and Statistics, 2006*. Available via the Internet: http://www.world-exchanges.org/WFE/home.Asp?nav=ie

World Federation of Exchanges, "Gross Amount of New Capital Raised and Stock Markets Importance in the National Economy" in Annual Statistics (various years). Available via the Internet: http://www.world-exchanges.org/WFE/home.asp?menu=27

World Federation of Exchanges Share Ownership Surveys:
Brazil (Bovespa, 2001-2007); Korea (Korea Stock Exchange and KOSDAQ, 2002-2003); Thailand (Stock Exchange of Thailand and Market for Alternative Investment, 2003); United States (NYSE Share Ownership Survey, 2000).
Available via the Internet:
http://www.world-exchanges.org/WFE/home.asp?action=document&menu=266