The Influence of Environmental Factors and Organizational Characteristics on Federally-Funded Health Centers' Financial and Non-Financial Performance

By DaShawn Groves

B.S. in Integrated Science and Technology, May 2002, James Madison University
MPH in Health Policy and Management, May 2006, Emory University

A Dissertation submitted to

The Faculty of
The Milken Institute School of Public Health
of The George Washington University
in partial fulfillment of the requirements
for the degree of Doctor of Public Health

August 31, 2016

Dissertation directed by

Leighton Ku
Professor of Health Policy and Management

The Milken Institute School of School of Public Health and Health Services of The George Washington University certifies that DaShawn Groves has passed the Final Examination for the degree of Doctor of Public Health as of June 16, 2016. This is the final and approved form of the dissertation.

The Influence of Environmental Factors and Organizational Characteristics on Federally-Funded Health Centers Financial and Non-Financial Performance

DaShawn Groves

Dissertation Research Committee:

Leighton Ku, Professor of Health Policy and Management, Dissertation Director

Peter Shin, Associate Professor of the Department of Health Policy and Management, Committee Member

Andrew Bazemore, Director, Robert Graham Center, Committee Member

© Copyright 2016 by DaShawn Groves
All rights reserved

Dedication

The author wishes to dedicate this work to his grandfather, Francis “Pappap” Morrison who always said, “Education is the one thing that no one can take away from you.” I only wish that he was here today to see what I have finally accomplished. I know he is shining down on me and would be proud of his grandson.

Acknowledgements

I would like to thank my dissertation committee as they have all encouraged me to stay motivated along this long process. First most, I would like to think Leighton Ku, for his sage advice, patience, and knowledge of methods and policy. I could not have asked for a better Chair. I now appreciate the cautionary notes that I was being too ambitious tackling too many outcome variables and I needed to consolidate my findings. I am very grateful for his patience. I would also like to thank you, Peter Shin for his thoughtful insights on my findings and also pointing out when I was being more of an advocate than an academic. I would like to thank Andrew Bazemore for the trips to Starbucks to talk about the environmental factors, how to disseminate my work and what's next in my professional career. I would like to think Peter Long, who perhaps did not know what he was getting himself into when he called me to discuss FQHCs and payment reform. I appreciate him dedicating the time and directing me to previous work in this area specific to California health centers. I would like thank Sara Rosenbaum for her encouragement and her ability to get me to think about the practical implications of my findings.

I would also like to thank Marsha Regenstein and Anne Markus, without them I may not have made it through. Both of them being there when I thought I would not make it to the end. To Brian Whittaker, for eight years he had to endure the starts and stops of working on my dissertation. I appreciate his willingness to remind me that my "dissertation vacations" which was meant to be working on my dissertation was not actually to spend time do other things.

Last, but in no way least, I want to thank my fellow GWU health policy dissertating crew: Emily Jones, Randy Gale, Sally Turbyville, Michele Proser and

Jennifer Skillicorn. They are the reason that I would sit down for hours and crank out work while having a blast in their company. I am so very thankful to call each of you a colleague and friend.

Abstract of Dissertation

The Influence of Environmental Factors and Organizational Characteristics on Federally-Funded Health Centers' Financial and Non-Financial Performance

The federally-funded health center expansion initiated by the Bush administration and continued through the Affordable Care Act (ACA) underscores the health centers' role as a cornerstone of primary and preventive care. Their success rests on their ability to maintain financial viability. As non-profit health care organizations, federally-funded health centers must balance their finances and their ability to provide health services to medically underserved populations. However, health centers operate in a precarious environment and are largely dependent on two main funding streams – Medicaid and federal grants. With the average health center's operating margin hovering around 1%, their limited access to financial resources – capital and reserves – handicaps them from withstanding financial losses. A decline in any funding streams will have a negative impact on a health center's bottom line. Therefore, financial performance not only has management implications; it is a substantial policy concern.

Because financial performance measurement is not a straightforward concept, there is not a single key evaluative criterion. Few studies have examined the health center financial performance. However, the studies lacked a holistic approach – using only one performance indicator and examining only organizational factors. They omitted the environment conditions that may influence a manager's decision on operations.

This study seeks to identify the favorable organizational characteristics and mechanisms that can improve health center viability, as well as the environmental factors that could influence a manager's operation decisions. The study utilizes two databases –

the Uniform Data System (UDS) and Area Health Resource File (ARF) – to study 897 federally-funded health centers from 2005 to 2009.

As a product of financial performance's intricacies, this study utilizes five performance indicators to obtain a comprehensive assessment on health center performance:

1. Operating margin: a primary financial performance measure which indicates whether sufficient revenue was generated to cover cost of health care services.
2. Net revenue per encounter: similar to the operating margin but based on visits.
3. Grant reliance: a measure to assess the dependence on grants as a revenue source.
4. Total cost per patient: an efficiency measure that indicates the ability of a health center to control costs over time.
5. Composite measure: (the summation of z-scores of the first three measures) a combination of the indicators instead of assessing each individual performance measure in isolation.

Composed of four analyses, the study develops a comprehensive review of health center's short and long-term performance. First, descriptive statistics (means, standard errors, and t-test) are calculated to assess trends over the five-year period. Second, a time series cross-sectional analysis is used to identify specific environmental factors and organizational characteristics related to short-term financial performance. Third, logistic regression models are used to calculate the likelihood of certain factors associated with in the top and bottom quartiles of long-term performance. Lastly, multinomial logistic regression models are used to calculate risk ratios for factors associated with health

centers with consistent negative outcomes relative to those with consistent positive outcomes.

This study demonstrates that, like other non-profit organizations, health centers have small margins and experience fluctuations over time. These fluctuations can occur as a health center tries to build up reserves for hiring more staff or making capital improvements. Health centers margins reached their lowest levels at -1.11% in 2008, the year of the economic recession. Alarmingly, a quarter of health centers have a margin equal to or lesser than -5% (a red flag for credit agencies).

In 2009, the influx of American Recovery and Reinvestment Act (ARRA) funds to health centers –an atypical supplemental federal appropriation to assist them in weathering the economic recession – produced uncharacteristically high margins and net revenue per encounter levels. As a consequence, two-thirds of the health centers have become more reliant on grant funding, which runs counter to the Bureau of Primary Health Care (BPHC) goals to assist health centers to become more self-sufficient – greater revenue diversification – in order to weather a downturn in any particular funding streams. Because the ACA includes $11 billion in new, dedicated funding over five years to finance new health centers for communities in need and expand capacity at existing health centers, ARRA could be an indication of future performance which temporarily bolstered margins due to increased funding, but leaves health centers vulnerable if Congress does not sustain funding levels and/or health centers do not maximize patient revenue.

Twenty-five of the thirty-three environmental factors and organizational characteristics are found to have a significant association with at least one of the five

financial performance measures. Staffing, productivity, economies of scale, location, patient demographics, grant funding, and reimbursement rates are all common performance drivers able to affect health center revenue streams and costs. Several factors have an immediate impact on performance while other factors are associated with long-term performance. While health center managers may not be able to control all factors, those factors should be viewed as "red" flags, monitored as early warning indicators and considered in health center strategic planning. Policymakers should also be engaged to alleviate pressures from some of these factors to sustain the health center expansion initiatives.

Staffing: Health centers with more services, such as behavioral health (includes mental health and substance abuse) and enabling services are more likely to be health centers with the highest costs per patient (e.g., for each percentage increase in behavioral health staff, health centers are 23.6% more likely to be in the top cost per patient quartile). Typically a large share of medical patients will utilize other services, so the addition of these different services would increase costs at a faster rate than a health center's ability to recruit new patients, which results in an increased cost per patient.

Health centers with more behavioral health and enabling services are also more likely to be health centers with the most grant reliance. Enabling services are typically non-reimbursable services which have an immediate impact on grant reliance. For each unit increase in the percent of enabling staff, the grant reliance ratio increases by 0.011. Health centers need to demonstrate the value of enabling services to payers and policymakers in order to obtain sustainable reimbursement and funding.

Behavioral health staffing – often under reimbursed services – is also associated with being less likely to be a top financial performing health center and running the risk of having perennial negative overall financial performance, according to the composite score. These findings should not deter health center managers from providing such services, but they should be aware that alternative funding streams will likely be needed to cover the costs. BPHC should continue support for awarding grants for expanding behavioral health services, as well as grants to maintain such services.

The staffing of non-physician clinicians was also found to be significant. The study found that the ratio of non-physician clinicians to physicians is associated with net revenue per encounter as well as grant reliance. When health centers rely more on non-physician clinicians, there is an increase in net revenue per encounter increases by $0.26 for each unit increase. The ratio is also associated with long-term performance. They are 17% more likely to be in the top quartile for net revenue per visits and 50% less likely to be at risk for having constant negative net revenue per visit. However, health centers with higher non-physician clinician staffing are two times more likely to be grant reliant in the longer term and 15% more likely to be consistently grant reliant. Health centers managers might be using grants to cover personnel costs as they utilize team-based care models that need more flexible reimbursement methodologies from payers than the fee-for-service schedule.

Productivity: Non-physician clinician productivity is a key driver in performance found to be associated with each measure. For every visit a non-physician clinician produces, health center costs per patient decreases by $0.02. Due the lower costs per patient associated with non-physician clinician productivity, health centers were able to

generate more revenue. They are more likely to be health centers with the highest operating margin, net revenue per encounter, and overall financial performance. Because payers typically reimburse per visit, health centers focus on creating more patient service revenue through generating more visits, and they are less likely to depend on grant revenue.

However productivity is dependent on staffing, process, and facility. Health center managers should ensure that staffing plans support team-based model optimizing the skills of team members and the facility space maximizes efficiencies. State legislation can also be used to authorize the type of services that a specific provider can offer, allowing licensure or reimbursement of certain practitioners for specific services, or investment in training that would expand the role of that practitioner. Expanding the scope of practice would improve access to and quality of primary care services and contribute to lower per-patient costs of care, generating significant savings to patients, payers, and taxpayers.

Economies of Scale: More locations and patients indicate a larger penetration in the primary care market stimulating efficiency. For every additional patient served by the health center the cost per patient decreases by $4.92 and they are 3.2% less likely to be in the highest cost per patient quartile. Health centers with more patients are 9% less likely to experience constant grant reliance due to more insured patients. The number of delivery sites also decreases the odds of being in the highest cost per patient and grant reliance quartile. When considering expanding delivery sites, health center managers should ensure location would meet patient demand. Federal policymakers should be able to assess if patient demand and other factors will sustain new locations.

Location: Health centers are more likely to be financial viable if they are located in the northeast and west regions. While health centers located in the Northeast and West are 18.7 and 17.5 times, respectively, more likely to be in the highest costs per patient. These regions are also associated with health centers in the top quartile for net revenue per encounter. Health centers in the Northeast are also three times more likely to have the highest operating margin. These regions typically have more generous Medicaid programs in terms of eligibility and reimbursement, which improves patient revenue. Health center managers should be aware that the location can affect the need for security, clinician recruitment, communication, and other overhead costs. The regional variation should force federal policymakers to closely monitor health centers located in the South and direct needed resources to the region.

Patient Demographics: There are two patient demographic characteristics associated with performance: the percent of uninsured patients and the percent of non-white patients. Health centers 23% more likely to be in the quartile with the highest grant reliance and are 13% more likely to be consistently grant reliant. Health centers with more uninsured patients also are 6% less likely to be in the quartile with the highest costs per patient. Because of the lack of revenue from the uninsured, health centers seek grants to cover the uncompensated care.

Health centers with more non-white patients are more likely to be health centers with the highest costs per patient. Due to high costs per patient, they are 3% more likely to be at risk for being perennially dependent on grants as the proportion of non-white patients increase in health centers. Because of the reliance of grants, health centers were less likely to run constant negative operating margins. In order to maximize revenue,

health center managers should ensure front-desk personnel are well-trained and motivated to enroll patients in appropriate insurance programs and ensure that they are able to collect sliding fee payments. Findings suggest federal policymakers should continue using the number of uninsured patients as part of the funding formula, but also should consider other socioeconomic factors.

Grant Funding: Health centers face threats related to reimbursement, and the loss of the Health Center Trust Fund would deteriorate health centers' pivotal role in providing access to millions of patients. Grant funding was found to have a profound impact on the overall financial performance. The findings suggest managers leverage those funds in the long-term to provide a stronger performance outlook. For every percentage increase in grant funding, there is a 0.19 unit increase in a health center's operating margin, indicating that they immediately spend the available funds. However long-term dependence has detrimental effects as health center are 2% more likely to be at risk for having consistent negative margins since they may not diversify their funding streams.

Health centers may have become grant reliant because they were filling gaps in reimbursement for services such as oral and behavioral health or covering costs of non-reimbursable services such as enabling services. Managers should consider seeking grants to build capacity and support an effective team-based care model, while seeking opportunities to diversify and sustain revenue streams from more reliable sources.

Designed to cover the uncompensated care to uninsured population, the Section 330 grant is based upon the center's caseload of uninsured patients and historical funding decisions. However, as more patients gain insurance coverage, BPHC should consider

incorporating other factors such as underinsurance, non-reimbursable costs, demographics and environmental changes that drive costs and increase demand for services.

Reimbursement: Medicaid agencies and other payers can play a role to ensure their reimbursement adequately covers services. Any attempt to cut or restructure payments could be harmful to a health center's ability to accomplish its mission. Medicaid reimbursement has a prevalent impact on short-term performance. With each increase in reimbursement, there was found to be a 0.024 percentage increase in operating margin and a $0.91 increase in net revenue per encounter. Due to increase patient revenues, Medicaid reimbursement rate decreased grant reliance in health centers. Medicaid also impacted the long-term performance in term of health centers more likely to be in the highest operating margin and net revenue per encounter. The prospective payment system (PPS) was constructed to ensure efficiency. However, many health centers still use cost-based reimbursement. Medicaid agencies should set adequate rates that promote team-based care models and efficiency.

Private insurance reimbursement constitutes a small source of health center revenues. Health centers were 3.2% less likely to have the highest grant reliance and 2.1% less likely to be at risk for constant reliance on grants for ever one unit increase in the private insurance reimbursement rate. Due to the ACA, private insurance is set to become one of the fastest growing insurers in health centers. Policymakers and health center managers should ensure plans operating in the Exchanges are aware of the out-of-network provision of reimbursing health centers at their Medicaid PPS rate, which may help health centers negotiate adequate payment rates can negotiate payment rates with

that health center. Another scenario is for BPHC to factor private insurance shortfalls into the Section 330 grant, since health center grants would be forced to supplement these shortfalls.

Financial performance is a multidimensional complex construct comprised of various metrics. Due to its complicated nature, no one measure should be taken on its own. The performance timeframe (short, medium, or long term) is another aspect that adds to its complexity. Another additional complication stems from the diverse range of comprehensive health center services, including dental, mental health, and pharmacy, as well as specialized services tailored to their communities' unique cultural and health needs. Higher costs per patient may not be a sign of inefficiency, but a product of health centers offering different or more services than others.

The study findings suggest there is no "silver bullet" when examining health center financial performance. The study does shine a light on several drivers that are common amongst the five performance measures. These drivers implore key recommendations from health center managers, state and federal policymakers.

Health center: Management should seek to maximize various revenue streams where dependence is not exclusively on Medicaid and Section 330 grants. Such diversification will allow health centers to weather deterioration in any particular funding stream. Managers should also seek to promote staffing plans and policies that emphasis the utilization team-based models to maximize efficiency and increased margins. They should also advocate for the reimbursement of non-traditional services that facilitate access and improved patient outcomes. They should continue to monitor patient demand,

demographics and utilization for strategic planning purposes which will determine the needed services and additional funding that may be need to cover such services.

State government: While health center managers play a primary role determining how to manage resources ultimately impacting financial performance, state government can assist in alleviating some of the pressures. For example, they should ensure regulations facilitate and create team-based models to provide high quality care for diverse populations of patients, families and the community. State legislators should invest in health center grants. State health center grants have declined over the years, health centers need additional funding to expand or sustain services such as behavioral health. As states explore opportunities to transition away from cost-based reimbursement or fee-for-service, policymakers should ensure there is an adequate reimbursement baseline for health center services as any significant decrease in reimbursement will be disadvantageous for health centers. Reimbursement should permit health centers to experiment care models that would promote efficiency and improve patient outcomes.

Federal government: The Health Center Trust Fund expired in 2015 and was extended until 2017. The uncertainty of continuous funding jeopardizes health center strategic planning. Congress will need to find a sustainable method to sustain the funding levels in order to sustain the ACA's health center expansion initiative. Cuts in grant fund will cause health centers to reduce the number of offered services, reduce staffing or shutter their doors in order to maintain financial viability. While the Section 330 grant is intended to cover the costs of caring for uninsured individuals, the study found there are other factors that should be considered when developing a funding formula. Federal policymakers can monitor plans in the Exchanges to ensure they are offering health

centers adequate reimbursement for services. There will also need to be increased monitoring and resource diversion to health centers in the South as they are more likely to experience poor financial health.

The study should be considered the foundation for future research for more in-depth exploration of the environment and organizational factors that may influence performance. From the findings, better tools could be employed to evaluate financial performance of this important, yet expensive program. By shedding more light on the factors influencing health centers performance, policy makers and health care providers may gain information necessary to make sound economic decisions about health care delivery in medically underserved areas throughout the U.S., thus strengthening the system as a whole.

Table of Contents

Dedication ..... **iv**

Acknowledgements ..... **v**

Abstract of Dissertation ..... **vii**

List of Figures ..... **xxii**

List of Tables ..... **xxiii**

Chapter 1: Introduction **1**

Overview 1
What are Federally-Funded Health Centers? 3
Health Centers as Non-Profits 9
Performance Measurement in Non-Profits 11
Health Center Challenges to Financial Performance 13
Statement of Purpose 20
Significance of the Study 21

Chapter 2: Literature Review **23**

Financial Performance and Health Centers 23
Non-Financial Performance in Health Centers 26
Theoretical Framework 28
Application to Conceptual Framework 32
Factors Influencing Performance 34
Conclusion 51

Chapter 3: Methods **53**

Overview and Scope of the Study 53
Research Design 54
Data Sources 57
Construction of the Analytic Databases 58

Measurement 59
Explanatory Variables 61
Data Analysis 73
Chapter 4: Results 79
National Trends 79
Descriptive Statistics 80
Operating Margin 87
Trends 87
Fixed Effects Model 91
Pooled Analysis 94
Total Cost per Patient 98
Trends 98
Panel Analysis 100
Pooled Analysis 102
Composite Measure 105
Panel Analysis 106
Pooled Analysis 108
Net Revenue per Encounter 114
Trends 114
Pooled Analysis 118
Grant Reliance 124
Trends 124
Panel Analysis 127
Pooled Analysis 129
Key Study Findings 136
Chapter 5: Discussion, Policy Implications, and Conclusion 144
Policy Implications 147
Study Limitations 154
Recommendation of Future Research 157

References **160**

Appendix A – Operating Margins **174**

Appendix B: Net Revenue per Encounter **178**

Appendix C: Grant Reliance **181**

Appendix D: Total Cost per Patient **183**

Appendix E: Fixed Effects Diagnostic Tests **185**

List of Figures

Figure 1: Conceptual Framework 33

Figure 2: Average Retroactive Payments Has Been Consistent Over the Years 61

Figure 3: National Trends of Health Center Revenue and Cost, 2005-2009 80

Figure 4: Operating Margins 88

Figure 5: Health Centers with Negative Margins 88

Figure 6 : Total Cost per Patient, 2005-2009 98

Figure 7: Percent of Health Centers with Negative Composite Score 105

Figure 8: Net Revenue per Patient 114

Figure 9: Percent Health Centers with Negative Net Revenue per Encounter 115

Figure 10: Grant Reliance over Time 124

Figure 11: Percent of Grant Reliant Health Centers 125

List of Tables

Table 1: Association between Performance Measures and Environmental Factors 36

Table 2: Association between Performance Measures and Organizational Characteristics 40

Table 3: Financial Viability/Cost Measures 60

Table 4: Summary of County Level Factors 65

Table 5: Summary of Health Center Organization Characteristics 70

Table 6: Summary of Health Center Patient Characteristics 73

Table 7: Descriptive Statistics for Dependent Variables 81

Table 8: Correlation Matrix 81

Table 9: Bivariate Time Effects Coefficients for Lagged Dependent Variables 82

Table 10: Descriptive Statistics for Environmental Factors 83

Table 11: Descriptive Statistics for Patient Characteristics 84

Table 12: Descriptive Statistics of Health Center Characteristics 86

Table 13: Operating Margin by Different Health Center Characteristics 90

Table 14: Operating Margin Fixed Effects Models 93

Table 15: Logistic Regression Predicting Differences in Health Centers in the Top Quartile for Operating Margin 95

Table 16: Multinomial Logistic Regressions Comparing Health Centers with Constant Positive with Fluctuating and Negatives Margins 97

Table 17: Total Cost per Patient by Different Health Center Characteristic 99

Table 18: Total Cost per Patient Fixed Effects Model Results 101

Table 19: Logistic Regression Predicting Health Center Total Cost per Patient in the Top Quartile 104
Table 20: Fixed Effects Model for Composite Scores 107
Table 21: Logistic Regression Predicting Health Centers' Composite Score in the Top Quartile 109
Table 22: Multinomial Logistic Regression Predicting Relative Risk for Health Centers with Fluctuating Composite Score and with Constant Negative Composite Scores 111
Table 23: Logistic Regression Predicting Health Centers with at Least Two Poor Indicators 113
Table 24: Net Revenue per Encounter by Different Health Center Characteristics 117
Table 25: Results for Ordinary Least Squares Models 119
Table 26: Logistic Regression Predicting Health Centers Net Revenue in the Top Quartile 121
Table 27: Multinomial Logistic Regressions comparing Health Centers with Constant Positive Net Revenue with Fluctuating Net Revenue and Negative Net Revenue 122
Table 28: Grant Reliance by Health Center Characteristics 126
Table 29: Fixed Effects Models for Grant Reliance 129
Table 30: Logistic Regression Predicting Grant Reliance Status 131
Table 31: Logistic Regression Predicting Health Centers Grant Reliance in the Top Quartile 132

Table 32: Logistic Regressions comparing Health Centers with Fluctuating Grant Reliance with Constant Reliance and Self Sufficiency 135

Table 33: Fixed Effects Model Significant Findings 137

Table 34: Logistic Regression Significant Results 139

Table 35: Multinomial Logistic Regression Significant Results 142

Chapter 1: Introduction

Overview

In general, a non-profit organization's financial performance determines the quality and quantity of provided services.[1] Nowadays, it is important for a non-profit organization to maintain sound financial condition to sustain existing service levels. A non-profit organization may be pressed in a difficult financial situation due to a reduction in government or donor funding. If a nonprofit organization reduces its services when an external financial stressor occurs like an economic crisis, the organization can become financially vulnerable. [1]

Changes in the U.S. economy have intensified pressures on the health care system. Health care costs are increasing faster than reimbursements. There is limited opportunity to shift costs among payers. Employers are looking to cut costs and pass more responsibility for health care benefits to their employees, government organizations are cutting benefits for their program members, and care-seeking patterns are changing as patients delay care due to cost. [2-3] One cost containment strategy is to freeze or cut provider reimbursement rates. In 2012, 45 states and the District of Columbia implemented cost containment actions on provider payments. These actions have an impact on a provider's financial performance.

As non-profit health care organizations, federally-funded health centers are equally vulnerable to poor financial performance which places their ability to provide health services to vulnerable populations in jeopardy. Health centers have limited access to financial resources, capital and reserves which prohibit them from withstanding financial losses. They must have enough reserves to cover their current and future claims

and be able to match their short- and long-term liabilities with their assets. They also must minimize their operating costs and put their profits, if any, into resources which could lead to a higher return in investment.

If health centers are to maintain their mission providing comprehensive care to vulnerable populations, then stakeholders need to understand what drives their costs and their financial well-being. This study seeks to examine the relationship between financial performance and county-level factors along with organizational characteristics. Because of this research, stakeholders will be informed of the performance determinants that health centers face as they strive to achieve their mission of providing high-quality health care to underserved populations.

A 2000 Institute of Medicine (IOM) report found three factors affected health centers' ability to fulfill their commitment to serve all patients seeking care, regardless of ability to pay. The three factors were: (1) a growing number of uninsured; (2) the proliferation of Medicaid managed care; and (3) the erosion of the subsidies used to cover the cost of providing charity care.[4] Health centers have to be financially viable while not abandoning their mission and philosophical underpinnings. As the health center program expands, it is essential not to focus solely on creating new sites and expanding services, but making available additional resources for existing sites as they address changes to the their environment due to demographics changes, increased costs, staff retention, competitive provider salaries, and various other issues.

A 2000 Government Accountability Office (GAO) report cited that the Health Resource and Services Administration (HRSA) – the agency charged with health center program oversight – needed to improve its monitoring processes and administration tools.

Nearly half of the health centers had operational or financial problems and 10 percent were struggling to maintain operations.[5] Twelve years later, the GAO found a need for improved compliance oversight especially with financial management policies.[6] While HRSA has implemented revised oversight policies, the GAO reports raises concern that there may be delays in timely performance monitoring.

The measurement of performance is not a straightforward manner, especially for non-profit organizations such as health centers.[7] They are not defined by their financial returns, but by their federally-managed mission and offered services. Due to the complexity of performance, there is not a single key evaluative criterion. Numerous studies have examined the impact of health centers effectiveness on healthcare spending and utilization.[8] Many studies have found health centers are associated with lower health care costs and/or lower acute care utilization. However, relatively few studies have examined the association between financial status and financial drivers.

What are Federally-Funded Health Centers?

The Health Center program dates back to 1965. Head Start teachers working in Mississippi and Alabama realized they could not begin to provide educational services because of their students' unmet health needs. President Johnson's "War on Poverty" Initiative officials suggested that the Head Start teachers use some of their grant funds to purchase health care from the local physicians. The teachers were shocked to learn that the mostly white medical establishment would not treat the black students regardless of the price the teachers were willing to pay.[9]

Proposals were submitted to the federal Office of Economic Opportunity (OEO) to establish health centers in medically underserved inner city and rural areas of the

country based on a unique model of health care that Dr. Jack Geiger – a physician who dedicated his career to the problems of health, poverty and human rights – had studied in South Africa.[10] The health center model featured team-based providers, convenient locations, and a focus on the community; non-clinical services such as outreach, transportation and child care were offered to help patients receive medical services; and attention to economic and environmental factors that contributed to poor health; and involvement of the patients themselves. The program began as a $1.3 million demonstration project and increased forty-fold in 1967 receiving nearly $51 million to support 33 new centers. The OEO was not the only agency experimenting with the health center concept. The Department of Health, Education, and Welfare (HEW) began to fund its own version following a more medical approach. By 1969, HEW had funded 24 health centers with proposals to expand to 1,000 centers serving 25 million patients in the next 5-years.

Today, health centers are non-profit, community-based ambulatory care clinics that provide comprehensive, coordinated, and continuous primary and preventive care to vulnerable populations in medically underserved areas throughout the country. Federally-funded health centers are authorized under Section 330 of the Public Health Service Act and HRSA, Bureau of Primary Health Care (BPHC) administers the grants. Health centers that meet federal statutes but do not receive federal Section 330 funds can be designated as Look-Alikes. They must meet rigorous governance, quality of care, service, and cost standards. They are qualified to receive enhanced reimbursement under Medicaid and Medicare law.

The authorizing legislation uses the term "health centers" to refer to the four programs that receive federal funding under Section 330 of the Public Health Service Act.[11] Programs included under this rubric are: Section 330(e) – community health centers serving medically underserved and low income people; Section 330(g) - serving migrant and seasonal agricultural workers and their families; Section 330(h) – serving homeless adults, families, and children; and Section 330(i) - serving residents of public housing.

In order to receive Section 330 funding, or to qualify as a Look-Alike, a health center must provide care to either a federally designated Medically Underserved Area (MUA) or Medically Underserved Population (MUP).[i] The criteria used when designating a Medically Underserved Area requires that a community has a:

1) Low primary care physician-to-population ratio;

2) High infant mortality rate;

3) High percentage of the population living below the federal poverty level (FPL);

4) High percentage of the population aged 65 and over.

The clinic site does not have to be physically located in the MUA/P, but it must serve populations that live in designated areas or be considered as medically underserved. Once any site of the health center meets this criterion the entire organization is compliant. Opening a new site in other areas does not require additional MUA/P designations.

[i] All Section 330(e) health centers must serve a federally designated MUA/P. Migrant Health, Health Care for the Homeless and Public Housing Primary Care sites do not have to have MUA/P designations to qualify for federal Section 330 funding as these special populations are by definition considered medically underserved.

In addition to the MUA/P designation requirement, health centers must also meet 18 other program requirements that are divided into four main categories: needs, services, management and finance, and governance.

Needs: Health center grantees must perform periodic needs assessments to document its target population's needs in order to inform and improve its delivery of appropriate services.

Services: Health centers must provide comprehensive, culturally competent, primary care (directly and/or by contract) and services – such as transportation, interpretation and translation, case management, and health education – that facilitate access to care and while eliminating financial, geographic, and language barriers. These services also enhance patient–provider interactions, increase patient knowledge and understanding of treatments, and improve patient safety.[11] Health centers are also required to have accessible hours of operation and locations. For example, BPHC recommends health centers offer some appointments after normal work hours. Health centers are required to provide care for all patients regardless of ability to pay and offer a full discount to individuals and families with annual incomes at or below 100% of the poverty guidelines and for those with incomes between 100% and 200% of poverty, fees are charged based a sliding discount policy based on family size and income.

Management and Finance: Health centers are required to have a proper management team for its size and complexity. When entering into a contractual or affiliation agreement, the health center must have the oversight and the ability to maintain its autonomy and integrity or they compromise their compliance with

other program requirements. As health centers establish themselves in their defined service area, they must make an effort to establish and maintain collaborative relationships with other health care providers.

Health centers must maintain accounting and internal control systems reflecting Generally Accepted Accounting Principles (GAAP) to safeguard assets and maintain their financial stability. Health centers are required to undergo an annual independent financial audit. They need to have documented billing and collection policies and procedures to maximize reimbursement from Medicare, Medicaid, CHIP, and other applicable public or private third party payers. Health centers must also have systems that accurately collect and produce data to submit accurate and timely program required reports (e.g., Uniform Data Systems (UDS), financial status reports (FSR), Health Center Quarterly Report (HCQR)) that demonstrate performance improvement.

Governance: A health center's board, much like any other governing board approves and reviews the annual progress of the organization's short and long-term goals and the services are meeting the community needs. However, a key difference in the structure is a majority (at least 51%) of the board members receive services (i.e., are patients) at the health center. The "patient/consumer" board members must reasonably represent individuals who are served by the health center in terms of race, ethnicity, and sex.

Health centers balance efficiently using their resources to ensure financial viability, complying with these numerous program requirements and carrying out their mission of caring for the poor and underserved. Notwithstanding their high levels of

charity care and bad debt, health centers are expected to remain financially viable in order to fulfill their missions as safety-net providers. The Section 330 grant is designed to supplement payments from patients and insurers, so that health centers can provide uncompensated care to their target population. However, the grant is almost entirely based upon the center's caseload of uninsured patients and historical funding decisions. It does not incorporate factors such as underinsurance and non-reimbursable costs, demographics and environmental changes that may drive costs and increase demand for services.

Health centers are underfinanced given the size and needs of their patient population. Health center operating margins have historically hovered around one percent.[12] Due to increased funding from the American Recovery and Reinvestment Act (ARRA) and the ACA, their margins have increased to over three percent. However without the additional funding, their margins would have been negative.[12] Health centers receive funding from a number of revenue streams, but Medicaid reimbursement and federal grants being the two largest sources. Being health centers' highest payer, Medicaid reimbursement covers 81 percent of health center Medicaid patient costs.[13] Though federal grants are intended to assist health centers in providing care to uninsured patients, these grants have not kept up with inflation covering about half of the cost of delivering services to their patients.[14] For example, the cost per uninsured patient has increased 66 percent, while federal grants per uninsured patients have grown 10 percent over the past decade.[15] While state and local government grants are a smaller proportion of health centers' operating budgets, they still are significant revenue source composing seven percent of their budget. However, state grants have declined over for four

consecutive years, and FY2012 represents a seven year low – health centers in 35 states will receive a total of $335 million (a $60 million decrease, or 15 percent less than reported in FY11).[16] These factors potentially could weaken a health center's financial performance.

Like other non-profit organizations, a health center's financial behavior is first to its mission. In health centers' case, their mission is to care for the underserved, regardless of their ability to pay and then to make sure they are financially viable. As a non-profit, they must have adequate cash flow and sufficient levels of revenue to serve as many patients as possible while maintaining quality of care. They must compete with private physicians, other health centers, and hospitals for insured patients while also caring for the uninsured and underserved patients. Health centers are concerned with their bottom-line since it impacts their ability to provide adequate staffing, care for patients, and maintain operations while also achieving goals in terms of growth.

Health Centers as Non-Profits

As one of the program requirements, health centers must operate under a non-profit status. In exchange for the exemption from federal and state income taxes and the ability to solicit tax-deductible contributions, these organizations are expected to perform their programmatic functions in an effective and efficient manner. The mission statement is revered in contemporary non-profit management and confirmed in scholarly literature, practitioner guides, government policy and rhetoric.[17-19] Mission statements generally are viewed as more important to non-profit organizations than their for-profit counterparts.[20] This view derives from the belief that, lacking a profit motive, non-profit organizations rely on a mission statement to articulate their "*raison d'être*."[21] A non-profit

organization's mission benefits the "greater good" of the community, society, or the world.

A health centers' mission benefits the community. In general, primary care is an essential step in improving health outcomes and mitigating health care disparities. It is also critical for controlling health care expenditures. Primary care prevents manageable conditions from worsening, and those who use primary care have fewer preventable emergency department visits, hospitalizations, and unnecessary tests – thereby making the health care system more efficient.[22] Evidence shows patients choose health centers because they are convenient, affordable, and offer a range of services under one roof.[23] Health centers serve a disproportionate share of low-income, uninsured or publicly insured patients, as well as members of racial/ethnic minority groups. Evidence shows health centers will serve ever-larger numbers of patients with complex health problems and at higher risk for poor health outcomes than the general public.[24] They are also more likely to offer evening or weekend hours than their primary care counterparts (50 percent vs. 38 percent).[25] Research has shown health centers provide better or equal care compared to other primary care providers, despite serving patients with more chronic illness and socioeconomic complexity.[26]

Beyond providing care to underserved populations, health centers generate an economic benefit to their predominately low income and under-resourced communities. Health centers employ people in their communities by providing critical entry-level jobs, training and career development opportunities. As an indirect effect, health centers purchase goods and services from local businesses stimulating additional economic activity in their communities. Their employees further induce economic activity by

purchasing household and other goods made possible by their salaries. A Capital Link analysis found that community health centers generated $20 billion in total economic activity and produced 189,158 jobs in the nation's most economically challenged neighborhoods in 2009. Further analysis found health centers will generate $53.9 billion in total economic activity and create 284,323 additional jobs due to increased federal funding authorized in the recently enacted Affordable Care Act.[27] Another study conducted in the state of Washington established that health centers create a $1.2 billion economic impact, approximately 8,500 jobs, and $176 million in tax contribution.[28]

Substantial evidence validates health centers not only have expanded their role in the U.S. health care system providing services to over 20 million patients, but the benefits that they have contributed to their communities and the nation demonstrates their commitment to their mission. They have also established that the program is efficient and effective to achieving its mission. However, few studies have examined the factors that determine a health center's performance. More importantly, there have been few studies addressing the health center's financial sustainability. There is a need to ensure health centers are viable, so they may continue to improve access and quality care as well as savings to the delivery system.

Performance Measurement in Non-Profits

Accountability and performance measurement is critical for non-profit organizations as they face increasing competition from other organizations competing for scarce resources such as funding. Stakeholders want to see resources effectively and efficiently used to meet program goals. The literature on non-profit organization performance evaluation is extensive, but generally inconclusive.[29] Non-profits have

difficulty "developing surrogate quantitative measures of organizational performance . . . because [they] frequently have goals that are amorphous and offer services that are intangible".[29]Health centers may be an exception given part of their program requirements entails financial management standards and oversight.

Non-profit organizations are able to make a profit, but it must be used solely for the operation of the organization. Non-profit managers give primacy and deem importance to financial ratios because they provide an adequate and complete measure of organizational performance. Secondly, they are readily available measures. Third, no thorough measures have been developed yet.[30] For example, the ratio of program expenditures to total revenues is a relevant ratio. A higher ratio designates a more efficient organization in the current period. However, a single-minded focus on the program ratio may be misleading. Overspending on programs may result in unfavorable quality due to a lack of competent administrative guidance. The Financial Accounting Standards Board (1980) in its Statement of Accounting Concepts No. 4 noted that thorough measures are needed for non-profits.[31] To date, the non-profit literature does not contain adequate measurement techniques.[30]

Traditionally, financial indicators—generated from balance sheets and income statements—have played a key role in measuring organizational performance. However, many scholars have argued that accounting-based financial measurement systems are not sufficient to assess organizational performance.

First, financial evaluation systems typically focus on short-term performance.[32] Therefore, reliance on purely financial data encourages managers to focus on short-term goals and stifles long-term planning and innovation. Second, non-financial measures are

thought to be actionable; an operational problem can thereby be addressed quickly.[33] Finally, non-financial measures are thought to be better indicators of future financial performance as they can provide a superior estimate of intangible assets, like the firm's intellectual capacity or reputation.[33] One of the important reasons for using non-financial measures is that some of them are early indicators of financial performance. Examples of non-financial performance include efficiency, productivity, and quality. Efficiency is commonly used as a non-financial performance measure.

However, efficiency is a relative term that can be defined differently by purchasers, payers, plans, consumers and providers all of whom have a different perspective on what constitutes quality and appropriate cost.[34] Typically, efficiency can be defined as when the outputs can be produced with fewer inputs.[35] Efficiency can be the ratio of the number of encounters relative to the number of clinicians. The economic or cost efficiency can be computed by the total cost of operations divided by the total number of encounters. Understanding the factors that affect financial and non-financial performance is important for various policy issues, including how to structure public programs such as Medicaid or how to guarantee access for the uninsured.

Health Center Challenges to Financial Performance

The ACA seeks to transform the fragmented U.S. health care system to provide access to affordable quality health care by expanding insurance coverage and experimenting with initiatives to integrate and improve care. It also positions health centers to play a key role in America's future health care system. As Congress considered the needed changes to reform the health care system, they saw the unique benefit that

health centers have embodied over 45 years. Legislators decided to invest additional resources in health centers to help meet the nation's primary care need.

The ACA establishes a Community Health Center Trust Fund of $11 billion over a 5-year period providing funding for health centers to further expand access to communities. The Act has the potential to transform the health landscape for health centers and their patients. The reform law is focused on two major challenges: reshaping the system of insurance coverage, and reinventing the health care delivery system. Though the ACA creates financial investments in health centers, there are remaining challenges. These challenges include the uncertainties of Section 330 discretionary grants, Medicaid, state funding and workforce. There are other challenges with unknown effects to financial performance which depend on how health centers leverage themselves in other ACA initiatives such as Accountable Care Organizations and patient centered medical homes. In order to leverage themselves, health centers may have to use their scarce resources to invest in needed capital.

Federal Grant

Health centers receive discretionary funding for Section 330 grants as well as other federal grants. Annual federal grants to health centers provide about 24 percent of their total operating revenues.[13] Federal grant funding has been was used to help offset uncompensated costs associated the care for Medicaid patients. Today, the grant has become available to increase health center capacity to serve more uninsured patients and expand more clinical services such as dental and behavioral health. While health center federal grants have seen increases over the years, they are not increasing at the same rates as the uninsured costs.[36]

In FY2011, health centers received additional funding from the Health Center Trust Fund mandating $11 billion to be allocated to health centers over five years. As the political climate shifted towards fiscal austerity, Congress and the Obama Administration reached an agreement to reduce the FY 2011 health center discretionary appropriations by $600 million (27 percent) from $2.2 billion to $1.6 billion.[37] The FY 2012 federal appropriation for health centers was $1.6 billion – again, $600 billion short of the $2.2 billion level associated with sustaining pre-ARRA operational capacity. The ACA Trust Fund provided for $1.2 billion in FY 2012, like FY 2011, $600 million had to offset the reduced FY2012 appropriation level.[37] These funding reductions have significantly impacted the health center programs shifting the focus of expanding capacity toward ongoing operations. Without action by Congress, the Health Center Trust Fund was slated to expire at the end of FY2015, leaving only discretionary funding to cover the program's operations – a reduction of approximately 70 percent in federal funding for all existing Health Centers. In April 2015, mandatory funding was extended for an additional 2 years, at $3.6 billion/year in each of FY16 and FY17. However, the expiration of the funding extension or further funding threats would have significant impact to the ongoing health center operations if a more permanent solution is not found to sustain funding levels.

Medicaid

Medicaid is the largest public health insurance program in the U.S. covering over 60 million low-income individuals or 1 out of 5 Americans.[38] With the passage of the ACA, states have the option to expand coverage to individuals over 133 percent of the federal poverty level increasing the number of individuals eligible in 2014. Medicaid coverage is essential to health centers' ability to serve more of the low-income

population. Medicaid accounts for approximately two-thirds (65%) of patient-generated revenue for health centers and 38% of total revenue.[13] Over the last decade, states have implemented an variety of Medicaid cost containment measures as well as innovative service delivery models (including use of managed care and medical home models) to manage the growth of Medicaid costs. Medicaid costs are driven primarily by increases in enrollment. Inflation in the price and utilization of the health care services that Medicaid buys also affect Medicaid spending, but enrollment is the dominant driver.[39] Medicaid reimbursement cuts not only infringe on the ability of health centers to provide much needed services to patients, but they also inhibit health center expansion efforts.

In some states, Medicaid directors have proposed and/or implemented changes to the health centers' reimbursement methodology. Congress replaced the traditional cost-based reimbursement system for health centers with a new prospective payment system (PPS) with the enactment of the Medicare, Medicaid and CHIP Benefits Improvement and Protection Act of 2000 (BIPA).[40] The PPS reestablishes the federal requirement that health centers be reimbursed at a minimum rate for services provided to Medicaid patients. Based on the average of each health centers' FY1999 and FY2000 reasonable costs per visit rates, each health centers has a different payment rate. For FY2002 and subsequent years, the per visit rate equals the previous year's per visit rate adjusted by the Medicare Economic Index (MEI) for primary care and any change in the health centers' scope of services.[40]While the PPS establishes a Medicaid per visit payment rate floor, states may choose to implement an alternative payment methodology (APM) as long as it does not pay less than the PPS rate and health centers agree to it. However, Medicaid reimbursement even when adjusted with the MEI has declined over the years. From 2007

to 2011, reimbursement has declined four percentage points to 81 percent even as the number of patients has increased by 39 percent.

State Funding

As mentioned earlier, state funding composes seven percent of a health center budget. However, funding cuts have detrimental effects on health centers and their communities. In at least two states, California and Colorado, there have been clinic closures as a result of state funding reductions.[41] Other states have reported reductions in hours and offered services. Numerous states have indicated their health centers have eliminated some disease management or preventative care programs and had to reduce overall operating costs. Health center employees have also been affected by these cuts, as many centers have implemented hiring or salary freezes, reductions in benefits and layoffs.

Health Insurance Marketplaces

Private insurance is the smallest health center third party payer revenue. It consists of eight percent of total revenue and 14 percent of the total number of patients. Private insurance can greatly put a health center in financial trouble. There is evidence that health center privately insured patients do not have coverage that adequately reimburses and is significantly lower than that of Medicaid.[42] The average annual revenue per privately insured patient received by health centers is $200 less than the Medicaid average.[16] The ACA provides a changing landscape for private insurance and health centers as it expands private insurance coverage.

The ACA created Health Insurance Marketplaces or Exchanges which connect patients with private insurance and offer premium subsidies for low and moderate income

individuals to make insurance more affordable. Many uninsured health center patients with incomes above the new Medicaid eligibility threshold will likely qualify for subsidies in the exchange. The new coverage availability and the associated reduction in health center uninsured patients will have a major impact on health centers' operations. By 2019, more than 9 percent of health center patients are projected to be covered by Exchange plans.[43]

Qualified health plans sold through the Exchanges must offer a standard set of essential benefits which health center provide (e.g. ambulatory patient care, maternity care, mental health and substance use services, prescription drugs, laboratory services, prevention and wellness care, and pediatric care including oral and vision care). ACA also provides cost-sharing assistance to individuals with incomes below 250 percent of the federal poverty level limiting out-of-pocket costs to access needed care. These two provisions provide a financial boost for health centers by ensuring that most services provided by health centers are reimbursed and by reducing the level of bad debt (unreimbursed care when low-income patients are unable to pay required deductibles, coinsurance, and copayments).

Unlike the Medicaid PPS statute, there is not a statute in the ACA that defines FQHC services in an Exchange or that provides that health center services must be made available to enrollees in Qualified Health Plans (QHP) that are certified by an Exchange.[44] Health centers are at a financial disadvantage since there is no ACA provision or regulation requiring QHPs to contract with health centers.

Workforce

Payers are not the only threat to performance. Health centers rely on a team-based care model that increases their capacity to serve patients. The use of multi-disciplinary medical teams can improve access to care, improve patient outcomes, and reduce health disparities; all while promoting a more efficient and effective primary care system.[45] At a time when demand for primary care is increasing, the workforce is shrinking. The number of medical students accepting placements in primary care residency programs continues to decline, and many current physicians are nearing retirement.[46,47] Primary care practice locations also mean that underserved communities are particularly at risk for such workforce shortages.[48] Health centers are understaffed compared to other providers, which creates a significant deficit in the number of primary care providers needed today and in the future.[48] The limited workforce requires health centers to allocate their staff which affects productivity and ultimately financial performance.

Primary and preventive care has become the cornerstone of delivery system reform. An investment in health centers has been made to ensure the delivery system transformation. The ability of these health centers to maintain optimal financial performance is an issue of utmost importance. Health centers will grapple with many issues including expansion in underserved and unserved communities, reform initiatives to control costs and improve health outcomes, health market competition, insurance coverage and changes in reimbursement. Health centers must mitigate these economic pressures. Other developments will likely take shape as provider organization form ACOs and other networks and larger hospitals consolidate smaller hospitals.

These political, economic, and organizational pressures lead to a concern about health center financial viability. Health centers must look beyond their traditional financial functions of accounting, billing and collecting toward focusing more on their rate of return, extent of market penetration and economies of scale in order to meet the challenges before them. Health centers will need to increase their capacity to meet the increased demand of the newly insured through the expansion of Medicaid and the creation of exchanges. They must be able to offer competitive salaries to attract qualified primary care providers and administrative staff. However, research is needed to inform stakeholders on drivers of financial performance to ensure health centers are able to be competitive in changing markets while balancing their program requirements and mission.

Statement of Purpose

As demonstrated in the 2000 GAO report, there is a need to develop adequate monitoring tools and analytical methods to assess financial performance benchmarks. A longitudinal analysis will be able to identify performance indicator trajectories and the factors influencing the variation in financial and non-financial performance. The study seeks to increase the scientific knowledge regarding health centers' financial and non-financial performance to ensure they remain a vital part of the health care safety net and the delivery system. Establishing factors associated with financial performance as well as identifying the difference between certain comparison groups allows for immediate operational and policy applications for health center management and policy makers. In regards to the recent health center program expansion efforts, success relies on the ability to ensure new and existing health centers achieve strong financial performance. A health

center with poor financial performance will not be able to reach its potential to provide appropriate and needed services to its communities.

Research Questions

The following questions are designed to frame the problem in health centers and the environment which they operate. The questions will explore the gaps in previous research to add context, so the findings can be dealt on a policy level. The aim of the research is to examine the relationships between environmental factors, organizational characteristics and federally-funded community health centers' performance in terms of financial stability and efficiency.

1. What are the patterns or trends in federally funded health center's financial and non-financial performance?
2. Are environmental factors and organizational characteristics related to performance of federally funded health center?
   2.1. Are there specific environmental factors and organizational characteristics related to financial performance of federally funded health center?
   2.2. How do environmental and organizational characteristics influence different categories of health center performance over the years?

Significance of the Study

The analysis measures the association between various organizational and environmental characteristics and financial performance. The models may be applied to future health centers in order to predict the likelihood and potential magnitude of financial and non-financial performance based on a health center's expected and/or current patient population. A better understanding of factors associated with financial

performance will allow with health centers to prepare for market shifts. BPHC and the National Association of Community Health Centers will be able to assess the risk of poor financial performance and provide assistance to improve the identified issues. As health center management teams must respond quickly and appropriately to market changes, rising costs and threats to revenue streams; this study can guide efforts to maintain and improve financial performance and help determine the appropriate grant support for health center in most need. Health center program expansion may spread limited resources even further (e.g., an existing health center may not receive the needed to expand services, improve quality, or hire providers). Thus, health centers must be able to apply best practice exemplars to guide performance improvement efforts. By monitoring financial performance and handling the determinants before they influence the quantity or quality of provided services, health centers will be able to increase capacity to serve more uninsured and underserved.

Chapter 2: Literature Review

This chapter begins by examining the literature on health centers' financial and non-financial performance. The body of literature is critical to understand that performance is multi-dimensional. After establishing the financial and non-financial performance of health centers, the chapter proceeds to describe the theoretical framework and its application to this study. Next, it reviews research on factors that correlate with financial and non-financial performance. This chapter informs the methods and explanatory variables to be used in this dissertation, as well as the hypotheses to be tested.

Financial Performance and Health Centers

Although health centers have demonstrated success in providing primary care, they have been less successful financially. Between 1998 and 2000, HRSA reported that about 10 percent of all health centers had major financial difficulties.[49] The factors contributing to poor financial performance include inadequate management, the burden of the uninsured, increasingly competitive health care markets, and insufficient funding. Examples of poor management practices are the inability to control expenditures, unfavorable contracts with other providers and managed care organizations, inappropriate or inadequate responses to market changes, and ineffective business operations.[49] During the three-year period, GAO found that 44 centers lost their federal funding, but new health centers came into the program to increase the number of from 608 to 611. The study also found that the proportion of revenue from federal grant funding has declined over the years. In 1980, the HRSA grant accounted for over half of the revenue. By 1988, the percentage dropped to 44 percent. In interviews with State/Regional Primary Care

Associations, health centers were likely to reduce services when revenues were tight. Enabling services were often the first to be reduced during financial difficulties. Health centers may also reduce staff providing a service or the scope and volume of services. These findings suggest that health centers face difficult decisions to support their mission when faced with financial hardship.

McLearney, et al. trended health center financial performance for four years from 1996 to1999. The article demonstrated the instability of health centers' financial performance. The article concluded that many centers are on the brink of insolvency.[50] More than half of the health centers reported having a deficit. The number of health centers in deficit continually increased from 1996 with 44 percent to a high of 59 percent before falling to 52 percent in 1999 at the end of the study period. However, the magnitude of the deficit decreased over the years with the mean deficit decreasing from more than $200,000 ($3.73 per visit) in 1997 to $15,000 ($0.09 per visit) in 1999.[50]

In another study, Shi et al found that from 1998 to 2004 the trend in health center financial performance was primarily positive, but showed signs of struggle with the increasing number of uninsured patients.[51] Federal and non-federal grants compromised a significant portion of health center revenue during this time period. The largest single source of revenue was and continues to be Medicaid which accounted for 36 percent of revenue in 2004. Medicare comprised nearly 6.7 percent and reimbursement has continually decreased over the years. Private insurance accounted for 6.3 percent. Private insurance reimburses on a fee schedule, may pay discounted rates than other payers and place burdensome requirements administrative costs on the health center.

Health centers care for a population who have higher risks for health problems and require more intensive care than the general population.[52]The cost of care and third party reimbursement is a primary concern for health centers. The mean medical visit costs have risen steadily over the years (1998-2004) from $81 to $116.[51] Medicaid consistently has covered the highest proportion of health center charges at 87 percent where private insurance covered 57 percent of charges. Health centers have become more self-sufficient over the years. Self-sufficiency is measured as a ratio of health center service revenue to grant revenue. The closer to 1 a ratio is the more self-sufficient a health center becomes. In 1998, the health center ratio was 0.71 and in 2004 it was 0.84. Between those years, the ratio was largely stagnant.[51] Health centers' net revenue has increased from $870,000 in 1998 to $2,809,000 in 2004. The study also looked at operating margins as a measure of financial stability. With the average health center operating margins ranging from -0.2 percent in 1999 to 1.3 percent in 2001, health centers like non-profit organizations can rarely use any surplus for unexpected costs or care for more uninsured patients. While the financial performance were primarily positive compared to McLearney, study findings were also indicative of the financial burden for the increasing uninsured patient numbers. There is also a concern that changes to Medicaid and federal grants could threaten health center financial performance.

These two published articles trend health center financial performance over the years. These findings suggest financial struggles threaten to erode the health center safety net system and limit vulnerable populations' access to health care. It is imperative to understand which factors adversely affect health center performance, so that it can be improved. The next section focuses on non-financial performance.

Non-Financial Performance in Health Centers

In terms of this study, non-financial performance is primarily defined as efficiency. Efficiency is not a straightforward measure. First, efficiency is used by different stakeholders to connote various constructs. Second, little is known about the range of methods that exist to measure efficiency and how well available efficiency metrics capture the constructs of interests. Hussey et al searched potential measures of health care efficiency in published and gray literature.[34] There were 5,563 titles found and reference mining uncovered an additional 118 articles. Of these articles, 5,022 were rejected as irrelevant to the project leaving 659 studies. Additional review of the remaining titles excluded 64 titles. For a total of 588 that were retrieved and reviewed. Researchers found 256 efficiency measures. The majority of the measures used outputs such as discharges, procedures and visits. Physician resources, costs or a combination of both were used as inputs. These findings informed this study to use ratios of cost and visits as its inputs and outputs. The Hussey et al literature review also found that the methodology was divided between with the use of specified ratios using single inputs and outputs and the use of econometric or mathematical programming such as Data Envelopment Analysis. Because of the division in the efficiency methodology and the primary focus of this study is on financial performance using ratios, the non-financial measures will be operationalized as specified ratios.

Efficiency in health centers has been studied in depth. Some studies have found health centers to be inefficient. For example, Brecher and Forman compared costs of nine health centers to those of private, for-profit group practices and found that health centers had higher expenditures for their non-medical staff, which contributed to raising overall

costs.[53] In contrast, Goldman and Grossman (1982) found that health centers were not necessarily cost-inefficient. Health centers' decisions depart from the cost-minimizing behavior found in other office-based providers. They employ too few nurses and physician assistants and too many medical support and ancillary personnel relative to primary care physicians. Contrary to a previous GAO report citing health center overstaff their sites, these findings suggest that health centers do not make less efficient selection of inputs than profit motivated physicians. They also found that incentives exist for health centers to minimize cost, particularly if they seek to maximize a utility function that depends on the quantity and quality of delivered services. They operate on budgets determined by the number of patients and not the number of services.[54]

Recent literature on health center performance describes how health centers are responding to the challenges in the current health care environment. Some studies describe how health centers are responding to the impact of managed care on their financial performance by integrating and forming their own HMOs.[55,56] However, Oritz found that being in a network did not have a significant impact on revenue enhancement and cost efficiencies.[57]

A large and growing body of literature finds that health centers are effective and efficient primary care providers, contributing substantial savings to the larger health care system particularly through reducing the use of costly, avoidable forms for care such as the emergency department (ED). Avalere Health published a systematic review of recent literature.[8] Researchers uncovered five studies comparing direct patient costs across providers. These studies found health centers were associated with lower health care spending compared to other providers, and some of these studies determined savings

were driven by reductions in ED visits and hospitalizations. Avalere also found six studies evaluating avoidable utilization, and determined that health centers prevent complications from chronic illnesses and reduce unnecessary acute care treatment.

Additional studies demonstrate that health centers provide system-wide savings, including savings to Medicaid. After controlling for patient mix, Stuart and Steinwachs found that Medicaid recipients who identified a health center as their usual source of care had overall more ambulatory care visits at lower cost per visit than those who sought care at a hospital outpatient department.[58] A 2010 study by Ku, et al. looked at total patient health care expenditures by provider type and found annual savings of $1,093 per health center patient in 2006 and amounts to $24 billion in total expenditures for 2009.[59] A previous study found annual savings of $9 billion.[60] Further analysis is needed to identify the effects of organizational characteristics and environmental factors on health center non-financial performance. Knowledge gained from the analysis can potentially guide performance improvement and further expand health center's system savings.

Theoretical Framework

The environment has long been recognized to have a profound influence on organizations.[61,62] Since the 1970s, researchers and managers began to focus on the influence of the environment on an organization's operation and survival. This concentrated effort contributed to the development of new theories emphasizing the environment is able to shape organizational structure, change and performance.

There are two categories of environmental characteristics: technical (which involve the organization's production and market exchange of goods and services) and institutional (which involves the rules and regulations imposed on organizations in order

to obtain political support).[63]Within the technical environment, three elements are considered to be able to explain change: socio-demographic, technological and market. The technical environment is where the organization exchanges a product or service within a market. In addition to providing a place where organizations can deliver a product or service, technical environments also provide resources and information required by organizations to perform complex work processes.[63] All three elements of technical environment are exerted on a health center. For examples, changes may include patient demographic shifts during the economic recession or electronic health records adoption or managed care expansion.

The institutional environment consists of rules, regulations or shared belief systems (e.g., legislation or strong social norms) which organization must comply.[64] These external requirements come from different sources and belief systems including regulatory structures, accreditation bodies, government agencies, public opinion, laws, courts, and professions.[65]

Resource Dependency Theory

Resource dependency theory centers on the idea that inter-organizational participants provide managers with information about power and dependence relationships within their network. By understanding these dynamics, organizations can anticipate and counteract influences within their network.[66] Because an organization is dependent on resources within its network (e.g., materials, personnel, and knowledge), the environment has some power over the organization and can make demands on an organization, including competitive pricing, offering certain goods or services, and demanding efficiencies. This dependency is not related to one specific factor, but is

affected by all aspects of the organization's network.[67] Under the resource dependency theory, there is an assumption that organizations will identify the most scarce or critical resources and attempt to develop ways to either reduce or avoid dependency on these factors. The theory was developed to explain the formation and durability of human service agency networks, rural hospital participation in consortia; urban hospitals and provider alliances.[68-71]

Resource dependency explores the set of exchanges between the organization and the environment. The theory provides a perspective for examining how health centers depend on their environment to supply needed resources. Since organizations are incapable of internally generating all inputs or resources needed, they must engage in transactions with their environment.[72] Resource dependency assumes that one of the organization's primary goals is survival.[65,72]Thus, the organization seeks to stabilize relationships with environmental elements that enhance the chances of its survival. Organizations need to ensure and manage resource flows in order to increase the organization's stability.[73,74] Health centers must transform resources (labor, supplies, funding) into health care services.

Institutional Theory

Institutional theory emphasizes that organizations are open systems influenced by their environments.[75-77] The theory presumes that rules and regulations are not just limited to government bureaucracies, but have adopted a "big tent" approach that embraces numerous conceptual frameworks.[78] The central focus of the theory is that institutions are defined in three pillars of cognitive, normative, and regulatory and their activities provide stability and meaning to social behavior. As the theory has evolved, normative and

cognitive were combined citing that organizations emerge on different fronts and the defined pillars acted more like barriers.[76] Cognitive refers to the institutions' ability to adapt and their isomorphism. [79]

Therefore, strong ties with other organizations create the path and resulting changes to certain practices. The creation, transformation, and diffusion of institutions require legitimacy, a condition whereby other alternatives are seen as less appropriate or useful. As organizations strive to conform, organizational behaviors become institutionalized. Once this happens, organizations are presumed to become stable, enduring and sustainable. However, there are three major sources of pressure on institutionalized norms: (1) function – pressures that arrive from perceived problems in performance levels; (2) political – shifts in societal interests; and (3) power distribution and social pressures associated with differentiation of groups. These factors are deemed to be strong predictors of institutional change.[80]

Health centers operate within an institutional environment which includes regulations at the federal, state, and local level as well as the influence of professional associations and organizations. Health centers face numerous requirements from the federal government as part of their official designation and must also deal with requirements of the state Medicaid program. State agencies dictate the scope of responsibility for all types of personnel in health care through various licensing and certifying requirements (i.e., state licensing agencies govern the types of services that physicians, mid-level providers, nurses, and technicians can provide). Regulations within the institutional environment determine the skill mix of personnel needed to provide the full range of services required by all health centers. Professional associations and

organizations (i.e., the National Association of Community Health Centers or State/Regional Primary Care Associations) provide training and technical assistance to health centers and disseminate best practices.

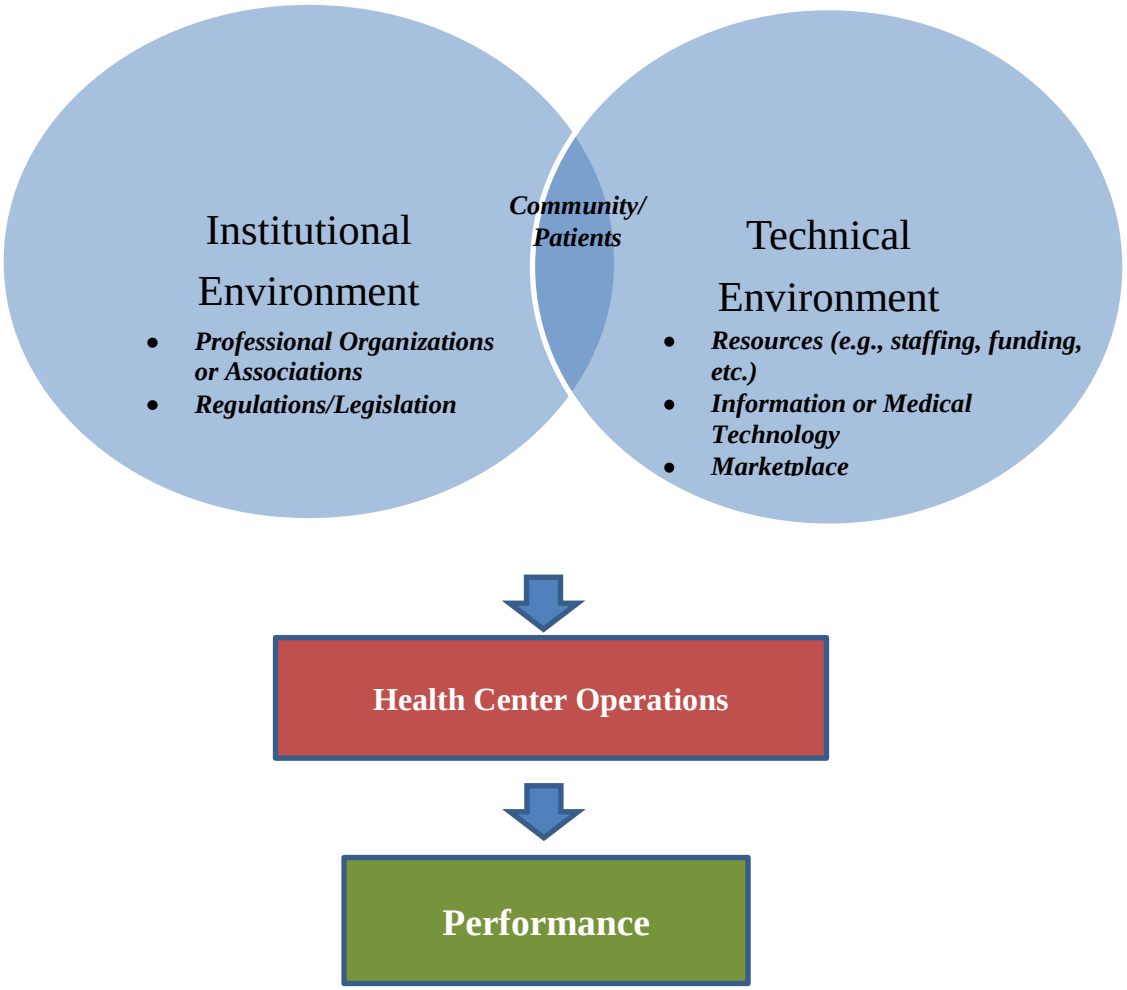
Application to Conceptual Framework

From the environment, health centers are able to transform inputs through organizational structures and processes into services (outputs). There are a multitude of environmental influences which include 1) new information or medical technology, 2) the health care marketplace where the health center operates, 3) needed resources including funding and personnel (workforce), 4) the community and patients served by the health center, 5) federal, state, and local regulations/legislation, and 6) professional organizations or associations. The decisions regarding their structures and processes may affect their financial performance. The combination of the resource dependency and institutional theory allows for the exploration of the health centers environment as they strive to improve performance. Figure 1 demonstrates the environment for which a health center operates.

However, the two environments do not operate in parallel. They often share common features that may conflict in a health center's decision-making process. In the technical environment, the organization focuses on tightly managing resources. In the institutional environment, outside entities impose rules, regulations and belief systems imposed on the organization. For example, state Medicaid programs impose a series of conditions on health centers. The technical and institutional environments lead to different perspectives by the organization. In the former, the organization is facing inward towards the control of technical processes; in the latter, the organization is facing

outward towards the external entities that create the rules and regulations or normative beliefs.[81] Each environment represents a different type of input for the health center that may lead to different responses when adapting to external change. With each organizational decision, the health center will allocate resources to address each of these concerns in the environment. However, there may be more than one way to address these factors and have strong financial performance.

Figure 1: Conceptual Framework



Factors Influencing Performance

As mentioned in the previous section, health care organizations, including medical groups, operate under intense normative expectations and regulatory demands.[82] At the same time, limited resources in the environment require exchange and dependency relationships that introduce uncertainties and constraints on the organization.[83] Environmental forces influence the organizations' strategies, behavior, and performance.[85-88]

The dynamic market conditions pose many challenges to health care organizations. For instance, ambulatory surgery centers (ASCs) – a limited-service alternative for surgery patients not requiring an overnight stay – have proliferated in the U.S. and other countries. Between 1997 and 2004, the effects of ASC competition have been found to have downward pressure on general hospitals' revenues, costs, and profit margins in Arizona, California, and Texas.[89] As for health centers, both the IOM and GAO reported that the health care environment threatens health center financial viability. The IOM study found that health centers' ability to fulfill their commitment to serve all patients seeking care regardless of ability to pay has been affected by the growing number of uninsured; the proliferation of Medicaid managed care and the erosion of subsidies used to cover the cost of providing charity care.[4] The GAO found that market conditions such as level of competition and the size of the uninsured population vary in different locations creating challenges. Health centers have lost market share due to shifts in demographics or socioeconomic status or the proliferation of competition from other providers.[5] This section explores the factors that have been found to influence health care organizations financial viability, particularly health centers.

There have been three longitudinal studies providing a comprehensive analysis on the factors on health center performance. Table 1 displays the association between the financial and non-financial performance measures and the environmental predictors. There has been inconsistency in terms of issues examined and measures with significant findings. There have been cases where studies may have measured the same environmental factor, but the performance measure was different. Table 1 illustrates that the research is not conclusive and presents an opportunity for further research.

The first, a dissertation published in 2006, examined health center characteristics facing financial deficit between the years 1998 to 2002.[90] The author uses two approaches to assess health center deficit: panel and pooled approaches. In time-series regression, the panel model used the same dependent variable as used in the pooled models. The difference between the models is a time component is included in the calculations. The study found 33 health centers out of 649 reported deficits in all five years and only 64 centers reported a surplus for all five years.[90] The author found that higher uninsured proportion increases likelihood of deficit in the panel design, but not associated with long-term deficit or the surplus/deficit ratio.[90] The author found that long-term deficit was associated with health centers structured to care for seasonal farmworkers. The author found that being located in states with higher levels of Medicaid generosity and the presence of Medicaid managed care had no significance on a health center deficit.[90]

Table 1: Association between Performance Measures and Environmental Factors

Study Measure	% Medicare	% Medicaid	% Hispanic	% Poverty	Crude Death Rate	Urban/Rural Status	Region	Population per Physician	Medicaid Generosity	Unemployment
Total Encounters per Provider	+	+	+	***NS***	***NS***	***NS***	***NS***	***NS***	N/A	N/A
Total Cost per Total Encounters	+	***NS***	+	***NS***	***NS***	***NS***	***NS***	***NS***	N/A	N/A
Mean Cost per Encounter	N/A	N/A	N/A	N/A	N/A	***NS***	N/A	N/A	N/A	N/A
Mean Cost per Medical Encounter	N/A	N/A	N/A	N/A	N/A	***NS***	N/A	N/A	N/A	N/A
Mean Annual Salary per Personnel	N/A	N/A	N/A	N/A	N/A	+	N/A	N/A	N/A	N/A
Mean Salary per Medical Personnel	N/A	N/A	N/A	N/A	N/A	***NS***	N/A	N/A	N/A	N/A
Mean Encounter per MD	N/A	N/A	N/A	N/A	N/A	***NS***	N/A	N/A	N/A	N/A
Mean Encounter per Non-Physician Provider	N/A	N/A	N/A	N/A	N/A	***NS***	N/A	N/A	N/A	N/A
Payments per Costs	N/A	N/A	N/A	N/A	N/A	+	N/A	N/A	N/A	N/A
Net Revenue	N/A	N/A	N/A	N/A	N/A	+	N/A	N/A	N/A	N/A
5-yr Pooled Deficit Status	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	***NS***	+
5-yr Pooled Deficit Ratio [(Revenue-Cost)/encounters]	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	***NS***	+
5-yr Paneled Deficit Ratio	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	***NS***	***NS***

Note: NS means not statistically significant. "+" means there was a positive association and "-" means there was a negative association. Blacked out cells indicate measure was not examined in the study.

However, there were several limitations to the study. First, the health center and its local environment are significantly intertwined. It is important to include both sets of variables in the regression models to predict deficit. The study only includes a few environmental factors. Second, the study did not account for whether a health center was newly funded or established health center. Third, the study is conducted prior to the implementation of Medicaid PPS which could have an impact on health center's revenue collection. Fourth, the time period occurs during a period of economic prosperity and would be useful in understanding how deficits and financial pressures for health centers change with national economy. Finally, the study only uses one measure of financial performance where a health center may be found weak on one measure but may be strong on other financial and non-financial measures.

A 2007 study published examined health center characteristics on non-financial performance measures of technical and cost efficiency. Using a longitudinal panel design for 493 health centers with repeated measures of efficiency for 5 years between 2000 and 2004, the authors sought to determine the trends and patterns of efficiency (i.e., visits per providers and cost per visit) and its predictors.[91] Instead of using ratio-based measures, the authors used Data Envelopment Analysis (DEA) which uses a linear programming to calculate the radial distance from the actual position of that same health center on the efficient production function curve. DEA calculates the maximum relative efficiency score of each decision-making unit (DMU). Inefficient scores are considered between 0 and 1. Inefficient DMUs need more inputs to produce the same output in comparison to more efficient counterparts. The authors found that health center efficiency is associated with percentage of Medicare, Medicaid and Hispanic in service areas, and the

organizational factors of staff mix and federal funding. They found that a larger amount of variance is explained by environmental and organizational characteristics. Technical efficiency, staffing mix, and payer mix positively affects initial cost efficiency. While DEA can be a powerful tool can also create problems. DEA is an extreme point technique where noise (even symmetrical noise with zero mean) such as measurement error can cause significant problems. The approach is able to assess how well an organization is doing compared to your peers, but not compared to a "theoretical maximum." The approach may not be readily available to health center managers who may use ratios to benchmark and assess their performance. However, the study was not able to assess the difference between high-performers and low-performers characteristics as one of its objectives. Another limitation is that the study does not account for the fact that the service area can expand beyond the county that the grantee is located but the delivery sites could be places in other counties. The study was limited in terms of the authors only looked at efficiency and did not assess financial performance or other non-financial performance measures.

In 2009, a third study assessed characteristics associated with financial performance. The authors found urban health centers were more likely to have higher personnel costs, greater-self-sufficiency and higher net revenues.[92] Centers serving a large patient population also had greater personnel costs and net revenues, but also greater physician productivity, greater mid-level productivity.[92] Enabling services had greater visit costs, greater medical encounter costs, less personnel costs and less self-sufficiency. Health centers with chronic disease encounters had less visit costs and higher net revenues.[92] Health center with prenatal centers had greater visit costs, medical visits

costs, and self-sufficiency and net revenues.[92] When examining the effect of managed care, centers with high volume/low revenue had higher visit costs, lesser physician productivity, lesser self-sufficiency and lesser net revenues. Health centers with low volume/low revenue only experienced lesser net revenues. Health centers that participated in a managed care network for the first time experienced greater visit costs, greater medical visit costs, greater personnel costs, greater medical personnel costs, lesser physician productivity, lesser mid-level productivity, but greater net revenues.[92] While the study uses multiple measures of financial and non-financial performance, it does not account for community characteristics, influence of the board, practice characteristics, and culture of the center. Finally, health centers operating during some portion of the seven-year period and were financially stressed may not have been present for the entire study period due to a lack of financial viability.

Table 2 summarizes the findings from these three findings regarding organizational characteristics. As with the environmental factors, the three studies do not find consensus on the organizational characteristics that may influence performance. However, there were few characteristics shared across the three studies. Only three measures were used in at most two of the studies. They included payer mix, enabling services, and chronic disease encounters. Even if the characteristic is statistically significant, the direction of the association varies between measures. Thus, indicating there is no ultimate criterion to measure performance, but also showing there is a gap in literature to demonstrate not only the need to identify environmental factors, but also organizations characteristics influence performance.

Table 2: Association between Performance Measures and Organizational Characteristics

	Payments per Costs	Net Revenue	5-yr Pooled Deficit Status	5-yr Pooled Deficit Ratio	5-yr Paneled Deficit Ratio	Mean Cost per Encounter	Mean Cost per Medical Encounter	Mean Annual Salary per Personnel	Mean Salary per Medical Personnel	Mean Visit per MD	Mean Visit per Non-Physician Provider	Total Cost per Total Visits	Total Visits per Provider
Estab-lished vs New Health Center	*NS*	+	-	-	-	+	+	+	+	-	-	N/A	N/A
Enabling Services	-	*NS*	*NS*	*NS*	*NS*	+	+	-	*NS*	*NS*	*NS*	N/A	N/A
Chronic Disease Visits	*NS*	+	*NS*	*NS*	*NS*	-	*NS*	*NS*	*NS*	*NS*	*NS*	N/A	N/A
Payer Mix	-	-	N/A	N/A	N/A	+	*NS*	*NS*	*NS*	*NS*	-	+	*NS*
Users	*NS*	+	N/A	N/A	N/A	*NS*	*NS*	+	*NS*	+	+	N/A	N/A
High Volume High Revenue Managed Care	-	-	N/A	N/A	N/A	+	*NS*	*NS*	*NS*	-	*NS*	N/A	N/A
High Volume Low Revenue Managed Care	-	-	N/A	N/A	N/A	*NS*	*NS*	*NS*	*NS*	+	*NS*	N/A	N/A

Table 2 Continued: Association between Performance Measures and Organizational Characteristics

	Payments per Costs	Net Revenue	5-yr Pooled Deficit Status	5-yr Pooled Deficit Ratio	5-yr Paneled Deficit Ratio	Mean Cost per Visit	Mean Cost per Medical Visit	Mean Annual Salary per Personnel	Mean Salary per Medical Personnel	Mean Encounter per MD	Mean Visits per Non-Physician Provider	Total Cost per Total Visits
Low Volume Low Revenue Managed Care	***NS***	**-**	N/A	N/A	N/A	***NS***	***NS***	***NS***	***NS***	***NS***	***NS***	N/A
Prenatal Care Users	+	+	N/A	N/A	N/A	+	+	***NS***	***NS***	***NS***	***NS***	N/A
Mean Patients per MD	***NS***	***NS***	N/A	N/A	N/A	***NS***	+	+	+	N/A	N/A	N/A
Mean Patients per Non-Physician Provider	***NS***	-	N/A	N/A	N/A	+	+	***NS***	+	N/A	N/A	N/A
% Medicaid Managed Care	N/A	N/A	***NS***	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A
% Patients Medicaid and Other Public	N/A	N/A	***NS***	***NS***	+	N/A	N/A	N/A	N/A	N/A	N/A	N/A
% Uninsured	N/A	N/A	**-**	+	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A
% Enabling Visits	N/A	N/A	***NS***	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 2 Continued: Association between Performance Measures and Organizational Characteristics

	Payments per Costs	Net Revenue	5-yr Pooled Deficit Status	5-yr Pooled Deficit Ratio	5-yr Paneled Deficit Ratio	Mean Cost per Visit	Mean Cost per Medical Visit	Mean Annual Salary per Personnel	Mean Salary per Medical Personnel	Mean Visit per MD	Mean Visit per Non-Physician Provider	Total Cost per Total Visits
Migrant Patients	N/A	N/A	***NS***	***NS***	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Homeless Patients	N/A	N/A	***NS***	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No Dental Visits	N/A	N/A	***NS***	***NS***	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Number of Services	N/A	N/A	***NS***	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Number of Sites	N/A	N/A	***NS***	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A
% Children	N/A	N/A	***NS***	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A
% Low-Income	N/A	N/A	***NS***	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A
% High Income	N/A	N/A	+	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A
% White	N/A	N/A	***NS***	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Size (MD+PA+NP)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	***NS***
Staffing Mix (Size /Total Staff)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	+

Table 2 Continued: Association between Performance Measures and Organizational Characteristics

	Payments per Costs	Net Revenue	5-yr Pooled Deficit Status	5-yr Pooled Deficit Ratio	5-yr Paneled Deficit Ratio	Mean Cost per Visit	Mean Cost per Medical Visit	Mean Annual Salary per Personnel	Mean Salary per Medical Personnel	Mean Visit per MD	Mean Visit per Non-Physician Provider	Total Cost per Total Visits
Network Member-ship	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	***NS***
Mean Cost per Visits	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mean Cost per Medical Visit	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mean Annual Salary per Personnel	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mean Salary per Medical Personnel	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mean Visit per MD	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mean Visit per Non-Physician Provider	***NS***	***NS***	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Initial Visit per Provider	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	+

Many studies examining factors that influence health care organization's performance focus on hospitals. There are few studies that have focused on physician offices. One such study assessed 693 medical groups' performance based on four domains: quality performance, patient satisfaction, organizational learning, and financial performance.[93] The researchers' aim was to develop a set of theory-driven predictors that would explain performance variation within and across the four domains. The drivers fall into four areas: environmental forces, resource acquisition factors, resource deployment factors, and having a quality-centered culture. The medical groups consisted of 20 or more physicians who treated patients with chronic illness. The financial performance of the medical group was measured by whether it reported positive net income for the most recent 2 fiscal years (in most cases 2000 and 2001), had positive net income or broke even for at least 1 of the 2 years, or experienced a loss in these 2 consecutive years.[93] Environmental forces were measured by the degree of managed care penetration measured at the county level, the degree of delegation of hospital risk (i.e., the extent to which the group was responsible for the costs of hospitalization), and whether or not external reporting of quality measures was required. Resource acquisition was measured by:

(1) The extent to which the medical group was able to obtain better health plan contracts in terms of payment rates and practice volume,

(2) The extent to which it was able to successfully negotiate additional income based on the organization's quality performance,

(3) The percentage of revenue received from Medicare patients, and

(4) The amount of capital per physician invested in the practice.

Resource deployment was assessed by four practice characteristics:

(1) Practice size measured by the number of physicians;

(2) Type of practice—multispecialty versus single specialty or primary care only;

(3) Practice age measured by years in existence; and

(4) Whether the medical group was owned by, or affiliated with, potentially a more resource rich hospital, health system, or health plan versus owned independently.

In terms of financial performance, the only statistically significant factor was resource deployment (the number of physicians in both primary care and hospital system settings).[93] The study found groups that were able to secure additional contracts were twice as likely to be in the top quartile on the quality index, the care management index, and physician stability.[93] Environmental factors were not found to be significant.

The aforementioned studies have provided insight on factors that influence performance in primarily in health centers as well as in physician offices. However, only two studies actually measured the environmental factors that influence performance, but one only assessed the non-financial measures and the other used a state Medicaid generosity as its environmental factor. There has not been a study that examines the environmental factors effects on financial performance. The remaining sections of this chapter describe studies that have determined factors influencing financial performance.

Grant Revenues

One possible explanation for the financial distress of some health centers is that service intensity and delivery increased with more grant revenues. Federal and state political climate determine the investment in health centers. Lo Sasso and others sought

to examine the impact of federal, state and local grants on health centers' ability to provide additional services, expand staff and provide more uncompensated care.[94] The researchers used the 1996-2006 UDS and found that the grant investments explain the increase in offered services to health center patients, including behavioral health treatment and counseling. Furthermore, state grant funding allowed for health centers to increase staffing and provide additional uncompensated care. The authors concluded an increase in $500,000 in federal granting would result in the ability for health centers to treat 540 more uninsured patients.[94] However, another study showed that an increase in grant revenues decreases non-physician productivity and also has a negative effect on a health centers' net revenue.[92] The study also showed that health centers with higher encounter costs also had higher grant revenues. The association with encounter costs and high grant revenues could be problematic. A 2007 study found that health centers are heavily dependent on grant support.[95] One could infer a decrease in grant revenues could threaten a health center's financial viability if they do not have other funding sources capable of covering their encounter costs. Additional research is needed in order to provide a more comprehensive understanding of the impact of grant revenue on in health centers viability and how different factors interact with each other.

Socioeconomic Status

There have been several studies that have examined the effect of socioeconomic status on health care organizations' financial viability. Past research has indicated that some hospitals were successful in maintaining their profitability; others experienced financial deterioration and, as a result, were sold or closed in the late 1990s. Studies of hospitals in New York City and California documented a widened gap between

financially strong and financially weak hospitals.[96,97] Many of the financially weakest hospitals were those with significant burdens of "safety net" activities or that served low socioeconomic populations, Medicaid, and uninsured patients. Potential impacts included an increase in the number of uninsured, increased competition for the lowest-risk Medicaid patients enrolled in Medicaid managed care plans, increased price-shopping by private insurers, increased concentration of uncompensated care in a smaller number of hospitals, and the slowdown in the growth in Medicaid payment rates.[98-104]

Another study assessed the relationship between two safety net activities: 1) the provision of care to Medicaid beneficiaries and low socioeconomic populations, and 2) their effect on total profit margin and operating expenditure on urban hospitals.[105] The safety net activities examined were the socioeconomic status of the population in the hospital serving area, and Medicaid intensity or the proportion of hospital admissions that are insured by Medicaid. For the most part, increased safety net activities, whether measured continuously or for the highest 5th percentile, did not negatively affect financial performance to a significant extent during the study period. Even when these relationships did reach statistical significance, their effects were small. Medicaid beneficiaries and uncompensated care did not appear to be associated with any reduction in operating expenditure. However, serving a low-SES population, which was associated with a reduction in profitability and operating expenditure possibly because unlike Medicaid beneficiaries and uncompensated care it is not used explicitly to allocate subsidies. The impacts of low-SES are relatively small. The results suggested that hospitals providing these activities are unlikely to face widespread closures.

Unlike hospitals, health centers' mission is to be the safety net for the uninsured and low-SES populations. Their payer mix is not like hospitals nor do they receive supplemental Medicaid or Medicare payments for providing the very same activities. For health centers, the burden of the uninsured and low-SES has increased. During the 10-year period immediately prior to the GAO study period of 1988 to 1997, the number of uninsured non-elderly persons in the U.S. grew by 30 percent.[4] The number of uninsured patients served by health centers also grew. Health centers with greater increases in their percentages of uninsured users have incurred greater deficits per medical encounter.[50] Health centers with a large increase in the number of uninsured patients seem to experience higher deficits. Health centers that experienced at least a 20 percent increase in the share of uninsured in 1998–99 reported a mean deficit of nearly $2 per medical encounter. This compares to health centers with a surplus of $0.10 that did not experience such a dramatic increase in the number of uninsured.[50] The increase in uninsured patients and the need for care of the homeless and immigrants have raised the cost of providing services.[106]

Managed Care

As previously mentioned, Medicaid revenues are important to health centers as a third-party payer source to help stabilize health center revenue. However, health centers were faced with challenges with the onset of Medicaid managed care (MMC). With rapid growth in the 1990's, the proportion of Medicaid enrollees in managed care increased from nine percent in 1990 to approximately 72 percent in 2009, almost two-thirds percent are in Medicaid-only managed care organizations.[107] Health centers are faced with either becoming participants or losing Medicaid revenue. Managed care may result in a

reduction in revenues which reduces resources used to provide services to the uninsured and potentially affect access to care.

As MMC grew during the 1990s, health centers faced more competition for Medicaid patients and the prospect of reduced Medicaid revenues. During the period 1996 - 1999, those health centers serving Medicaid patients under managed care patients performed worse financially than did those whose Medicaid patients were not under managed care.[50]

In examination of past research on health centers, one retrospective cohort study of 179 community health centers in New York City found that MMC led to lower reimbursement than fee-for-service and health centers may have been turning away MMC patients as a result. Another study found that centers with managed care had significantly higher encounter costs and a lower rate of increase in uninsured.[108] Researchers suggested that the lower uninsured rate at health centers participating in MMC was due to the fact that MMC does not reward uncompensated care. They argue that continued involvement in managed care would put health centers at risk of compromising their ability to provide uncompensated care in the future. Case studies of Oregon and Rhode Island health centers point out that the mission of health centers is at risk due to the number of uninsured, budget cuts and grant reductions.[109] Thus, health centers are more dependent on Medicaid revenue to further their mission. However, the case studies also points out that health centers experienced a decrease in their revenues ranging from 20-25 percent as they shifted to MMC.

A 2003 study found that non-managed care centers served more uninsured and suggested that MMC patients will crowd out the uninsured.[110] Health centers that serve

MMC patient populations also appear to be financially struggling. One in seven recently experienced a large decline in Medicaid patients as a portion of their patient-mix.[50] This is likely the result of greater competition for Medicaid patients as more providers accept Medicaid managed care. The literature shows that an increase in MMC concentration led to declining revenues, higher encounter costs and declining rates of uninsured patients.

Staffing

There have been relatively few studies examining the impact of staffing mix on efficiency and no studies focusing on financial viability. One of the few studies examining cost efficiency and staff mixture in health centers was a longitudinal study of 493 health centers between 2000 and 2004 and it found that cost efficiency was partially determined by staffing mix.[91] However, the measure of staff mix was the total number of physicians, NPs and PAs divided by the total number of staff. This measure is useful, but it does not distinguish between a health center with a high percentage of physicians versus one with a high level of NPs or PAs. Another study found that higher encounter cost were associated with lower non-physician productivity.[92] On the other hand, a 2001 study found that physicians cost per encounter was $33 while NP visits were $19 and PA visits cost nearly $22.50.[111] Researchers suggest that the use of mid-level professionals such as NPs and Pas allows physicians to see more complex patients.[112]

Even in the literature around health care organizations, there are only a few articles that have examined the relationship between nurse staffing and hospital financial outcomes.[114-116] Specifically, hospital financial performance measures were limited to overall costs while excluding other important measures such as operating and total profit margin linked nurse staffing, quality of care, and financial performance. In a longitudinal

study between 1990 and 1995, researchers showed there were no significant effects of nurse staffing on profit margins, which questions hospital management practices of reducing nursing staffing during times of financial hardship.[116] However, there is a paucity of research examining the effect of nurse staffing ratios on hospital performance while controlling for market characteristics. Market structure and competition, specifically, affects the performance of organizations in a given industry.[117] Hospitals in competitive markets face differing challenges and constraints, including competition for scarce resources among competing hospitals and other health care providers. Hospitals in markets with lower levels of competition do not face the same challenges for scarce resources and the need to compete on quality. For this reason, nurse staffing might not have a significant impact on financial performance in less competitive markets. One study found an increase in 1 RN per 1,000 inpatient-days in a competitive market is associated with an increase in the total profit margin.[118] However, RN staffing ratios were not significantly associated with financial performance in less competitive markets. There is a gap literature on the impact staffing mix has on a health center's financial performance and the evidence on non-financial performance seems to be mixed. Therefore additional research needs to be done to assess how staffing mix factors into a health center's performance.

Conclusion

This chapter reviewed research showcasing health center performance in terms of financial and non-financial indicators. This chapter also reviewed empirical evidence on the factors or aspects within organizational and environmental domains. Most of the quantitative research on health center financial performance tends to emphasize the

organizational-level factors. Only two studies sought to explain the environmental factors associated with performance. Yet one study was limited to non-financial performance and the other used a Medicaid-related factor. The environment influences organizations' strategies and behavior which ultimately impacts its performance. The lack of literature examining the relationship between environmental forces and health center financial and non-financial performance only demonstrates the importance of the study to the fill the gap in the literature to better understand the factors contributing to poor financial performance.

Chapter 3: Methods

This chapter describes the research methods used in the study. The chapter begins with a general overview of the research approach and the scope of the study. The second section describes the unit of analysis, explains the use of a times series cross-sectional analysis, pooled analysis, and time period. The third section describes the operational definitions and data sources for the dependent and independent variables. The final section describes the statistical methods used in this study.

Overview and Scope of the Study

This study employs both a time-series cross-sectional research design and a pooled analysis to identify the environmental factors and organizational factors influencing financial performance among federally-funded health centers from 2005-2009. This study fundamentally differs from existing research for several reasons. Unlike prior research, it does not solely summarize the financial performance of the health center, but investigates the factors associated with performance. Second, it uses several different methods to assess health center short- and long-term financial performance and the environmental and organizational factors could impact performance. Existing research provided limited insight on environmental factors influencing health center performance.

While the primary study objective is the short-term financial performance, it is important to examine long-term performance. Some health centers have had capital expansion plans that could have affected their short-term performance. Other health centers have continuously struggled with their financial viability, thus the focus of the study. A pooled analysis of the five-year average will be used to examine health centers

perform in the long term. A logistic regression will be able to examine the likelihood of having certain factors in terms of long-term performance.

The study uses administrative data from health centers which will able to estimate a health center's financial performance. Due to the use of administrative data, factors such as organizational leadership and culture were not able to be examined in this study.

Research Design

This study uses time-series cross-sectional analysis with health center as the cross sectional units and yearly data from the time period 2005-2009. The primary variables of interest are operating margin, total cost per encounter, net revenue per encounter and grant reliance. The study is a quasi-experimental research design meaning there is no random assignment to treatment groups. Strong quasi-experimental designs allow researchers to control for not only the variables of interest, but secular trends that may affect the study's relationships.

The study looks at health centers in the U.S. between 2005 and 2009. Health centers are the units of analysis for several reasons. Health centers operate in specific communities. Therefore, each health center's operational management decisions are based on the local resources of the community. Since health centers are monitored at the organizational level, it is the utmost importance to assess financial performance in a similar manner. Financial performance is not measured at the state level for the same reason; it is up to the individual health centers to achieve higher financial performance in order to sustain high-quality services to their patients. While some factors at the state-level would impact financial performance, each health center will respond differently to the factor. Also aggregating financial performance at the state, regional or national level,

may insert bias in the study as health centers with a strong financial performance overshadowing the poor performers or vice versa. Because of the dynamic nature of financial performance and the inability to measure all desired measures, this study examines demographic, staffing, and service variables at the organizational level. Health center serve patients who live in these communities will have variation in environmental factors such as employment and insurance coverage. Finally, the health center program is a national HRSA program which the agency applies a standard funding formula. Any conclusions that may come from this study should inform the national program and not just assess a state or regional financial performance.

The study utilizes data for the years 2005-2009. Some experts suggest that it takes at least five years to understand an organization's financial direction.[119]The study period was selected for several reasons. The study period reflects several years since the implementation of Medicaid PPS reimbursement – a mechanism to provide adequate reimbursement for Medicaid costs. Also during the study period, the Health Center Growth Initiative was underway providing funding for health center operating revenue. Third, the last two years of the study period occur during an economic recession which started in December 2007 and ended in 2009. Health centers received additional federal funding to continue their operations. Because of different economic conditions that occur under the study period, the study period allows for the observation of health centers in a variety of economic conditions. The final reason is the study period occurs before the implementation of ACA which expands insurance coverage and increases appropriations to health centers which may impact health center financial viability.

Over the past 10 years, the health center has experienced significant growth in terms of funding creating new health centers. This dynamic environment requires a research design that will have the ability to handle a population that may drop out during the study period as well as health centers that open during this time. In 2005, there were 925 health centers in the U.S. Health centers in U.S. territories other than the District of Columbia were excluded based on the lack of availability of compiled national data sets needed for explanatory variables.

Throughout the study period, 22 federally funded health centers no longer met federal grant requirements, merged operations with other health center grantees, or changed UDS identifier (which could mean that the grantee was under new management, may have changed operating location, or changed scope of services and number of sites). The health center attrition rate is 2.5% during the study period. By 2008, nineteen grantees were no longer in existence. In 2007, the year saw the most grantees drop out with eight grantees. Of the 22 health centers that dropped out of the study period, 68% of the former grantees had delivery sites still in operation, but other grantees now administer the sites. Eight of the fifteen grantees that now administer an existing delivery site were in existence in 2005 and are included in the study. Only three HRSA regions did not have any health centers drop out of the study period which included Region 3 (Pennsylvania, Maryland, Delaware, Virginia, and West Virginia), Region 7 (Nebraska, Kansas, Iowa, and Missouri), and Region 10 (Washington, Oregon, Idaho, and Alaska). HRSA Region 4 was the region with the most health center dropped from the study (Kentucky (1), Tennessee (1), North Carolina (2), South Carolina (2), Georgia, Florida, Alabama, and Mississippi).

There were 202 health centers that entered the study period that were not present in the 2005 baseline year. In 2007, the number of health centers increased by 72 new grantees which was the largest influx of new health centers during the study period. Both 2006 and 2009 had 55 and 54 new health centers, respectively. Only 21 new health centers were established in 2008 which was the beginning of the economic recession.

Data Sources

The study uses two data sources to evaluate the influence of environmental factors and organizational characteristics on federally funded health centers. The secondary data were obtained from HRSA.

Area Health Resource File (ARF): ARF contains more than 6,000 variables for each of the nation's counties. ARF will provide the majority of the environmental factors. The database contains information on health facilities, health professions, resource scarcity measures, health status, economic activity, health training programs, and socioeconomic and environmental characteristics. Data used for this study came from the 2011-12 ARF release. Various indicators were matched by county to other data sources. The ARF provided data on population, socioeconomic indicators, geographic codes, and the number of active health professionals.

Uniform Data System (UDS): UDS provides the health center data necessary for the analysis of the financial performance. The UDS is an integrated reporting system used by all federally-funded health centers. BPHC collects data on its programs to ensure compliance with legislative mandates and to report to Congress, OMB, and other policy makers on program accomplishments. To meet these objectives, BPHC requires that grantees submit a core set of information annually that is appropriate for reviewing and

evaluating performance and for reporting on annual trends. The UDS is the vehicle used by BPHC to obtain this information. The UDS is composed of 11 tables which collect clinical, operational and financial data. The UDS data is based on the calendar year. In order to minimize missing data points or invalid data, BPHC performs follow-ups and trainings to help grantees report data. In 2008, BPHC added a new table to collect clinical quality data on three variables: trimester of entry into prenatal care, immunization of two-year olds, and Pap tests for women aged 21 – 64 years old.

Construction of the Analytic Databases

UDS was used to obtain the dependent variables and organizational characteristics for each year during the study period. The merge process is repeated for each year of the study and datasets are appended to each other to create a long-form dataset. Replication of the process for each year of the study results in repeated observations for health center markets and the final analytic dataset consists of five years of observations. All cost and revenue data were adjusted to 2009 dollars using the Medicare Economic Index to account for inflation. In order to create the pooled data set, the panel data was collapsed to calculate the average for each variable.

Previous studies used the location of the health center grantee only to determine county-level factors. However, a health center grantee may have several delivery sites in other counties which may serve a different population. Therefore, this study uses the patients' zip code as a means to create a data set that is representative of the counties where health center patient reside. ARF was used to merge county level data with the UDS dataset based on zip code. In order to match health centers with the corresponding environmental factors at the county-level, a cross walk was created based on the UDS

Patient Zip Code Table to the counties. The cross walk was constructed using Dasheer, LLC Zip-Codes, US Zip Code Deluxe database using the state and county FIPSs to construct a new variable in the zip code table which would be used to be linked to ARF. While zip codes may cross county lines, Zip Code Deluxe includes a variable to indicate the primary city and county associated with the zip code as well if the zip code was decommissioned.

Measurement

The goal of the study is to assess how factors influence financial performance. The outcome variables of interest for health center viability include three variables: cost, financial margins, and grant dependence. These categories contain four variables which are included in the table below. The variables were obtained from prior research examining financial performance, viability, and efficiency.

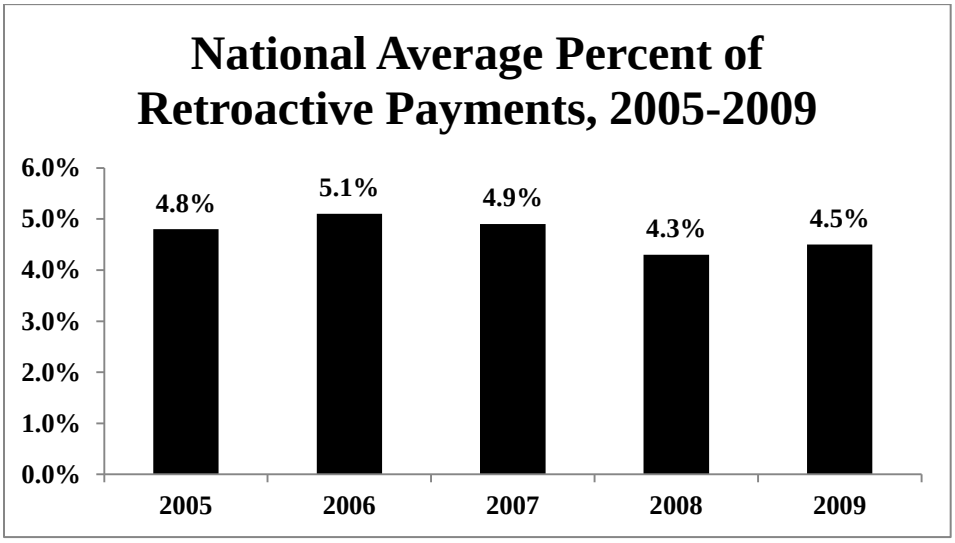
In order to calculate a health center's financial deficit, costs and revenues must be used from the UDS tables. However, these two categories are based on different accounting methods. Revenues are reported on a cash basis, regardless of when the paid services were rendered. On the other hand, costs are to be reported on an accrual basis. These are the costs attributable to the reporting period, including depreciation, regardless of when actual payments were made. If a service was rendered at the end of the year, payment may not have been received from the payer. This discrepancy creates a problem with defining deficits on an annual basis. Depending on how much revenue is received at the beginning of the year, and how much cost are accrued at the end of the year, a center could have inaccurate data reported in the UDS for actual costs and revenues. This discrepancy creates a problem with defining deficits on an annual basis.

Table 3: Financial Viability/Cost Measures

Category	Variable	Operational Definition	Relevance
Cost	Total Costs per Patient	Ratio of total accrued cost before donations and after allocation of overhead to total number of patients	Represents dollar value for services provided
Deficit	Operating Margin Ratio	Ratio of net income divided by total revenue. Net income consists of the excess of cash revenue after subtracting accrued expenses. This means that the only data that is necessary to compute an operating margin ratio is total revenue and total expenses.	A deficit in one year does not necessarily indicate financial difficulty. A health center may have had an unusually large expenditure in the current year, but prudently planned for such events by conserving resources in previous periods. Credit ratings agencies are generally concerned when there are two consecutive years of deficits, when the size of deficits is increasing or when there is an abnormally large deficit (5% to 10%).%).[120] In addition, the continuous recurrence of deficits may exhaust a health center's reserves.
Deficit	Net Revenue per Encounter	Net Revenue divided by encounters	The size of the health center may influence the surplus-deficit ratio as health centers invest in expanding services or building facilities. Therefore per encounter will account for the number of encounters the health center has over the years.
Grant Reliance	Grant Reliance Ratio	Ratio of grant revenue (e.g., 330 grant revenue) to total patient-related revenue	Awareness of risk in both reliance & autonomy. Govt. funding is often closely tied to specific contracts & budgets with limited cost allocations & flexibility. The closer the reliance ratio is to 1, the less self-sufficient health centers are (i.e., the more reliant on grants as a revenue source). Since the early years of the health center program, it has been a stated goal for health centers to become as self-sufficient as possible.
Composite Measure	Composite	Summation of z-scores for total cost per patient, operating margin ratio, Net Revenue per Encounter, and grant reliance. The z-scores for grant reliance and total cost per patient were reversed, so higher values reflect stronger financial performance.	Due to the multi-dimensional aspects of financial performance, a composite measure allows for multiple performance indicators to be combined instead of assessing performance on a single variable.

Depending on how much revenue is received at the beginning of the year, and how much cost are accrued at the end of the year, a center could have inaccurate data reported in the UDS for actual costs and revenues. However, this could be important depending on the length of accounts receivable is delayed. Figure 3 shows that retroactive payments comprise only a small percentage of revenues.[13] Thus, the discrepancy may not be an issue. The pooled analysis of long-term performance should be able to alleviate any discrepancy and bias because pooling the data removes variation in the dependent variable due to accounting methods.

Figure 2: Average Retroactive Payments Has Been Consistent Over the Years



Explanatory Variables

Explanatory variables have been divided into two different levels. The first level is environmental factors stemming from county-level variables which the health centers operate. The second level reflects organizational characteristics of the health center and its operation.

County-level Variables

Income: Income and financial resources have long been understood as important to health, so that individuals can obtain health insurance, pay for medical care, afford healthy food, safe housing, and access to other basic goods, at least until a certain income threshold is achieved. Considering health centers must provide sliding scale discount for individuals in poverty, a variable for per capita income could have an effect on health center financial performance.

Hypothesis:

- The higher the income would result in poor financial performance since patients would rely on private insurance or seek care in private physician offices.
- The total cost per patient would also decrease as patients may have other resources to seek care.

Insurance Coverage: As the U.S. expands coverage, both the Congressional Budget Office and Massachussetts indicate some individuals who will remain uninsured. Research estimates that the remaining uninsured will depend on health centers for their care needs.[27] The uninsured are less likely to receive preventive and diagnostic health care services, are more often diagnosed at a later disease stage, and on average receive less treatment for their condition compared to insured individuals.[121]

Hypothesis:

- *Grant funding is dependent in part of uninsured. The higher the uninsured percentage in the community would indicate a higher dependence on grant especially 330 grant funding.*

- *The higher the uninsured would indicate less Medicaid population. Since Medicaid is a health center's highest payer one would expect:*
    - *There would be lower net revenue per encounter and operating margin due to sliding fee scale lowering the reimbursement rate of those in self-pay.*
    - *Lower cost would result because health centers would be resolved to seek grant funding to provide certain services and would opt to offer just the core required services, not offer the more expansive services.*

Access to health care measures accessibility to needed primary care, health care specialists, and emergency treatment. While having health insurance is a crucial step toward accessing the different aspects of the health care system, health insurance by itself does not ensure access. It is also necessary to have comprehensive coverage, providers that accept the individual's health insurance, relatively close proximity of providers to patients, and primary care providers in the community.[122] There are additional access barriers for some populations due to lack of transportation to providers' offices, lack of knowledge about preventive care, long waits to get an appointment, low health literacy, and inability to pay the high-deductible of many insurance plans and/or co-pays for receiving treatment.[122] The next set of variables measures accessibility and utilization. Evidence suggests that access to effective and timely primary care has the potential to improve the overall quality of care and help reduce costs.[123,124]

Provider Composition: Provider composition variables relate to the percent of primary care physicians in a market. Integration and care coordination could have an influence on health center performance, a variable was created to represent the

percentage of primary care in a health center's service county. Two other variables (number of FQHCs and Rural Health Clinics (RHCs)) were created to access to indicate the primary care infrastructure for lower income individuals.

Hypothesis:

- *Higher percentage of primary care would mean that there is competition for patients and an infrastructure that has the potential to be an integrated system. The lower percentage would indicate a high reliance on specialty care which would indicated lower margins and grant reliance for health centers*
- *Competition would indicate lower costs for services as well as competiting for resources such as patients. Greater presence of FQHCs would likely decrease margins and costs.*

Utlization of Emergency Department ED Visits: The rate of emergency department (ED) visits per 1,000 residents will be constructed as a proxy measure for appropriate use of primary care services. A 2006 California survey found one of the principal causes of ED use to be lack of access to primary care. Forty-six percent of patient-respondents believed that the problem bringing them to the ED could have been handled in primary care. Of this 46 percent, two-thirds would have seen a primary care practitioner instead of visiting the ED had they been able to obtain an appointment.[125] People with no usual source of care, especially those with low incomes, are more likely than others to visit an ED. Twenty-two percent of ambulatory care visits in 2004 were to an ED for adults with low income and no usual source of care.[126] Studies have shown that health center reduce ED visits.[127,128] One study found counties with less access to primary

care had higher rates of ED visits. Further, counties found to have the highest rates of ED utilization lacked a Community Health Center (CHC). Results suggested counties might benefit from health centers as they may generate health care savings by reducing ED use while increasing access to primary care.[129]

Hypothesis:

- *The higher ED use would lower cost since patients will be going to the ED as a usual source of care instead of at a health center. However since ED use is more likely to attract uninsured and Medicaid patients, health centers will likely have strong margins and net revenue per encounters.*

Table 4: Summary of County Level Factors

Variable	Description	Data Source
Per Capita Income	Mean per capita income for the county based on patient zip code	Area Resource File
Percent Uninsured	Mean percent of uninsured individuals under the age of 65 for the county based on patient zip code	Area Resource File
Number of FQHCs	Total number of FQHCs delivery sites located in the county based on patient zip code	Area Resource File
Number of RHCs	Total number of RHCs delivery located in the county based on patient zip code	Area Resource File
Percent PCP in Service Counties	The mean percent of primary care physicians (family medicine, internal medicine, general practice, and pediatrics) of the total active physicians located in the county based on patient zip code	Area Resource File
Emergency Department Visits per capita	The mean emergency department visits per county population estimate based on patient zip code	Area Resource File

Health Center Organizational Characteristics

Urban/Rural Status: Rural residents are often isolated and have a more difficult time obtaining access to adequate primary care compared to their urban counterparts. Health centers are located in densely populated urban areas and in rural areas that serve a critical access need. Previous work has found that health centers in urban areas received more federal grants, had a larger tax base and have more funding resources.[92] This variable will be created using self-report data constructed using the percentage of health center delivery sites identifying their patient population as either urban or rural.

Hypothesis:

- *Health centers in urban areas would have higher costs per patient due to higher cost of living in urban areas*
- *Health centers in rural areas would have lower margins and net revenue per encounters because there will not be enough of a market to support a health center without being more reliant on grant funding.*

Staffing Mix: Organizational costs can be driven by the type and proportion of medical clinicians and their salaries. For instance, if OB/GYN, adult medicine or other specialists are added, the unit costs are likely to rise. Organizations with proportionately more nurse practitioners, physician assistants and/or certified nurse midwife clinicians are likely to have lower unit costs. Five variables are created to measure health center staffing patterns. First, the ratio of FTEs for NPs and PAs to physicians, NPs and PAs allows the measure to capture the difference in staff mix of health professionals between health centers.

Hypothesis:

- A health center with more NPs and PAs providing care would have lower costs due to lower overhead and have higher margins because the use of non-physician clinicians would be able to increase the panel size which would increase revenues.

The three variables measuring the different types of services include: 1) the percentage of dental staff; 2) the percentage of behavioral health staff; and 2) the percentage of enabling services.

Hypothesis:

- *An increase for any of these three categories would endure higher costs.*
- *Dental would likely increase margins and net revenue per encounter since it is bringing in new patients. However enabling and behavioral would not see an increase in either margins or net revenue per encounter and may actually see a decrease.*

Scale of Health Center: Two measures attempt to capture the scale of the health center. The first variable is the number of satellite locations associated with a health center. The second is the total number of patients served at the health center in a calendar year.

Hypothesis:

- *The more locations and patients could indicate a larger penetration in the primary care market; therefore it would be able to control costs and lower them as well as have positive margins and net revenue per encounter.*

Funding Stream: Health centers receive 330 funding through four main grant categories: Community Health, Migrant, Public Housing and Homeless. Health centers may also receive more than one type of 330 grant. Therefore, a categorical variable will

be created for Community Health, Migrant, and Homeless categories. The percent of health center 330 funding that composes a health center's revenues will also be assessed

Hypothesis:

- *Migrant Health Centers would likely have lower costs, be reliant on grants and negative margins and net revenue per encounter.*
- *Homeless Health centers would likely have higher costs, be reliant on grants, but have positive or zero margins since they are likely to have patients who are able to be insured unlike the migrant health centers.*

Staffing Productivity: Many factors can affect the productivity of staff including clinician and leadership effectiveness, the facility, demand, access, and the patient mix. The elderly and special populations are often more sick and consume more service and visit time which lowers productivity. Inefficient and insufficient space, mobile clinics, support staffing, phone management, hours of operation, scheduling, electronic medical record start-up are all things which may also affect access and productivity. Lower productivity could result in weak financial performance. While already measuring the composition of the workforce using non-physician, the study examines their productivity to see how they are utilized.

Hypothesis:

- *Higher non-physician productivity would lower costs and increase margins and net revenue per encounters. Since non-physicians would assume to be operating at the top of their licenses and the physicians would see the more complex patients.*

Reimbursement: In previous studies, payer reimbursement rates (ratio of revenue to gross charges) were not assessed for association of deficits or cost efficiency. These rates could be important factors associated with financial performance. Three variables are created to assess reimbursement on performance. These variables include the three major third party payers: Medicare, Medicaid and Private Insurance. While not necessarily a reimbursement variable, the percent of health center 330 funding that composes a health center's revenues will also be assessed. However the percent of 330 funding or health center cluster funding will not be used in the grant reliance models due to endogeneity.

Hypothesis:

- *The higher the reimbursement rate for any of these payers would mean higher margins and net revenue per encounters.*
- *Having a higher reimbursement rate could also mean that the health center could expand services since they would not be reliant on grants and therefore increase costs.*

Table 5: Summary of Health Center Organizational Characteristics

Variable	Description
Urban Status	Health center self-reported status of urbanity. Coded as 1 -Urban and 0 -Rural
Regions: Northeast, Midwest, South, West	Census regions that subdivide the United States. Each region was coded as 1 for Yes and 0 for No. South was used for reference.
Number of Sites	The number of health center delivery sites.
Number of Patients	Total number of patients served by health center during the reporting period.
Migrant Health Center Grantee	Health Center grantees who receive BPHC grants under Migrant Health Center program authorization. Coded 1 - Yes and 0- No
Community Health Center Grantee	Health Center grantee who receives BPHC grants under Community Health Center program authorization. Coded as 1 - Yes and 0 -No. Variable was used for reference.
Homeless Grantee	Health Center grantees who receive BPHC grants Homeless Health Care program authorization. Coded as 1- Yes and 0 - No
New Grantee	Health Center grantees who had three or more years of UDS data before CY 2005. Coded as 1- New and 0 - Established
% Dental Staff	Percent of staff full-time equivalents who are: Dentists (general practitioners, oral surgeons, periodontists, and periodontists); Dental Hygienists; and Other Dental Personnel (dental assistants, aides, and technicians).
% Behavioral Staff	Percent of staff full-time equivalents who are: Psychiatrists; Licensed Clinical Psychologists; Licensed Clinical Social Workers; Other licensed mental health providers; Other mental health staff, including unlicensed individuals; and Substance abuse workers and other individuals providing counseling and/or treatment services related to substance abuse.
% Enabling Staff	Percent of staff full-time equivalents who are: Case managers; Patient and Community Education Specialists; Outreach Workers; Eligibility Assistance Workers; Interpretation Staff; Personnel Performing Other Enabling Service Activities;
Non-physician to Physician Ratio	Ratio of the number of Nurse Practitioners, Physician Assistants, Certified Nurse Midwives to the number of physicians (M.D.s and D.O.s, except psychiatrists, ophthalmologists, pathologists, and radiologists
Non-physician Productivity	Ratio of the number of visits served by the number of Nurse Practitioners, Physician Assistants, Certified Nurse Midwives to the number of the number of Nurse Practitioners, Physician Assistants, Certified Nurse Midwives Full-time Equivalents
Medicaid Reimbursement Rate	Ratio of Medicaid gross receipts for services rendered to Medicaid patients during the calendar year to total Medicaid charges for the year on a cash basis, regardless of the period in which the paid for services were rendered.
Private Insurance Reimbursement Rate	Same as Medicaid Reimbursement Rate, for private insurance
Medicare Reimbursement Rate	Same as Medicaid Reimbursement Rate, Medicare
% Health Center 330 Funding	Percent of health center total revenue considered BPHC section 330 grants in the primary care clusters.

Health Center Patient Characteristics

Patient Gender: The continuous variable, the percentage of patients who are female, is used to measure the effects of gender.

Hypothesis:

- *The literature shows that females are more likely to use health care services than their male counterparts. Therefore, a lower percentage would predict higher costs since men would likely be seeking care as a last resort and could be costly. As a result, the lower percentage would lower margins and net revenue per encounter.*

Insurance Coverage: Health centers predominantly serve Medicaid and the Uninsured. Patients from these categories could have an effect on the financial performance. Medicaid tends to reimburse at a higher rate compared to other payers since its reimbursement methodology provides an adequate payment. Health center are typically funded 330 grant funds based on the number of uninsured patients they serve.

Hypothesis:

- *Private Insurance and Medicare are detrimental to a health centers financial performance since their payment rates are much lower than 330 grant funding and Medicaid. Therefore the lower the percentage of Medicaid and Uninsured patients could result in lower revenue. Medicare patients could have higher costs associated since they tend to need coordinated care and have chronic care conditions, so having a lower percentage in uninsured and Medicaid could also increase costs.*

Patient Race/Ethnicity: Health centers' patient composition in terms of race and ethnicity may also impact their financial due to the additional required services to address language barriers or unmeasured socioeconomic status, discrimination, cultures or presumed biological differences.[130-133] Two variables will be used to measure a health centers composition in terms of race and ethnicity: 1) the percentage of non-white patients and 2) the percentage of patients that are best served in a language other than English.

Hypothesis:

- *Higher percentages of either of the variables would have a higher reliance on grants since some the services would not be reimbursable.*
- *There would be higher costs because of the additional services.*
- *Net revenue per encounter and operating margins would be negative because additional resources needed to care for these populations.*

Chronic Visits: Health centers have been able to demonstrate cost saving on medically complex patients. Therefore, the study seeks to see if the percentage of chronic visits predicts financial performance in health centers.

Hypothesis:

- *Higher percentage would lower margins and net revenue per encounter because chronic patients due to their higher cost.*

Table 6: Summary of Health Center Patient Characteristics

Variable	Description
% Patients with Limited English Proficiency	Percent of patients who are best served in a language other than English or in sign language
% Non-White Patients	Percent of patients who are Black or African American, American Indian or Alaska Native, Asian, and Native Hawaiian, or Other Pacific Islander
% Uninsured Patients	Percent of patients who did not have medical insurance at the time of the last visit
% Medicaid Patients	Percent of patients whose primary health insurance covering medical care, if any, as of the last visited was Medicaid or CHIP
% Female Patients	Percent of patients who were female
% Patients under 100% FPL	Percent of patients under 100% of the Federal Poverty Line using HHS poverty guidelines
% Patients above 200% FPL	Percent of patients above 200% of the Federal Poverty Line using HHS poverty guidelines
% Chronic Visits	Percent of visits with the primary diagnosis of HIV, Diabetes Mellitus, Selected Heart Disease, Hypertension, Asthma, Chronic Bronchitis and Emphysema, and Selected Mental Health and Substance Abuse Conditions

Data Analysis

The study is composed of three separate analyses: trends, time series cross sectional and pooled regression. The three analyes are an attempt to depict a complete picture of the financial performance.

Trend analysis: Descriptive statistics (Means, standard errors and t-test) have been calculated at an aggregate level and for each year of the study period. The descriptive statistics were helpful in assessing trends as well as identifying the changes in to assess how economic condition changes influenced performance. At the aggregate level, the variation between health centers (labeled “between”) and the variation between years (labeled “within) were also calculated in addition to the means, standard deviation, minimums, and maximums for the variables. Understanding patterns to the data and the

sources of variation is instrumental in developing the multivariate models used later in the study.

Time-series Cross Sectional: As noted earlier in this chapter, the time-series cross-sectional (TSCS) research design is extremely strong with respect to internal validity as it controls for confounding factors across both health centers and time. However, TSCS datasets are highly prone to statistical threats as they often suffer from cross-sectional problems (especially heteroskedasticity) in addition to time-series problems (especially serial correlation). The simple regression model, Ordinary Least Squares (OLS), is recommended as the best linear unbiased estimator under a series of very specific assumptions that are often violated by TSCS data. The OLS assumptions include:

1. A functional form where: $yi = \alpha + \beta xi + \varepsilon i$, $I = 1,\ldots N$
2. Zero mean of the error term
3. Homoscedasticity (constant variance of the error term across observations)
4. Nonautocorrelation (errors are uncorrelated between observations)
5. Uncorrelatedness of the regressor and disturbance (no relationship between the independent variables and the error term)[134]

Observations within an individual times-series maybe correlated with one another, thus violating the non-autocorrelation assumption. Also the homoskedasticity assumption is also generally violated in a TSCS model as observations within a single state or a single year will be more similar to one another than those from different states and different years. Finally, if there are any omitted variables in the econometric model, these variables will be absorbed by the error term. If the omitted variables are correlated with any of the

explanatory variables, assuming the absence of any correlation between the regressor and disturbance will also be violated. There are statistical tools that can be used to diagnose and treat the various threats to statistical inference.

- A Hausman test was used to decide between fixed or random effects, which established that both straight OLS and random effects were inappropriate.[135]
- A time fixed effects test, a joint test to see if the dummies for all years are equal to 0, if they are then no time fixed effects are needed. Time variables were required for all outcome models with the exception of the operating margin model.
- Breusch and Pagan Lagrangian multiplier was used test for random effects and to reject OLS. Only the net revenue per encounter model failed to reject the null hypothesis and used a simple OLS.
- Modified Wald test was used to test for groupwise heteroskedasticity. The option 'robust' was used in the models to obtain heteroskedasticity-robust standard errors (also known as Huber/White or sandwich estimators).
- Serial correlation tests apply to macro panels with long time series (over 20-30 years). Not a problem in micro panels (with very few years).[136] Serial correlation causes the standard errors of the coefficients to be smaller than they actually are and higher R-squared. However, Lagram-Multiplier test for serial correlation was used and found the data does have first-order autocorrelation. Models adjusting for autocorrelation using Stata command xtregar and lagged dependent variables can be found in the appendix. These models are not presented since serial tests should not apply due to small time series. The

models include a lagged dependent to reduce the occurrence of autocorrelation arising from model misspecification. The introduction of a lagged dependent variable is also included because it is expected that the current level of the dependent is heavily determined by its past level.

Pooled: While panel data offers its advanateges, a pooled approach will also be used to assess health center performance in terms of a five-year average. This approach can be used to assess the long-term performance rather than assessing short-term performance by means with the panel approach.

In order to test the research question "*How do environmental and organizational characteristics influence different categories of health center performance over the years?"* a logistic regression will be used for this portion of the study. While the OLS regression estimated how the predictors changed the outcome variables, logistic regression estimates that odds of being efficient in an outcome variable compared to those that are inefficient. The odds ratio allows the study not only to understand the environment which health centers operate as it relates to performance, but also the magnitude in the odds of performance. Therefore, the study will need to quantify the magnitude of the association requires another methodology, which would allow for the use of odds ratio.

The study will compare categorized health centers based on their performance over time to assess any patterns. Odds ratios are defined as the odds of one event occurring in one group to the odds of the event occurring in the other group.[137] The calculation of the odds ratio in bivariate analysis only allows the opportunity to determine the strength and direction of two variables and does not control for the effects of other

potential confounders.[137] The log odds of the dependent variable (z) encompass two categories (1 and 0).[138] One is defined as the value of the dependent variable, and zero is used as the references value. On the opposite side of the equation there is β_0, which is the constant. Listed after the constant, there is the possibility of having k coefficients and k independent variables. Based on the theoretical nature of the investigation these, predictors are also allowed to interact.[138] The allowance of k independent variables allows the opportunity to test for associations while controlling for multiple predictors simultaneously.[137,138] In addition, logistic regression analyses are not beholden to many of the restrictive assumptions that define OLS regressions.[138] If the study is a time series cross-sectional design, it will take observations from different time periods and combines them into one time period. Thus, the observations are not independent, and the assumption of independence is violated.[139] Performing a logistic regression analysis alone on cross-sectional time series data can lead to misleading results.[140] This potential situation can be avoided by placing time corresponding dummy variables in the model to represent all the years (except the first year) from which the sample was drawn.[139] This strategy will be incorporated into the proposed analysis by placing time invariant dummy variables from 2005 to 2009 into the regression model.

Therefore, the five-year average will be used to determine the long-term financial performance. This study seeks to understand health center financial performance and the associated factors both long and short-term. By averaging the entire five-year period, variation in the dependent variable is removed. The logistic regression analysis will also give the advantage of comparing financial performance using several categories:

- The top and bottom quartile;

- Positive and negative margins; and
- Health centers with multiple poor indicators;

The study will also utilize a multinomial logistic regression to compare health centers with fluctuating outcomes against those health centers with consistent positive outcomes. It will also compare health centers with consistent negative outcomes with those with consistent positive outcomes. A multinomial logistic regression is used to predict categorical placement in or the probability of category membership on a dependent variable based on multiple independent variables. The independent variables can be either dichotomous (i.e., binary) or continuous (i.e., interval or ratio in scale). Multinomial logistic regression is a simple extension of binary logistic regression that allows for more than two categories of the dependent or outcome variable. Like binary logistic regression, multinomial logistic regression uses maximum likelihood estimation to evaluate the probability of categorical membership.

Chapter 4: Results

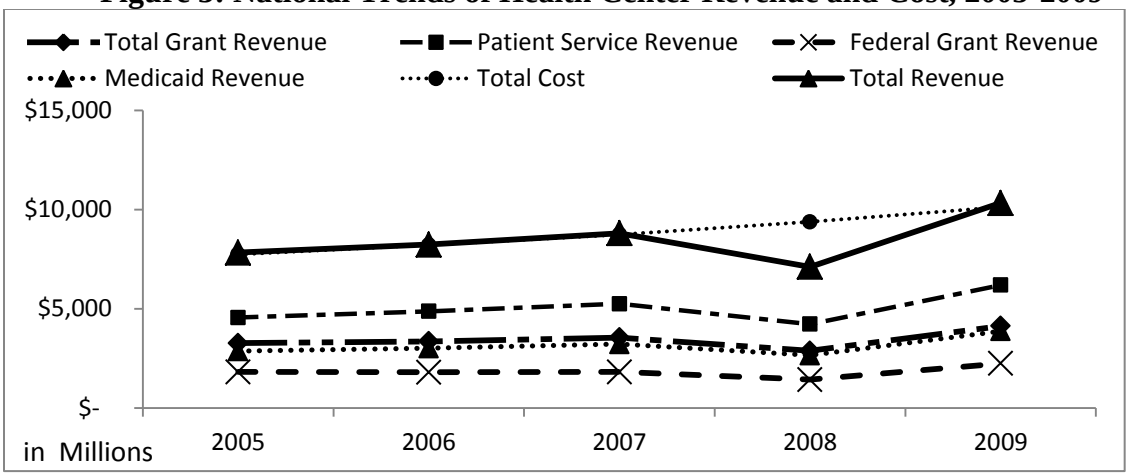
After careful examination of the literature and the bivariate means and frequency results, the presented factors were deemed associated with financial performance in health centers. This chapter is divided into six sections: national trends, key findings, descriptive statistics for dependent variables; dependent variables (operating margin, net revenue per encounter, total cost per patient, grant reliance and the composite score). Operating margins is the study's key outcome measure as it is a well-recognized standard to assess financial performance. Total cost per patient is a key non-financial measure used to assess cost efficiency and to determine cost drivers in health centers. The composite score is a concept that takes into account the multiple performance indicators. The composite measure was constructing using the summation of z-scores for total cost per patient, operating margin ratio, net revenue per encounter, and grant reliance. The z-scores for grant reliance and total cost per patient were reversed, so higher values reflect stronger financial performance. The results of the empirical trends, fixed effects, and pooled analyses will be presented within each of the dependent variable sections.

National Trends

Before further analysis of the key dependent variables, a brief examination of the national trends is shown below in Figure 3 to provide background on the national level factors affecting grant revenues (e.g., ARRA) and Medicaid. The chart shows the total revenue, total costs, total patient revenue (revenue from payers), total grant revenue, total Medicaid revenue, and total federal grant revenues of health centers in the study. Figure 3 shows total revenue and costs were on the same trajectory until 2008 – the beginning of

the recession. The influx of ARRA funding in 2009 allowed health centers to recover with healthier operating margins.

Figure 3: National Trends of Health Center Revenue and Cost, 2005-2009



Descriptive Statistics

The mean, standard errors and t-test results were calculated for a variety of variables that fall into three main groups that drive health center performance. The list of variable represents measures of patient characteristics, center characteristics and environmental factors. Table 7: Descriptive Statistics for Dependent Variables illustrates the means, standard deviation, minimums and maximums for the dependent variables as well as the variation between health centers as labeled "Between" and the variation between the years as labeled "Within".

Table 7 illustrates that all five dependent variables exhibit both cross-health center and cross time variation. Total cost per patient varies more considerably between health centers than it does over time whereas the four other variables (operating margin, net revenue per encounter, grant reliance, and composite) vary more over time than between health centers.

Table 7: Descriptive Statistics for Dependent Variables

Variable		Mean	Standard Deviation	Minimum	Maximum
Operating Margin	Overall	0.014	13.79	-192.86	67.46
	Between		9.35	-135.71	42.42
	Within		10.17	-88.46	89.96
Total Cost per Patient	Overall	622.67	377.90	80.36	5132.81
	Between		364.32	92.54	3882.79
	Within		100.86	-927.77	2339.47
Net Revenue per Encounter	Overall	1.50	29.95	-1007.31	652.92
	Between		16.52	-201.21	154.08
	Within		25.00	-804.60	500.34
Grant Reliance	Overall	29.48	1063.40	.043	68608.04
	Between		733.74	.063	20962.32
	Within		841.863	-19374.82	47675.21
Composite	Overall	0.32	2.47	-38.84	24.39
	Between		1.82	-22.60	7.58
	Within		1.75	-30.03	25.35

Table 8 illustrates the correlation coefficients for the dependent variables. Net revenue per encounter and operating margin has a strong positive relationship with a coefficient of 0.769. The composite variable has a strong positive relationship with operating margin (0.76) and grant reliance (0.73), but a weak negative relationship with total cost per patient and net revenue per encounter.

Table 8: Correlation Matrix

	Operating Margin	Total Cost per Patient	Net Revenue per Encounter	Grant Reliance	Composite
Operating Margin	1.00				
Total Cost per Patient	-0.069 (0.000)***	1.00			
Net Revenue per Encounter	0.769 (0.00)***	-0.049 (0.001)**	1.00		
Grant Reliance	0.032 (0.032)**	-0.006 (.688)	0.024 (0.111)	1.00	
Composite	0.761 (0.000) ***	-0.439 (0.000) ***	-0.223 (0.000) ***	0.732 (0.000) ***	1.00

*** Significant at the 0.001 level; ** Significant at the 0.05 level

Table 9: Bivariate Time Effects Coefficients for Lagged Dependent Variables

	Bivariate w/o Time Effects			Bivariate w/ Time Effects		
	Coefficient	SE	Sig	Coefficient	SE	Sig
Operating Margin	-0.092	0.032	**	-0.088	0.032	**
2007				0.019	0.450	
2008				-0.657	0.544	
2009				2.392	0.575	***
Net Revenue per Encounter	-0.158	0.025	***	-0.157	0.025	***
2007				0.650	1.040	***
2008				-0.153	1.011	***
2009				4.423	1.379	***
Grant Reliance	0.097	0.0306	***	0.088	0.032	**
2007				-0.013	0.015	**
2008				-0.044	0.018	**
2009				-0.035	0.019	**
Total Cost per Patient				0.186	0.057	**
2007				3.371	3.058	
2008				12.211	3.909	**
2009				16.074	4.59	***
Composite Score	-0.132	0.032	***	-0.132	0.031	***
2007				-0.001	0.068	
2008				-0.002	0.087	
2009				1.647	0.094	***

*** Significant at the 0.001 level; ** Significant at the 0.05 level

Table 9 demonstrates the time fixed effects for each of the dependent variables. For operating margin and net revenue per encounter the coefficients alternate between years, the findings support the theory that non-profit margins alternate between positive and negative over the years. Because of their non-profit status, health centers reserve their financial resources, but they must use it serve more patients, pay better salaries to recruit health care professionals, make capital or service improvements, etc. Moreover, because of the lag between revenue and operational adjustments, one year a health center may build up a margin and then makes adjustments to staffing or implement capital projects that affect the margins/revenue the following year. Health center administrators may be able to adjust practices to increase or lower costs, but there is typically a lag. However, grant reliance and cost per patient have positive lagged dependent variables, suggesting that health centers tend to have steadier paths in those areas.

Table 10 illustrates the descriptive statistics for environmental factors. Health centers in the study period served areas with a mean per capita of $34,700—serving low-income counties. There was a mean of 23 health center sites in the counties. Almost half of the health centers were in urban areas and located in either southern or western states (39.4% and 27.5%). Nearly 17% of the active physicians in the service were practicing primary care and the mean emergency department visit per capita was 0.44. However, there was a considerable more variation between health centers than over time.

Table 10: Descriptive Statistics for Environmental Factors

Variable		Mean	Standard Deviation	Minimum	Maximum
Per Capita Income	Overall	34699.85	9224.95	15322.00	120790.00
	Between		8676.61	17523.05	93268.20
	Within		3132.62	8470.15	65530.20
Percent Uninsured (under 65 years old)	Overall	17.29	5.36	3.70	39.90
	Between		5.16	6.67	35.80
	Within		1.47	8.34	26.98
Percent Primary Care Physicians	Overall	16.90	12.46	0	100
	Between		12.04	0	88.27
	Within		3.24	-0.34	75.23
Emergency Department Visits per Capita	Overall	0.44	0.15	0	1.74
	Between		0.13	0	1.22
	Within		0.07	-0.34	1.54
Number of FQHCs	Overall	23.12	28.14	0.00	273.00
	Between		25.29	0.00	165.40
	Within		12.34	-61.88	145.72
Number of Rural Health Centers	Overall	8.92	14.58	0	162.00
	Between		13.96	0	125.80
	Within		4.27	-45.88	75.72
Urban	Overall	49.61%	.500	0.00	1.00
	Between		.478	0.00	1.00
	Within		.148	-.303	1.30
West	Overall	27.65%	0.45	0.00	1.00
	Between		0.45	0.00	1.00
	Within		0	0.28	0.28
Midwest	Overall	17.94%	0.38	0.00	1.00
	Between		0.38	0.00	1.00
	Within		0.00	0.18	0.18
South	Overall	39.35%	0.49	0.00	1.00
	Between		0.49	0.00	1.00
	Within		0.00	0.39	0.30
Northeast	Overall	15.05%	0.36	0.00	1.00
	Between		0.36	0.00	1.00
	Within		0.00	0.15	0.15

Table 11 describes the patient characteristics for the health centers in the study. Health centers serve vulnerable populations. More than two-thirds of their patients are below poverty and 19.6% of the patients are best in a language other than English. Nearly a three-fourths are either insured by Medicaid (31.1%) or do not have insurance (41.7%) indicating the role health centers play as the safety net. More than four out of nine (44.6%) health center patients are non-white. There is considerable variation between health centers and over time. However for the percent of non-white patients, there was more variation over time than between health centers.

Table 11: Descriptive Statistics for Patient Characteristics

Variable		Mean	Standard Deviation	Minimum	Maximum
Percent Patients w/ Limited English Proficiency	Overall	19.62	23.95	0	100
	Between		23.07	0	97.35
	Within		6.43	-36.30	99.62
Percent Non-White Patients	Overall	44.62	33.57	0	99.90
	Between		29.78	0.03	99.48
	Within		15.92	-24.99	110.21
Percent Patients Below Poverty	Overall	67.92	18.70	0	100
	Between		17.21	16.01	100
	Within		7.77	16.51	125.50
Percent Patients Above 200% FPL	Overall	8.87	11.54	0	100
	Between		9.86	0	60.66
	Within		6.11	-40.70	59.88
Percent Uninsured Patients	Overall	41.70	20.47	1.37	100
	Between		19.88	5.00	99.54
	Within		5.01	4.94	76.59
Percent Medicaid Patients	Overall	31.08	15.60	0	97.59
	Between		15.06	0	92.85
	Within		4.05	3.90	57.18
Percent Female Patients	Overall	57.47	7.96	13.38	82.88
	Between		7.76	15.34	78.83
	Within		1.75	38.48	89.51
Percent Chronic Visit	Overall	15.25	8.34	0.23	88.18
	Between		7.52	0.75	52.60
	Within		3.72	-15.63	51.47

Table 12 illustrates the descriptive statistics for key health center characteristics. More than a third of the health center workforce (36%) provides medical services. Nearly eight percent (7.6%) are dental staff with even fewer as behavioral staff (3.9%). Health centers are using more non-clinician providers to physicians at 1.6 to 1 ratio. While health centers may be employing more non-clinician providers, physicians have more encounters than non-physician providers (3,795 per physician and 2,874 per non-physician providers).

A majority of the health centers in the study are established health centers (those with three or more years of UDS data) whereas 14.7% would be considered new health centers. Health centers operate on average seven sites and serve 16,627 patients. Medicaid has the highest mean reimbursement rate at 93% and private insurance is the lowest rate at 57%. The health center cluster grant comprises on average 27% of health center revenue whereas state funding only consists of 4% of revenues. More than 90% of health centers are designated as a Community Health Center, 15% as a Migrant Health Center, and 20% as a Homeless Health Center. The health center characteristics variables exhibit both cross-health center and cross time variation.

Table 12: Descriptive Statistics of Health Center Characteristics

Variable		Mean	Standard Deviation	Minimum	Maximum
Percent Dental Staff	Overall	7.60%	6.32	0.00	40.11
	Between		6.07	0.00	35.95
	Within		1.83	-5.93	22.74
Percent Behavioral Staff	Overall	3.90%	6.32	0.00	78.58
	Between		5.54	0.00	71.4
	Within		1.6	-10.95	30.28
Percent Enabling Staff	Overall	9.96%	8.97	0.00	77.21
	Between		8.54	0.00	72.42
	Within		2.79	-14.02	39.45
Percent Medical Staff	Overall	36.00%	0.1	0	0.81
	Between		0.1	0	0.74
	Within		0.03	0.07	0.61
Non-physician Clinicians to Physician ratio	Overall	1.55	7.05	0.00	216
	Between		8.17	0.00	195
	Within		2.21	-59.89	62.99
Physician Productivity	Overall	3,795.03	3138.94	0.00	116,620
	Between		2507.25	0.00	67,979.31
	Within		1,421.15	-37845.39	52,435.72
Non-physician Productivity	Overall	2,874.40	915.94	0.00	12,669.44
	Between		865.22	0.00	10,165.11
	Within		400.36	-729.54	6,538.44
Medicaid Reimbursement Rate	Overall	93.74	39.79	0.00	474.62
	Between		32.21	12.07	293.45
	Within		23.5	-65.05	363.99
Private Insurance Reimbursement Rate	Overall	56.96	26.99	0.00	735.01
	Between		19.55	0.00	200.41
	Within		19.33	-128.44	591.56
Medicare Reimbursement Rate	Overall	71.67	36.12	0.0	711.79
	Between		29.93	0.0	450.77
	Within		20.85	-271.48	360.41
Percent 330 Grant Funding	Overall	27.07	17.56	0.00	100
	Between		16.87	2.6	98.9
	Within		5.00	-7.08	71.7
Percent State Funding	Overall	4.44%	5.36	0.00	50.1
	Between		4.76	0.00	39.56
	Within		2.18	-13.76	26.39
Number of Total Patients	Overall	16,627.80	17,379.37	137	212,783.00
	Between		17,117.87	608.8	207,029.40
	Within		3041.37	-10358	54,243.00
Number of Delivery Sites	Overall	7.13	8.48	0.00	123.00
	Between		6.77	1.00	86.20
	Within		5.10	-76.07	73.33
Migrant Health Center	Overall	14.96%	0.36	0.00	1.00
	Between		0.36	0.00	1.00
	Within		0.00	-0.65	0.95
Homeless Health Center	Overall	20.07%	0.40	0.00	1.00
	Between		0.39	0.00	1.00
	Within		0.08	-0.60	1.00
Community Health Center	Overall	90.17%	0.30	0.00	1.00
	Between		0.30	0.00	1.00
	Within		0.06	0.30	1.7
New Grantee	Overall	14.72%	0.35	0.00	1.00
	Between		0.35	0.00	1.00
	Within		0.00	0.00	1.00

Operating Margin

The operating margin is the ratio of net income divided by total revenue. Net income consists of the excess of revenue after subtracting expenses. Credit ratings agencies are generally concerned when there are two consecutive years of deficits, when the size of deficits is increasing or when there is an abnormally large deficit.

Trends

The mean operating margin as illustrated in Table 7 indicates that health centers operate on negligible margins at 0.014% during the study period. Figure 4 illustrates a downward trend operating margins on until 2009. Federal ARRA grants were awarded to all heath centers in 2009, thus increasing their margins to 2.02%. The extent of the trend varies based on certain health center characteristics. As shown in Figure 4, rural health centers had higher margins than urban health centers. This trend shadows the national trend of total costs and total revenue with 2008 being the year health centers had negative margins, but recovered in 2009 due the increases in grant and Medicaid revenues. Over the five year study period, the mean difference gap between urban and rural health centers had increased over the years. In 2008, rural health centers had significantly higher operating margins than urban health centers with a mean difference in margins of 2.01 percentage points due urban areas most impacted by the recession.

Figure 4: Operating Margins

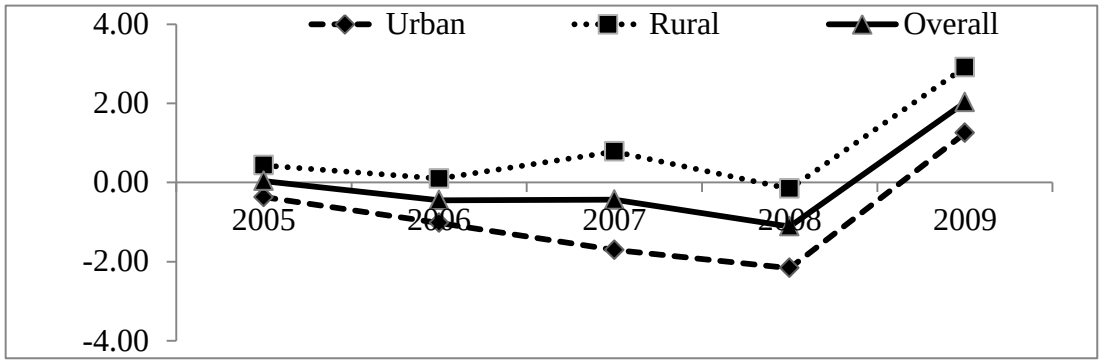


Figure 5 illustrates the percentage of health centers with negative margins during the study period. A large portion of health centers may be at risk of poor financial performance with the percentage not dipping below forty-four percent in the first four years of the study indicates. To further demonstrate the extent of poor financial performance, Figure 5 also shows a quarter of health centers with a margin equal to or lesser than -5% (a red flag for credit agencies). However with the influx of funding such as ARRA, there was a sharp decrease in both categories in 2009.

Figure 5: Health Centers with Negative Margins

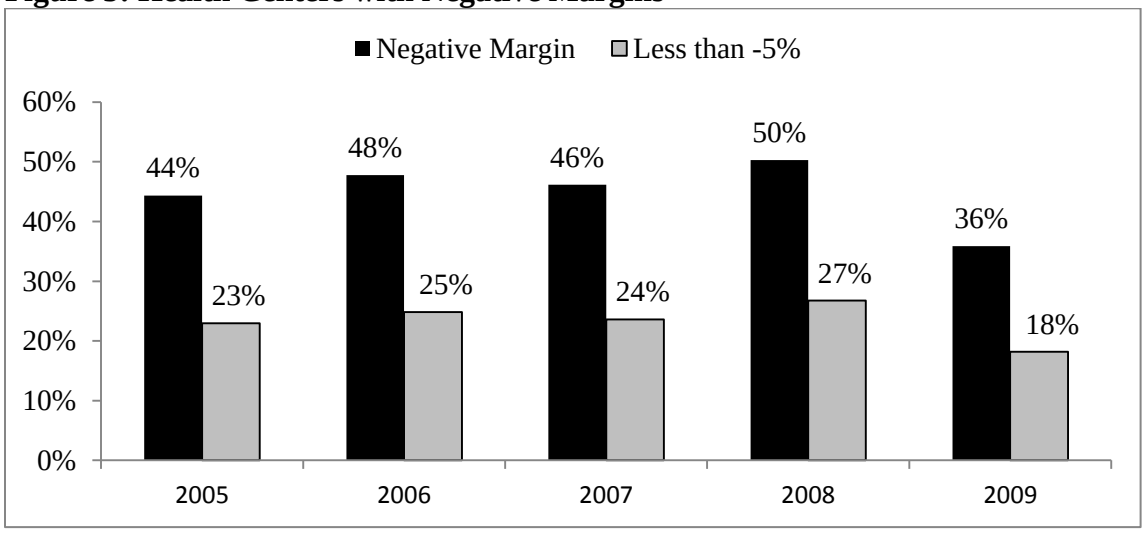


Table 10 shows operating margins by different health center characteristics. Health centers that did not experience a significant change between 2008 and 2009 were

Migrant, Homeless, and Public Housing health centers. Community Health Centers suffered a significant decrease in their operating margins from 2007 to 2008 (-0.1 vs -0.9) during the recession. However, they experienced a significant increase from 2008 to 2009 (-0.9 to 2.08). After examining health center operating margins with 2005 being the baseline, rural health centers, Community Health Centers, established health centers, health centers that had less than half of the patients insured by Medicaid or health centers in in the Midwest experienced significantly higher operating margins in 2009 than in they had in 2005. Established Health centers (having been in the UDS for three or more years) as well as those in the South had a significant decrease in their operating margins in 2008 (-1.18 and -2.04, respectively) compared to at the start of the study period (0.09 and 0.27) which indicates the recession their margins had a significant impact on the margins.

Table 13: Operating Margin by Different Health Center Characteristics

Mean SE Std Dev CI	Urban	Rural	Comm-unity Health Center	Migrant Health Centers	Home-less Health Centers	Public Housing Health Centers	New Health Center	Estab-lished Health Center	Majority Medicaid Patient Volume	Non-Majority Medicaid Patient Volume	North-east	South	Mid-west	West
2005	-0.37 0.66 13.87 -1.67 0.93	0.43 0.56 12.04 -0.68 1.54	0.16 0.42 11.79 -0.66 0.97	2.65 0.89 10.04 0.88 4.42	0.30 1.26 16.10 -2.19 2.79	0.50 1.74 10.455 -3.04 4.03	-0.27 1.55 17.66 -3.34 2.79	0.09 0.43 12.00 -0.76 0.94	0.82 1.67 12.07 -1.49 3.13	-0.068 0.47 13.089 -0.984 0.85	-0.35 1.12 12.91 -2.56 1.86	0.27 0.57 10.64 0.84 1.39	-1.26 1.22 15.52 -3.67 1.16	0.76 0.90 14.15 -1.02 2.52
2006	-1.02 0.73 15.82 -2.45 0.40	0.10 0.51 10.98 -0.91 1.11	-0.49 0.42 11.48 -1.31 0.33	1.79 0.70 8.01 0.40 3.17	-1.68 1.42 18.63 -4.50 1.14	0.45 1.81 11.03 -3.23 4.12	-0.81 1.27 14.54 -3.31 1.70	-0.39 0.47 12.96 -1.31 0.53	-1.64 1.51 15.57 -4.64 1.36	-0.29 0.46 12.85 -1.19 0.61	-0.60 1.12 13.07 -2.83 1.63	-0.48 0.57 10.66 -1.59 0.64	-0.72 1.11 14.06 -2.91 1.47	-0.15 1.00 15.78 -2.12 1.82
2007	-1.71 19.08 -3.50 0.08	0.78 11.37 -0.26 1.83	-0.10 0.45 12.73 -0.98 -0.78	1.88 0.67 7.83 0.55 3.21	-2.79 1.88 25.45 -6.50 0.92	-1.24 2.08 13.18 -5.45 2.98	-1.20 1.13 13.02 -3.44 1.04	-0.30 0.58 16.08 -1.45 0.83	0.71 1.56 16.93 -2.37 3.80	-0.61 0.55 15.46 -1.70 0.48	-0.17 0.97 11.19 -2.09 1.74	-0.95 0.72 13.56 -2.37 0.47	-0.52 1.36 17.21 -3.2 2.15	0.21 1.22 19.14 -2.19 2.60
2008	-2.16 14.51 -3.54 -0.78	-0.16 11.88 -1.23 0.92	-0.90 0.40 11.40 -1.68 -0.11 **	0.75 0.75 8.80 -0.73 2.22	-2.16 1.37 18.70 -4.87 0.54	-3.02 2.10 14.2 -7.24 1.20	-0.74 1.15 13.24 -3.02 1.53	-1.18 0.48 13.23 -2.12 -0.24+	-1.28 1.07 11.73 -3.40 0.82	-1.09 0.48 13.45 -2.03 -0.14	-2.64 0.97 11.27 -4.57 -0.72	-2.04 0.75 14.05 -3.51 -0.57+	-0.57 0.98 12.38 -2.49 1.36	0.67 0.85 13.39 -1.01 2.34
2009	*1.25* *14.86* *-0.09* *2.59* **	*2.91* *11.84* *1.77* *4.05* ** ++	2.08 0.36 10.35 1.37 2.79 **++	2.17 0.91 10.78 0.36 3.98	0.43 1.51 20.77 -2.54 3.41	0.59 1.22 8.30 -1.87 3.05	2.61 1.00 11.48 0.63 4.58**	1.93 0.50 13.88 0.94 2.91**+	1.63 0.83 9.42 -0.01 3.27**	2.09 0.51 14.13 1.09 3.010**+	2.20 0.83 9.66 0.55 3.84**	1.57 0.65 12.24 0.29 2.85**	2.87 0.87 11.06 1.14 4.58*+	2.05 1.13 17.93 -0.20 4.29

Note: p-value: * <0.05 **<0.001 if difference between years +<0.05 ++<0.001 difference between baseline

Fixed Effects Model

The following paragraphs describe the fixed effects model for operating margins. Table 11: Operating Margin Fixed Effects Models shows the coefficients and standard error (SE) for the independent variables. The coefficients should be interpreted as the impact of the change in the independent variables on the change in operating margins within a health center. The model includes a lagged dependent variable to assess whether if the current level of the dependent variable is heavily determined by its past level. After testing for time-fixed effects, the model does not need to be explained by overall time trends or other time series (for instance seasonal) patterns.

Overall, the fit of the model explains 25% of the variation in operating models. Looking at the independent variables about environmental factors, none of the variables are statistically insignificant. The health center characteristics on scope, urban status, and the different designation types were also found to be not statistically significant.

One patient characteristic variable was found to be significant. The percent of patients with limited English proficiency is positively related to a health center's operating margin. For each increase in the percent of patients with limited English proficiency, the operating margin is expected to increase by 8.8%. The finding is counterintuitive, patients with limited English proficiency usually require more time during visits because of their need for language access issues. Because health centers are not able to produce as many visits in a day, one would think health centers would lose revenue. However, there is a chance patients with limited English Proficiency are concentrated in Migrant Health Centers which had higher operating margins than other health center types. Another explanation could be that health centers with a higher

percentage of patients with limited English proficiency seek grants to cover the added costs of taking care of this population. In terms of reimbursement factors, Medicaid reimburses health centers at a PPS rate that covers a large portion of their Medicaid costs. The Medicaid reimbursement rate is significantly positively related to the operating margin. Private insurance makes a small percentage of the health center revenues, but the private reimbursement rate is also positively related to the operating margin. For every percentage increase in the Medicaid and private insurance reimbursement rates, the operating margin is expected to increase by 2.4% for Medicaid and 2.8% for private insurance. The percent of Health Center 330 funding is positively related to a health center's operating margins. As the percentage of Health Center 330 fund increases, there is an expected increase in operating margins of 18.6%. As the percentage of 330 funding increases in total revenues signifies health centers are not optimizing patient service revenues and strongly depend on grants to maintain positive margins.

There is a negative relationship between the lagged operating margin and the current level. Like other non-profits, health centers operate on slim operating margins. A bivariate fixed effects analysis of the lagged operating margin indicates that the lagged variable remains negative (-0.0922) indicating that there is an alternating pattern between years and margins fluctuate from positive to negative. The time effects are not significant in the multivariate model, but time fixed effects test conducted prior to the model had indicated there were timed fixed effects in the model. In the bivariate model, the year 2009 was found to be positively associated with operating margin. This finding indicates that ARRA funds helped health centers.

Table 14: Operating Margin Fixed Effects Models

Number of Observations	1837		
Number of groups	823		
F	5.55		
Prob>F	0.00		
Adjusted R-square	0.2466		
	Coefficient	SE	Sig
Per Capita Income	-0.0001	0.0002	
Percent Uninsured	0.5798	0.3759	
Number of FQHCs	0.0072	0.0184	
Number of RHCs	-0.0113	0.0631	
Percent PCP in Service Counties	0.0635	0.1427	
Emergency Department Visits per capita	5.2979	5.3968	
Urban Status	-0.2931	1.055	
Number of Sites	0.0863	0.0502	
Number of Patients	-0.2538	0.1249	
Migrant Grantee	-1.3679	3.1426	
Homeless Grantee	0.8599	2.7408	
% Dental Staff	0.26	-1.32	
% Behavioral Staff	0.2616	0.53	
% Enabling Staff	0.2757	1.21	
Non-physician to Physician Ratio	0.2988	1.22	
Non-physician Productivity	0.0007	0.94	
% Patients w/ Limited English Proficiency	0.0882	2.43	*
% Non-White Patients	0.0193	1.6	
% Patients under 100% FPL	0.0809	0.84	
% Patients above 200% FPL	0.0783	0.08	
%Uninsured Patients	0.1058	0.63	
% Medicaid Patients	0.1055	1.65	
% Female Patients	0.2163	0.53	
% Chronic Visits	0.0878	0.44	
Medicaid Reimbursement Rate	0.0237	3.81	***
Private Insurance Reimbursement	0.028	2.51	**
Medicare Reimbursement Rate	0.0134	1.38	
% Health Center 330 Funding	0.1857	-4.04	***
Lagged DV	-0.1027	0.0434	*
2007	-0.4493	1.1824	
2008	0.6812	1.3531	
2009	2.0092	1.5295	
constant	-29.8681	21.5768	

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

Pooled Analysis

As mentioned in the previous chapter, a logistic regression will be used to answer the question, *"How do environmental and organizational characteristics influence different categories of health center performance over the years?"* A five-year pooled average will be used to determine the long-term financial performance. Three logistic regressions were performed in order to assess the odds of predicting operating margins.

Health centers having a negative margin does not necessarily mean the health center is in financial distress although it is concerning having an average negative margin. The logistic regression assessing the odds of having positive margins can be found in Appendix A. Since the difference between positive and negative margins were not apparent in the previous logistic regression model, a logistic regression predicting membership in the top quartile for operating margins is utilized for the five-year period of time. Table 15 shows the results of the model.

The pseudo R-squared for this model indicates that 10% of the variation in the top quartile is explained by the independent variables used in the model. Three variables are significant in this model. Health centers in the Northwest region of the country, non-physician provider productivity and Medicaid reimbursement rate are all positively associated with the top quartile of health centers having the greatest operating margins with the reference group being the bottom quartile or those with poor operating margins.

Table 15: Logistic Regression Predicting Differences in Health Centers in the Top Quartile for Operating Margin

Variable	Adjusted Model		
Number of Observations	418		
Chi^2	53.34		
$Prob>Chi^2$	0.01		
Psuedo R^2	0.1055		
Log Likelihood	-258.995865		
	Odds Ratio	SE	Sig
Per Capita Income	1.000	0.000	
Percent Uninsured	0.982	0.029	
Number of FQHCs	1.006	0.006	
Number of RHCs	1.007	0.01	
Percent PCP in Service Counties	1.019	0.011	
Emergency Department Visits per capita	0.648	0.64	
Northeast	2.904	1.427	*
Midwest	1.403	0.548	
West	1.579	0.58	
Urban Status	1.441	0.522	
New Health Center	0.605	0.198	
Number of Sites	1.018	0.021	
Number of Patients	0.996	0.007	
Migrant Grantee	1.195	0.471	
Homeless Grantee	0.778	0.259	
% Dental Staff	1.023	0.02	
% Behavioral Staff	0.984	0.024	
% Enabling Staff	1.026	0.017	
Non-physician to Physician	1.097	0.054	
Non-physician Productivity	1.000	0.000	**
% Patients w/ Limited English Proficiency	1.005	0.007	
% Non-White Patients	1.007	0.003	
% Patients under 100% FPL	0.981	0.01	
% Patients above 200% FPL	0.981	0.015	
% Uninsured Patients	1.002	0.012	
% Medicaid Patients	0.99	0.014	
% Female Patients	0.988	0.02	
% Chronic Visits	1.002	0.017	
Medicaid Reimbursement Rate	1.013	0.004	*
Private Insurance Reimbursement Rate	1.002	0.009	
Medicare Reimbursement Rate	1.007	0.006	
% Health Center 330 Funding	1.014	0.011	

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

In Table 16, the multinomial logistic regressions contrasts health centers that consistently had positive margins (reference category) with the relative risk of having fluctuating margins and as well as the risk of consistently having negative margins. A small group (13%) of health centers had a constant positive margin over the five years. The large majority (80.9%) of 897 health centers had fluctuating margins and 6% percent had constant negative margins. The pseudo R-squared for this model indicates 8.8% of the variation is explained by the independent variables used in the model. There are four variables in the model that are statistically significant comparing fluctuating margins to positive margins. There are also three variables that are also statistically significant.

For those health centers with fluctuating margins over the 5-year period, the number of Rural Health Centers in a counties served by health centers reduced the risk by 4.8%. Other factors that had protective effect on fluctuating margins were the percent of patients with limited English proficiency which reduced the risk 3.1%. The other factor was having a higher percentage of patients who were non-white which reduced the risk by 1.6%. Health centers located in the West were more at risk at having fluctuating margins. They had 3.3 times the risk of having fluctuating margins.

Two factors were associated with consistently having a negative margin. Health centers with a higher percentage of patients who were non-white reduced the risk by 0.7%. The percentage increase in Section 330 funding as part of total revenue puts a health center at 1.023 times the risk of having a negative margin.

Table 16: Multinomial Logistic Regressions Comparing Health Centers with Constant Positive with Fluctuating and Negatives Margins

Number of Observations	850					
Chi^2	99.090					
Prob>Chi^2	0.003					
Psuedo R^2	0.088					
Log pseudolikelihood	-461.777					
	Risk of Fluctuation			Risk of Constant Negative		
	RRR	SE	Sig	RRR	SE	Sig
Per Capita Income	1.000	0.000		1.000	0.000	
Percent Uninsured	1.024	0.059		0.977	0.030	
Number of FQHCs	1.007	0.008		0.998	0.005	
Number of RHCs	0.952	0.023	*	0.995	0.009	
Percent PCP in Service Counties	1.004	0.019		0.993	0.012	
Emergency Department Visits per	3.898	5.889		1.069	1.051	
Northeast	1.171	0.898		1.152	0.514	
Midwest	1.071	0.658		0.928	0.366	
West	3.265	1.862	*	1.655	0.626	
Urban Status	1.435	0.853		0.897	0.306	
New Health Center	0.469	0.305		1.101	0.374	
Number of Sites	0.971	0.034		0.989	0.023	
Number of Patients	1.014	0.016		1.011	0.010	
Migrant Grantee	0.242	0.206		0.648	0.214	
Homeless Grantee	1.407	0.678		0.569	0.177	
% Dental Staff	1.011	0.034		0.986	0.021	
% Behavioral Staff	1.048	0.039		1.037	0.031	
% Enabling Staff	0.964	0.026		1.014	0.018	
Non-physician Clinicians to	0.571	0.168		1.054	0.044	
Non-physician Clinician Productivity	1.000	0.000		1.000	0.000	
% Patients w/ Limited English Proficiency	0.969	0.012	*	0.995	0.007	
% Non-White Patients	0.984	0.007	*	0.993	0.003	*
% Patients under 100% FPL	1.024	0.014		1.009	0.010	
% Patients above 200% FPL	1.019	0.032		1.030	0.018	
% Uninsured Patients	1.002	0.020		0.997	0.013	
% Medicaid Patients	1.015	0.023		1.011	0.014	
% Female Patients	1.029	0.030		1.035	0.021	
%Chronic Visits	1.016	0.028		0.997	0.020	
Medicaid Reimbursement Rate	0.992	0.008		1.000	0.004	
Private Insurance Reimbursement Rate	0.994	0.014		0.995	0.006	
Medicare Reimbursement Rate	0.997	0.007		0.998	0.004	
% Health Center 330 Funding	1.028	0.017		1.023	0.011	*

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

Total Cost per Patient

The total cost of care is the ratio of total accrued cost to total number of patients. The ratio represents dollar value for services provided to each health center patient. This non-financial measure assesses cost efficiency. Costs are generally benchmarked from a prior year and compared to other as a mechanism to trigger shared savings.

Trends

While the national trend shows total cost increasing over time, Figure 6 illustrates both the mean and median mean total cost per patient has been constant over the study period. The mean total cost per patient has increased by $8.05 whereas the median total cost per patient increased by $11.53 over the five year period, suggesting health centers were efficiently providing care to patients.

Figure 6 : Total Cost per Patient, 2005-2009

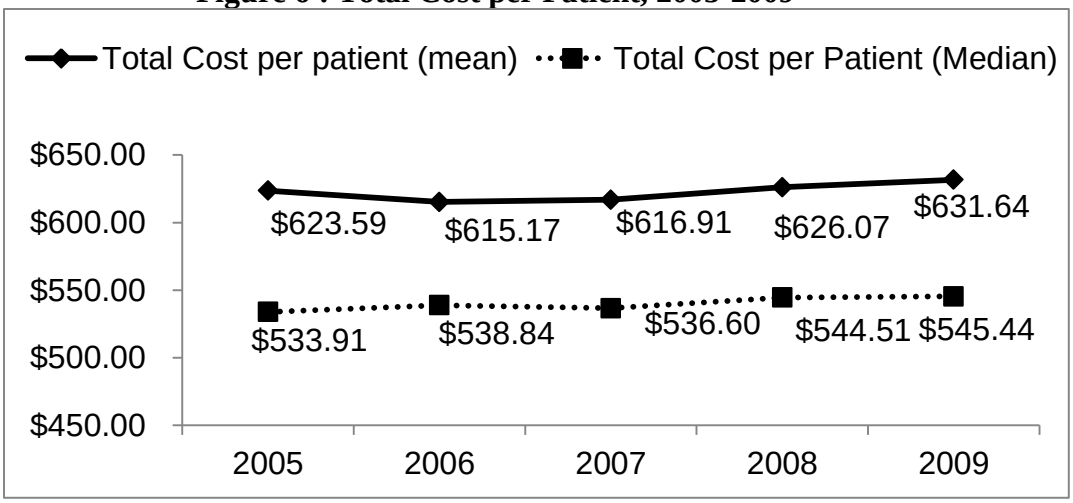


Table 17 shows the mean total cost per patient by various health center characteristics. There are no significant differences over the years for any of the health center characteristics.

Table 17: Total Cost per Patient by Different Health Center Characteristic

Total Cost per Patient	Urban	Rural	Community Health Center	Migrant Health Center	Homeless Health Center	Public Housing Health Center	New Health Center	Established Health Center	Majority Medicaid Patient Volume	Non-Majority Medicaid Patient Volume	North east	South	Mid-west	West
2005	641.11	606.60	618.64	533.33	650.98	660.16	693.62	611.59	741.49	607.60	688.05	518.19	541.68	791.26
	19.46	19.44	14.11	15.44	35.74	43.08	42.77	14.32	55.43	13.62	23.72	16.60	15.81	38.03
	408.64	414.69	400.22	173.32	460.44	258.48	489.53	396.16	573.42	382.467	275.57	311.52	200.60	598.96
	602.87	568.39	590.94	502.77	580.42	572.70	609.00	583.48	631.58	580.87	641.14	485.53	510.46	716.35
	679.36	644.80	646.35	563.89	721.54	747.62	778.23	639.71	851.39	634.32	734.96	550.85	572.90	866.17
2006	642.30	589.16	609.74	537.60	657.59	690.56	662.03	607.08	697.29	604.16	713.50	502.18	528.39	778.80
	17.42	16.78	12.18	14.73	33.41	55.63	37.03	12.67	34.61	12.88	26.33	12.30	14.68	33.15
	364.97	359.01	345.45	168.61	438.13	338.36	425.47	350.44	356.38	362.36	305.97	231.07	186.24	522.09
	608.06	556.20	585.86	508.46	591.65	577.75	588.77	582.21	628.66	578.87	661.41	477.99	499.40	713.50
	676.53	622.13	633.64	566.74	723.54	803.38	735.29	631.95	765.93	629.45	765.58	526.37	557.38	844.10
2007	641.21	593.62	611.04	540.78	655.78	685.83	659.70	609.53	674.25	608.22	728.66	496.45	527.47	785.60
	17.05	17.76	12.44	15.90	31.27	49.58	37.14	12.97	29.88	13.45	25.93	11.49	14.28	34.63
	357.34	380.02	353.16	185.44	424.22	313.60	426.76	358.69	324.63	375.43	301.26	215.89	181.13	545.37
	607.69	558.73	586.62	509.33	594.08	585.54	586.22	584.07	615.06	581.82	677.38	473.86	499.27	717.39
	674.73	628.52	635.46	572.230 2	717.48	786.13	733.18	634.98	733.43	634.63	779.94	519.05	555.66	853.81
2008	652.40	601.94	618.42	552.03	669.54	690.36	671.32	618.27	694.98	615.33	744.53	506.04	535.60	791.18
	16.83	17.26	11.96	17.82	30.89	42.83	35.88	12.76	30.74	13.11	28.32	10.84	13.90	33.47
	348.66	373.50	341.05	210.05	423.57	290.50	412.24	352.94	338.14	365.20	329.02	203.58	176.43	527.05
	619.31	568.02	594.94	516.80	608.60	604.09	600.4	593.22	634.12	589.59	688.53	484.73	508.14	725.27
	685.48	635.87	641.89	587.25	730.48	776.63	742.30	643.32	755.85	641.06	800.54	527.35	563.06	857.10
2009	648.00	613.04	623.19	553.33	675.96	697.13	681.79	622.98	701.66	619.87	748.86	509.13	538.15	802.88
	16.08	20.12	12.40	17.38	33.59	43.33	37.84	13.41	31.78	13.84	29.17	10.37	12.74	36.456
	351.17	412.27	354.06	204.96	462.99	293.91	434.74	370.80	360.90	383.46	338.97	194.89	161.69	574.10
	616.41	573.50	598.85	518.95	609.70	609.85	606.94	596.66	638.79	592.71	691.16	488.73	512.98	731.08
	679.6	652.59	647.54	587.70	742.21	784.41	756.65	649.30	764.53	647.04	806.56	529.53	563.31	874.68

Panel Analysis

Table 18: Total Cost per Patient Fixed Effects Model Results displays the results for the coefficient and standard error (SE) for health center total cost per patient. The adjusted R-squared value indicates that 17% of the variation can be explained by the independent variables in the model. There are three independent variables associated with total cost per patient. The increase in emergency department visits per capita decreases the total costs per patient by $179.45. As the number of patients increases, the total cost per patient decreases $4.92 per 1,000 patients. A unit increase in the non-physician productivity is found to decrease the total cost per patient by $0.02 for each encounter indicating the use of non-physician clinicians promotes cost efficiency as they are likely to serve patients with acute conditions and physicians are able to serve patients with more complicated conditions. The lagged total cost per patient is also significant indicating the total cost per patient does not alternate but increases over time.

Table 18: Total Cost per Patient Fixed Effects Model Results

Number of Observations	1837		
Number of groups	823		
F	3.89		
Prob>F	0.00		
Adjusted R-square	0.1701		
	Coefficient	SE	Sig
Per Capita Income	0.0013	0.0015	
Percent Uninsured	2.2381	2.1485	
Number of FQHCs	0.1	0.1612	
Number of RHCs	0.1508	0.4824	
Percent PCP in Service Counties	2.9363	2.6851	
Emergency Department Visits per capita	-179.4546	65.8703	**
Urban Status	3.0156	6.9264	
Number of Sites	-0.2557	0.5512	
Number of Patients	-4.9152	0.8616	***
Migrant Grantee	11.13	18.6329	
Homeless Grantee	15.288	15.3162	
% Dental Staff	3.4384	4.3106	
% Behavioral Staff	4.3156	3.419	
% Enabling Staff	0.6749	1.2095	
Non-physician to Physician Ratio	1.4188	4.0408	
Non-physician Productivity	-0.0173	0.0066	**
% Patients w/ Limited English Proficiency	-2.8597	1.6263	
% Non-White Patients	0.2534	0.1828	
% Patients under 100% FPL	-0.4995	0.3726	
% Patients above 200% FPL	0.2971	0.8517	
% Uninsured Patients	-1.5923	1.1091	
% Medicaid Patients	-1.4316	1.5453	
% Female Patients	0.2409	1.6736	
% Chronic Visits	0.1406	0.5647	
Medicaid Reimbursement Rate	0.3093	0.2968	
Private Insurance Reimbursement Rate	0.0389	0.2104	
Medicare Reimbursement Rate	-0.0592	0.0958	
% Health Center 330 Funding	-2.1793	1.1455	
Lagged DV	0.1282	0.0561	*
constant	750.1583	166.2495	***
2007	18.168	7.0085	**
2008	30.2106	9.3	**
2009	39.3371	10.5547	***

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

Pooled Analysis

Unlike the other performance variables, total cost per patient is a ratio and does not have positive or negative status. As a result, only a logistic regression predicting health centers with high costs is displayed in Table 16. The pseudo R-squared value indicates that 59% of the variation can be explained by the independent variables in the model.

There are six environmental factors statistically associated with health centers with high cost per patient. The number of FQHCs in health center served counties reduces the odds of being high cost by 3% with a greater FQHC penetration of delivery sites in health center service counties. Greater penetration could mean two things. First, the more health centers in the county means patients are able to receive access to timely and appropriate care which would lower the cost of treatment. The second could be competition forcing health centers to lower costs to attract patients into their waiting rooms. Income per capita and the county's uninsured rate increase the odds. A one percentage point increase in the uninsured rate increases the odds by 25.5%. Since uninsured individuals are less likely to receive health care services and often diagnosed at later disease stages, one would expect costs to be higher for these individuals. Health centers in the Northeast, Midwest and West all have high odds of being high cost per patient compared to health center in the South.

The number of health center patients and non-physician clinician productivity decreases the odds of being a high cost health center, but by a nominal margin. The percentages of behavioral health and enabling staff increase the odds by 24% and 11% respectively. There is a disparity in the way insurance companies reimburse behavioral

health care at lower provider reimbursement rates than physical health care. With BPHC seeking to expand health center capacity in behavioral health, health centers are increasing their costs. Additional enabling services staff increases a health center's administrative costs. Contrary to the county-level uninsured rate, the percent of uninsured health center patients decreases the odds of high costs per patient by 6%. Uninsured health center patients could have established a health center as their medical home. Therefore, patients are receiving the needed preventive and diagnostic care in a timely manner compared to non-health center patients. The percent of health center 330 funding also has a reduction effect, decreasing the odds of high cost per patient by 8%.

Table 19: Logistic Regression Predicting Health Center Total Cost per Patient in the Top Quartile

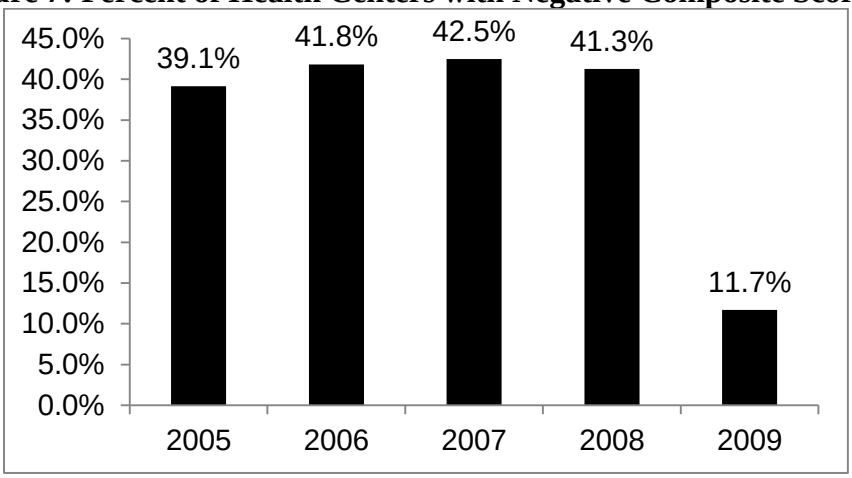
Number of Observations	416.00		
Chi^2	130.32		
$Prob>Chi^2$	0.00		
Psuedo R^2	0.59		
Log Likelihood	-118.46		
	Odds Ratio	SE	Sig
Per Capita Income	1.000	0.000	*
% Uninsured Residents	1.255	0.069	**
Number of FQHCs	0.975	0.008	*
Number of RHCs	0.998	0.018	
% PCP in Service Counties	1.033	0.023	
Emergency Department Visits per	1.375	1.911	
Northeast	18.67	16.24	**
Midwest	5.61	4.018	*
West	17.445	9.974	**
Urban Status	1.211	0.608	
New Health Center	0.324	0.188	
Number of Sites	1.076	0.052	
Number of Patients	0.968	0.012	*
Migrant Grantee	1.226	0.734	
Homeless Grantee	0.627	0.325	
% Dental Staff	1.017	0.033	
% Behavioral Staff	1.236	0.072	**
% Enabling Staff	1.107	0.034	**
Non-physician to Physician Ratio	0.999	0.008	
Non-physician Productivity	0.999	0.000	*
% Patients w/ Limited English	1.012	0.011	
% Non-White Patients	1.012	0.004	*
% Patients under 100% FPL	0.993	0.02	
% Patients above 200% FPL	1.013	0.029	
% Uninsured Patients	0.939	0.019	*
% Medicaid Patients	1.005	0.021	
% Female Patients	0.985	0.044	
% Chronic Visits	1.021	0.036	
Medicaid Reimbursement Rate	1.015	0.009	
Private Insurance Reimbursement Rate	0.992	0.009	
Medicare Reimbursement Rate	0.99	0.007	
% Health Center 330 Funding	0.916	0.02	*

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

Composite Measure

Due to the multi-dimensional aspects of financial performance, a composite measure allows for multiple performance indicators to be into a single variable. Instead of assessing each individual measure individually which may have conflicting coefficients, the composite measure allows an individual to standardize each outcome variable. The composite measure was constructed using the summation of z-scores for total cost per patient, operating margin ratio, net revenue per encounter, and grant reliance. A z-score is a statistical measurement of a score's relationship to the mean in a group of scores. A z-score of 0 means the score is the same as the mean. A z-score can also be positive or negative, indicating whether it is above or below the mean. The z-scores for grant reliance and total cost per patient were reversed, so higher values reflect stronger financial performance. The scores were all counted equally. Figure 7 illustrates that the percent of health centers with negative composite score increased from 39% in 2005 to 43% in 2007 before significantly declining decrease in 2009 to 12% – a similar finding compared to the operating margins.

Figure 7: Percent of Health Centers with Negative Composite Score



Panel Analysis

Table 20 shows the results for fixed effects model for the composite score including the coefficient and standard error (SE) for each independent variable. In addition to using fixed effects, the model includes a lagged dependent variable to assess whether if the current level of the dependent variable is determined by its past level. Time-fixed effects variables were included to explain by overall time trends or other time series (for instance seasonal) patterns.

The adjusted R-squared value indicates that 37% of the variation can be explained by the independent variables in the model. Three variables including the lagged composite score show a statistically significant impact on the overall financial performance. Medicaid and private insurance reimbursement rates are positively associated with the composite measure. For every percentage increase in the Medicaid reimbursement rate, the composite score increases by 0.012. The private insurance reimbursement rate increases the composite score by 0.013 for every percentage point increase in the reimbursement rate. This finding signifies reimbursement rates from each of these payers have an impact on a health centers financial performance. Health center 330 funding has a negative association with the composite measure and decreases the measure by 0.09. The lagged composited measure also showcases a negative coefficient indicating performance fluctuates between years and influences the current score. The bivariate fixed effects model confirms this negative association (see Appendix).

Table 20: Fixed Effects Model for Composite Scores

Number of Observations	1837		
Group	823		
F	22.16		
Prob>F	0		
Adjusted R-square	0.3746		
	Coefficient	SE	Sig
Per Capita Income	0.0000	0.0000	
Percent Uninsured	0.1476	0.0938	
Number of FQHCs	0.0007	0.0025	
Number of RHCs	-0.0047	0.0106	
Percent PCP in Service Counties	0.0185	0.0397	
Emergency Department Visits per capita	1.3605	1.275	
Urban Status	-0.0877	0.1547	
Number of Sites	0.0068	0.0086	
Number of Patients	-0.0203	0.0178	
Migrant Grantee	-0.4237	0.5642	
Homeless Grantee	0.0327	0.3657	
% Dental Staff	-0.0591	0.0588	
% Behavioral Staff	0.0221	0.0529	
% Enabling Staff	0.0322	0.0316	
Non-physician Clinicians to Physician Ratio	0.024	0.0525	
Non-physician Clinician Productivity	0.0001	0.0001	
% Patients w/ Limited English Proficiency	0.0522	0.0303	
% Non-White Patients	0.0043	0.0031	
% Patients under 100% FPL	0.0179	0.0164	
% Patients above 200% FPL	-0.0045	0.018	
% Uninsured Patients	0.0306	0.0232	
% Medicaid Patients	0.0242	0.0243	
% Female Patients	0.0284	0.0361	
%Chronic Visits	0.0008	0.0144	
Medicaid Reimbursement Rate	0.0123	0.0036	***
Private Insurance Reimbursement Rate	0.0132	0.0056	*
Medicare Reimbursement Rate	0.0017	0.0021	
% Health Center 330 Funding	-0.0933	0.0273	***
Lagged DV	-0.1393	0.0392	***
constant	-8.5572	5.0230	
2007	0.0567	0.2308	
2008	0.3554	0.2815	
2009	1.7306	0.323	***

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

Pooled Analysis

The following paragraphs describe the results of three logistic regression models: predicting health centers in the composite score top quartile; relative risk for health centers with fluctuating composite scores and with constant negative composite scores; and health centers with at least two poor indicators.

Table 21 shows the results of the logistic regression models predicting health centers in the top quartile for composite score (health centers considered to be in good financial health). The reference group is the bottom quartile. The pseudo R-squared value indicates that 21% of the variation can be explained by the independent variables in the model. The model finds five variables associated with the top quartile. A county's income per capita is the only environmental factor with a significant association with health centers in the top quartile. The county's per capita income increases the odds for being in the top quartile decreases by 0.0042%. The percent of behavioral health staff employed by a health center decreases the odds by 5%. Non-physician productivity increases the odds of being in the top quartile by 1%. The percent of uninsured patients increases the odds by 2.8%. Finally the percent of health center 330 funding increases the odds by 3.8%.

Table 22 shows the relative risk ratio for health centers having composite scores that fluctuate over time and those that had constant negative scores against those health centers that consistently above average. Nearly a quarter (24.5 %) of the health centers in the study had positive scores or were in good financial health whereas 70.6% had scores that fluctuated over the years and 4.9% were in bad financial health for five years.

Table 21: Logistic Regression Predicting Health Centers' Composite Score in the Top Quartile

Number of Observations	421.00		
Chi^2	90.12		
$Prob>Chi^2$	0.00		
Psuedo R^2	0.21		
Log Likelihood	-230.26		
	Odds Ratio	SE	Sig
Per Capita Income	1.000	0.000	*
Percent Uninsured	0.945	0.03	
Number of FQHCs	1.011	0.006	
Number of RHCs	1.02	0.013	
Percent PCP in Service Counties	1.019	0.013	
Emergency Department Visits per capita	2.423	2.374	
Northeast	1.925	1.008	
Midwest	0.896	0.397	
West	1.03	0.419	
Urban Status	1.545	0.592	
New Health Center	0.708	0.26	
Number of Sites	1.02	0.022	
Number of Patients	0.991	0.008	
Migrant Grantee	1.623	0.641	
Homeless Grantee	0.794	0.307	
% Dental Staff	1.000	0.022	
% Behavioral Staff	0.949	0.023	*
% Enabling Staff	0.984	0.02	
Non-physician Clinicians to Physician Ratio	1.037	0.042	
Non-physician Clinician Productivity	1.001	0.000	**
% Patients w/ Limited English Proficiency	1.003	0.007	
% Non-White Patients	1.004	0.004	
% Patients under 100% FPL	0.991	0.012	
% Patients above 200% FPL	0.994	0.017	
% Uninsured Patients	1.028	0.014	*
% Medicaid Patients	1.015	0.015	
% Female Patients	1.002	0.024	
%Chronic Visits	0.99	0.018	
Medicaid Reimbursement Rate	1.006	0.004	
Private Insurance Reimbursement Rate	1.008	0.008	
Medicare Reimbursement Rate	1.011	0.006	
% Health Center 330 Funding	1.038	0.012	**

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

The pseudo R-squared value indicates that 17% of the variation can be explained by the independent variables in the model. There are four variables associated with fluctuating scores and five variables associated with constant negative scores.

Income per capita is associated with both fluctuating scores and consistent negative scores. Income increases the odds by nominal percentage for each category. For fluctuating scores, income per capita increases the risk by 0.0033%. For consistent negative scores, income increases the risk by 0.0073% for each dollar increase. The percent of behavioral staff employed at a health center is also associated with both with fluctuating scores and constant negative scores. For every increase in the percent of behavioral health staff, the risk of having fluctuating scores increases by 6.1% and by 11.4% for constant negative scores.

Fluctuating scores are associated with two more environmental factors – uninsured rate and the percent of primary care providers in the served counties. For each increase in the uninsured rate, health centers are 1.06 times at risk for having fluctuating scores. For each increase in the percent of primary care providers reduces the risk by 2.3%. The risk of having constant negative scores is significantly associated with Migrant Health Centers but the magnitude of the risk is nominal. Non-physician clinician productivity and the percent health center 330 funding reduce the risk of having negative scores. The productivity reduces the risk by 0.1% for each encounter seen by a non-physician clinician. The percent of health center 330 funding in total revenue reduces the risk by 7.8% for every percentage increase in 330 funding.

Table 22: Multinomial Logistic Regression Predicting Relative Risk for Health Centers with Fluctuating Composite Score and with Constant Negative Composite Scores

Number of Observations	850.000					
Chi^2	2024.590					
$Prob>Chi^2$	0.000					
Psuedo R^2	0.172					
Log pseudolikelihood	-517.328					
	Risk of Fluctuating			Risk of Constant Negative		
	RRR	SE	Sig	RRR	SE	Sig
Per Capita Income	1.000	0.000	*	1.000	0.000	*
Percent Uninsured	1.060	0.027	*	1.003	0.065	
Number of FQHCs	0.994	0.004		0.994	0.010	
Number of RHCs	0.992	0.008		1.015	0.027	
Percent PCP in Service Counties	0.977	0.010	*	0.992	0.019	
Emergency Department Visits per capita	4.780	3.903		4.642	7.536	
Northeast	1.634	0.646		1.051	0.716	
Midwest	1.257	0.392		0.472	0.493	
West	1.470	0.417		2.276	1.740	
Urban Status	1.017	0.266		1.047	0.701	
New Health Center	1.395	0.405		0.717	0.430	
Number of Sites	0.990	0.019		0.988	0.029	
Number of Patients	1.000	0.000		1.000	0.000	
Migrant Grantee	0.612	0.160		0.000	0.000	**
Homeless Grantee	0.806	0.211		0.724	0.510	
% Dental Staff	1.006	0.017		0.952	0.045	
% Behavioral Staff	1.061	0.031	*	1.114	0.040	*
% Enabling Staff	1.007	0.016		1.002	0.028	
Non-physician Clinicians to Physician Ratio	1.039	0.035		1.043	0.037	
Non-physician Clinician Productivity	1.000	0.000		0.999	0.000	**
% Patients w/ Limited English Proficiency	0.996	0.005		0.995	0.012	
% Non-White Patients	0.996	0.003		0.992	0.008	
% Patients under 100% FPL	1.010	0.008		1.005	0.015	
% Patients above 200% FPL	1.017	0.013		1.001	0.023	
% Uninsured Patients	0.990	0.009		0.980	0.019	
% Medicaid Patients	0.998	0.012		0.996	0.020	
% Female Patients	1.021	0.019		0.957	0.031	
%Chronic Visits	0.983	0.013		0.910	0.044	
Medicaid Reimbursement Rate	0.997	0.004		1.004	0.006	
Private Insurance Reimbursement Rate	0.995	0.006		1.007	0.012	
Medicare Reimbursement Rate	0.998	0.004		0.983	0.011	
% Health Center 330 Funding	0.996	0.008		0.922	0.023	**

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

The final logistic regression predicting health centers with at least two poor indicators (operating margin, grant reliance and net revenue) results are presented in Table 23. The pseudo R-squared value indicates that 13% of the variation can be explained by the independent variables in the model. There are three variables that have a statistically significant association with health centers having at least two poor indicators. Non-physician clinician productivity decreases the odds of having at least two poor indicators by 0.03%. The percent of uninsured patients increases the odds by 2%. The percent of Health Center 330 funding also increases the odds by 2.2%.

Table 23: Logistic Regression Predicting Health Centers with at Least Two Poor Indicators

Number of Observations	641		
Chi^2	96.78		
$Prob>Chi^2$	0.00		
Psuedo R^2	0.129		
Log Likelihood	-383.56124		
	Odds Ratio	SE	Sig
Per Capita Income	1.000	0.000	
Percent Uninsured	1.007	0.027	
Number of FQHCs	1.002	0.005	
Number of RHCs	0.997	0.007	
Percent PCP in Service Counties	0.993	0.01	
Emergency Department Visits per capita	3.103	2.666	
Northeast	1.024	0.36	
Midwest	1.078	0.338	
West	0.913	0.269	
Urban Status	1.064	0.318	
New Health Center	1.39	0.412	
Number of Sites	1.019	0.024	
Number of Patients	0.984	0.01	
Migrant Grantee	0.88	0.278	
Homeless Grantee	0.977	0.285	
% Dental Staff	0.997	0.016	
% Behavioral Staff	1.041	0.025	
% Enabling Staff	1.003	0.017	
Non-physician Clinicians to Physician Ratio	1.032	0.064	
Non-physician Clinician	1.000	0.000	*
% Patients w/ Limited English Proficiency	1.001	0.006	
% Non-White Patients	0.997	0.004	
% Patients under 100% FPL	1.008	0.008	
% Patients above 200% FPL	1.005	0.013	
% Uninsured Patients	1.021	0.01	*
% Medicaid Patients	0.993	0.011	
% Female Patients	0.988	0.021	
%Chronic Visits	0.984	0.015	
Medicaid Reimbursement Rate	0.994	0.004	
Private Insurance Reimbursement	0.986	0.008	
Medicare Reimbursement Rate	0.994	0.004	
% Health Center 330 Funding	1.022	0.01	*

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

Net Revenue per Encounter

Since the three key measures have been examined, the study will analyze two additional performance measures. The first being net revenue per encounter. As mentioned in the previous chapter, net revenue is defined as health center revenue minus their cost. The net revenue is then divided by encounters to determine whether a health center experiences a deficit or surplus for each of their encounters.

Trends

The mean net revenue per encounter as illustrated in Table 5 indicates that health centers received $1.50 per encounter. Figure 8 illustrates net revenue per encounter followed a similar pattern as operating margins. The net revenue per encounter decreased after the first year and held steady until it spiked to $4.86 in 2009.

Figure 8: Net Revenue per Patient

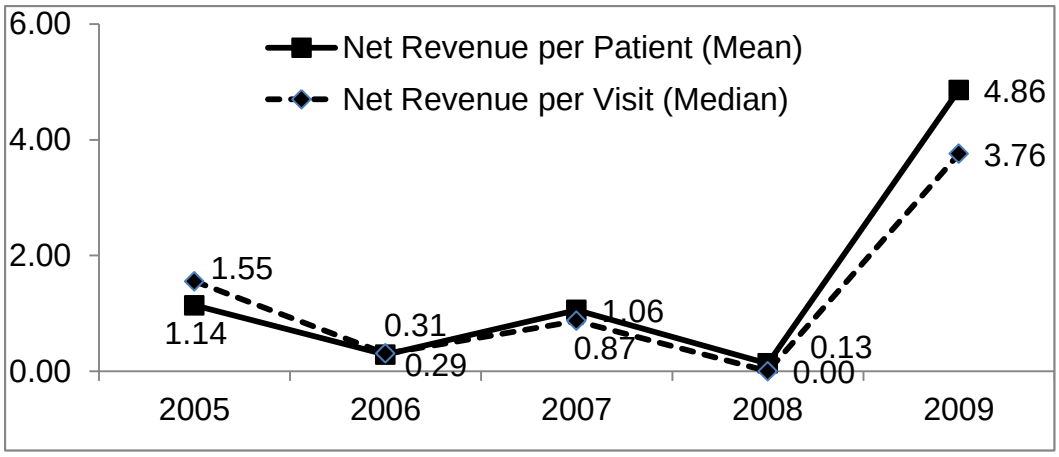


Figure 9 illustrates that forty-four percent had negative net revenue per encounter in 2005 and the percentage dropped at 35% in 2009.

Figure 9: Percent Health Centers with Negative Net Revenue per Encounter

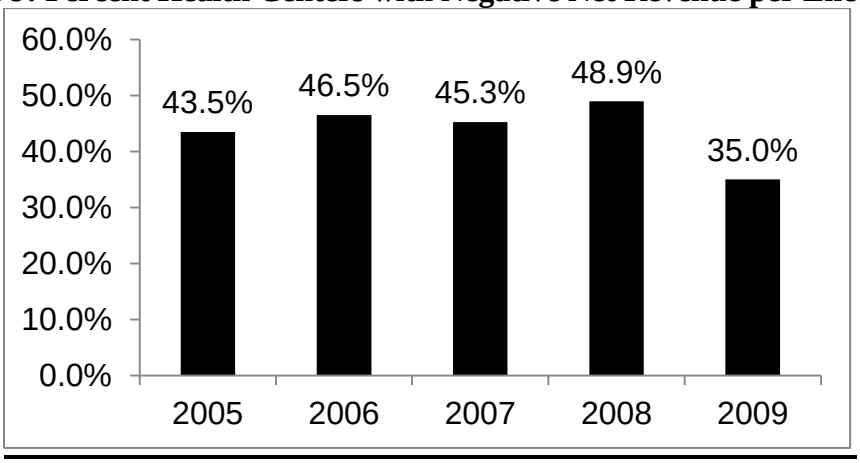


Table 24 shows net revenue per encounter by different health center characteristics. As with the operating margins, the only health centers that did not experience a significant change between 2008 and 2009 were Migrant, Homeless, and Public Housing Health Centers. Health centers in the West and new health centers also did not experience a significant change in net revenue per encounter. Urban health centers experienced a significant reduction in their net revenue per encounter decreasing from $1.49 in 2005 to -$1.37 in 2008. However urban health centers recovered the following year with a surplus of $3.19 per encounter. Rural health centers experienced a significant increase from 2008 to 2009 from $1.50 to $6.75 per encounter. Health centers designated as Community Health Centers experienced a significant increase in their net revenue per encounter from 2008 to 2009 ($0.30 vs $4.79). Established health centers also experienced an increase in their net revenue per encounter from -$0.06 in 2008 to

$4.85 in 2009. Health centers in the Northeast experienced a significant decrease from 2007 ($1.36) to 2008

(-$2.76), but then had a significant recovery ($4.56) in 2009. After examining health center net revenue per encounter from the baseline, established health centers, designated community health centers, established health centers, health centers that had less than half of the patients insured by Medicaid or health centers located in in the Midwest experienced significantly higher net revenues in 2009 than in 2005 which is similar to the operating margin trend. Urban, health centers with less than half of the patients insured by Medicaid and health centers located in the South all had significantly lower net revenue per patient in 2008 than in 2005 indicating these were the types of health centers hit hardest by the recession.

Table 24: Net Revenue per Encounter by Different Health Center Characteristics

Mean Std Dev LCI UCI	Urban	Rural	Com-munity Health Center	Migrant Health Centers	Homeless Health Centers	Public Housing Health Centers	New Health Center	Estab-lished Health Center	Majority Medicaid Patient Volume	Non-Majority Medicaid Patient Volume	Northeast	South	Midwest	West
2005	1.49	0.80	0.74	4.92	4.89	2.42	-1.52	1.59	4.35	0.70	1.32	2.01	0.56	0.18
	20.77	53.53	40.80	14.18	33.24	18.25	96.83	19.14	22.00	42.79	19.21	23.74	20.23	69.19
	-0.46	-4.13	-2.08	2.42	-0.25	-3.76	-18.32	0.23	0.13	-2.29	-1.96	-0.48	-2.58	-8.49
	3.44	5.73	3.56	7.42	10.04	8.60	15.28	2.95	8.57	3.70	4.61	4.50	3.71	8.85
2006	0.22	0.35	-0.11	2.64	0.59	0.46	0.90	0.18	-1.94	0.59	1.32	-0.10	-0.54	0.82
	23.39	24.40	22.68	15.18	28.13	20.37	33.08	21.95	25.38	23.69	19.42	15.04	20.28	35.71
	-1.98	-1.89	1.68	0.01	-3.67	-6.33	-4.80	-1.38	-6.83	-1.07	-2.00	-1.67	-3.70	-3.65
	2.42	2.59	1.45	5.26	4.85	7.25	6.59	1.7431	2.94	2.24	4.64	1.48	2.62	5.28
2007	-0.45	2.50	1.37	3.17	-0.87	0.56	0.31	1.19	3.05	0.76	1.36	0.04	1.07	2.34
	25.24	32.74	28.05	13.06	31.59	23.52	21.54	30.49	22.13	30.28	17.88	16.11	23.98	46.91
	-2.82	-0.51	0.57	0.96	-5.47	-6.96	-3.40	-0.98	-0.99	-1.37	-1.7	-1.65	-2.66	-3.53
	1.92	5.51	3.31	5.39	3.74	8.084	4.02	3.35	7.08	2.89	4.41	1.73	4.81	8.206
2008	-1.37+	1.50	0.30	1.60	-0.73	-2.09	1.23	-0.06	-0.76	0.274+	-2.76*	-1.43+	0.57	3.63
	19.69	20.92	19.45	14.82	22.46	21.33	21.39	20.21	17.69	20.78	15.62	19.36	19.13	24.12
	-3.24	0.40	1.04	-0.88	-3.98	-8.42	-2.45	-1.49	-3.95	-1.19	-5.43	-3.45	-2.41	0.61
	0.51	3.40	1.63	4.09	2.51	4.25	4.91	1.38	2.42	1.74	-0.09	0.6	3.55	6.64
2009	3.19*	6.75*	4.79**+	4.10	2.07	0.96	4.93	4.85**+	3.30	5.12**+	4.56**	2.89*	6.02*+	7.07
	22.22	38.47	2.75	17.34	29.06	14.78	22.78	32.15	16.85	32.72	14.95	17.59	17.86	51.89
	1.20	3.06	2.75	1.20	-2.09	-3.43	1.01	2.56	0.36	2.80	2.02	1.05	3.24	0.58
	5.19	10.44	6.83	7.01	6.23	5.35	8.85	7.13	6.23	7.44	7.11	4.73	8.80	13.56

Pooled Analysis

The Breusch and Pagan Lagrangian multiplier test finding indicated there were no significant differences across panels; therefore a simple OLS regression could be used instead of a random or fixed effects model. The following paragraphs describe the Ordinary Least Squares model for operating margins. Table 25: Results for Ordinary Least Squares shows the results for the model, including the coefficient and SE The model includes a lagged dependent variable as well as dummy time variables to control for omitted variable bias.

The R-squared value for this OLS regression model indicates that 8% of the variation in the dependent variable is explained by the independent variables in the model. There are five significant associations with net revenue per encounter. The more patients served by health centers decreases the net revenue by $0.0001 per encounter. The more non-physician clinicians compared to physicians would generate $0.26 per encounter due to the lower salaries paid to non-physician clinicians. By employing staffing models that utilize more non-physician clinicians, health centers are able comprehensive primary and preventive care that includes health education. An increase in the Medicaid reimbursement rate provides an increase of $0.09 per encounter. Similar to the operating margin results, the Medicaid reimbursement rate has a significant association with net revenue per encounter. This would indicate that Medicaid reimbursement plays a significant role in the financial health of a health center. The model also indicates that previous levels of net revenue per encounter would have a positive increase in the current levels of $0.22 per encounter. None of the environmental factors or patient characteristics are found to be statistically significant.

Table 25: Results for Ordinary Least Squares Models

Number of Observations	1837		
F	3.98		
Prob>F	0		
R-Square	0.0825		
	Coefficient	SE	Sig
Per Capita Income	0	0.0001	
Percent Uninsured	0.0983	0.1583	
Number of FQHCs	-0.0136	0.0182	
Number of RHCs	0.0004	0.0327	
Percent PCP in Service Counties	-0.0275	0.1613	
Emergency Department Visits per capita	3.155	9.7475	
Urban Status	-1.4656	2.0796	
Number of Sites	0.0989	0.0754	
Number of Patients	-0.0001	0	*
Migrant Grantee	-1.6947	1.803	
Homeless Grantee	1.0824	1.3473	
% Dental Staff	-0.1249	0.1231	
% Behavioral Staff	-0.1351	0.1182	
% Enabling Staff	0.1612	0.1203	
Non-physician Clinicians to Physician Ratio	0.2584	0.1167	*
Non-physician Clinician Productivity	0.0012	0.0011	
% Patients w/ Limited English Proficiency	0.0778	0.0982	
% Non-White Patients	0.0393	0.0537	
% Patients under 100% FPL	0.0158	0.0711	
% Patients above 200% FPL	0.0177	0.0735	
% Uninsured Patients	-0.0311	0.0656	
% Medicaid Patients	-0.0396	0.0775	
% Female Patients	0.0167	0.152	
%Chronic Visits	-0.043	0.1021	
Medicaid Reimbursement Rate	0.0908	0.0226	***
Private Insurance Reimbursement Rate	0.0588	0.0366	
Medicare Reimbursement Rate	0.0026	0.0283	
% Health Center 330 Funding	-0.1149	0.076	
Lagged DV	0.222	0.1007	*
constant	-16.0909	11.4396	
2007	-0.1846	3.691	
2008	1.3138	2.3892	
2009	6.1934	3.1549	*

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

Logistic regressions were used to assess the different categories of net revenue per encounter. As with the operating margins, three logistic regression models were used to test the association of predicting negative net revenue per encounter, being in the top quartile and relative risk of having fluctuating or consistently negative margins. However, the logistic regression predicting negative net revenue per encounter was not significant and can found in Appendix B.

A logistic regression predicting membership in the top quartile for net revenue per encounter is utilized for the five-year period of time. Table 26 shows the results of the model. The pseudo R-squared value for this model indicates that 10% the model variation is explained by the independent variables. Five variables are associated with health centers in the top quartile of having the highest net revenue per encounter. Like in the operating margin quartile regression, health centers in the Northeast and West were 2.92 and 2.1 times as likely to have net revenue per encounter in the top quartile. As the ratio of non-physician clinicians to physicians increased, health centers were 16.5% more likely to be in the top quartile. Like the logistic regression for operating margin quartiles, the productivity of the non-physician clinicians and Medicaid reimbursement also increases the odds of being in the top quartile.

Table 26: Logistic Regression Predicting Health Centers Net Revenue in the Top Quartile

Number of Observations	423.00		
Chi^2	47.66		
$Prob>Chi^2$	0.04		
Psuedo R^2	0.10		
Log Likelihood	-263.65		
	Odds Ratio	SE	Sig
Per Capita Income	1.000	0.000	
Percent Uninsured	0.975	0.028	
Number of FQHCs	1.003	0.005	
Number of RHCs	1.008	0.010	
Percent PCP in Service Counties	1.014	0.011	
Emergency Department Visits per	0.614	0.603	
Northeast	2.925	1.454	*
Midwest	1.680	0.653	
West	2.108	0.779	*
Urban Status	1.309	0.457	
New Health Center	0.722	0.235	
Number of Sites	1.023	0.021	
Number of Patients	0.996	0.008	
Migrant Grantee	1.061	0.396	
Homeless Grantee	0.784	0.260	
% Dental Staff	1.027	0.021	
% Behavioral Staff	0.975	0.024	
% Enabling Staff	1.018	0.017	
Non-physician Clinicians to Physician Ratio	1.165	0.065	*
Non-physician Clinician Productivity	1.000	0.000	*
% Patients w/ Limited English Proficiency	1.005	0.007	
% Non-White Patients	1.005	0.003	
% Patients under 100% FPL	0.984	0.011	
% Patients above 200% FPL	0.990	0.016	
% Uninsured Patients	1.006	0.012	
% Medicaid Patients	0.992	0.014	
% Female Patients	0.986	0.021	
%Chronic Visits	1.000	0.017	
Medicaid Reimbursement Rate	1.009	0.004	*
Private Insurance Reimbursement Rate	1.000	0.008	
Medicare Reimbursement Rate	1.006	0.006	
% Health Center 330 Funding	1.008	0.011	

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

Table 27 displays the results of the multinomial logistic regression model predicting the relative risk of having either fluctuating consistently negative net revenue per encounter relative to health centers with consistently positive revenues. Five percent of the health centers had consistently negative net revenue per encounter and the majority had fluctuating net revenue per encounter that from positive to negative or vice versa over the five years. Two variables are significantly associated with having fluctuating margins and another two variables associated with negative margins. The pseudo R-squared value for this model indicates that 8% the model variation is explained by the independent variables.

The ratio of non-physician clinicians to physicians and the percent of patients with limited English proficiency reduced the risk of having negative margins for all five years in the study period. Non-physician clinicians decreased the risk by 40.7% and limited English proficiency decreased the risk of having consistently negative margins by 3.7%

In terms of being at risk of having fluctuating net revenue per encounter, an increase in the percent of non-white patients decreased the risk of having net revenue per encounter fluctuate over the five years by 0.6%. An increase in the percent of revenues from 330 funding increased the risk of fluctuating by 2.3%.

Table 27: Multinomial Logistic Regressions comparing Health Centers with Constant Positive Net Revenue with Fluctuating Net Revenue and Negative Net Revenue

Number of Observations	850.000					
Chi^2	90.830					
Prob>Chi^2	0.015					
Psuedo R^2	0.083					
Log pseudolikelihood	-451.549					
	Fluctated			Constant Negative		
	Relative	SE	Sig	Relative	SE	Sig
Per Capita Income	1.000	0.000		1.000	0.000	
Percent Uninsured	0.973	0.030		1.037	0.062	
Number of FQHCs	0.997	0.005		1.002	0.008	
Number of RHCs	0.995	0.009		0.959	0.023	
Percent PCP in Service Counties	0.992	0.012		1.000	0.019	
Emergency Department Visits per capita	1.192	1.182		4.433	6.620	
Northeast	1.124	0.500		1.366	1.086	
Midwest	0.932	0.367		0.930	0.618	
West	1.555	0.585		2.735	1.603	
Urban Status	0.874	0.297		1.437	0.877	
New Health Center	1.123	0.384		0.596	0.387	
Number of Sites	0.988	0.023		0.983	0.037	
Number of Patients	1.012	0.010		1.018	0.016	
Migrant Grantee	0.645	0.212		0.265	0.224	
Homeless Grantee	0.578	0.179		1.377	0.705	
% Dental Staff	0.989	0.021		0.999	0.032	
% Behavioral Staff	1.043	0.031		0.971	0.046	
% Enabling Staff	1.017	0.019		0.973	0.027	
Non-physician Clinicians to Physician Ratio	1.057	0.045		0.503	0.121	*
Non-physician Clinician Productivity	1.000	0.000		1.000	0.000	
% Patients w/ Limited English Proficiency	0.996	0.007		0.963	0.015	*
% Non-White Patients	0.994	0.003	*	0.990	0.007	
% Patients under 100% FPL	1.008	0.010		1.012	0.013	
% Patients above 200% FPL	1.029	0.018		1.005	0.031	
% Uninsured Patients	0.997	0.013		0.996	0.019	
% Medicaid Patients	1.010	0.014		1.002	0.022	
% Female Patients	1.033	0.021		1.015	0.028	
%Chronic Visits	0.996	0.020		0.985	0.027	
Medicaid Reimbursement Rate	1.001	0.005		0.994	0.007	
Private Insurance Reimbursement Rate	0.995	0.006		0.992	0.015	
Medicare Reimbursement Rate	0.998	0.004		0.998	0.008	
% Health Center 330 Funding	1.023	0.011	*	1.032	0.017	

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

Grant Reliance

Grant reliance is another supplemental financial performance measure. Grant reliance is the ratio of grant revenue (e.g., Section 330 grant revenue) to total patient-related revenue. The reliance ratio close to 1 or over indicates the health centers are more reliant on grants as a revenue source or otherwise stated less self-sufficient they. The stated goal of the health center program is for health centers to become self-sufficient.

Trends

The mean grant reliance as shown in Table 5 was 29.48. There is a tremendous amount of variation with a standard deviation of 1063.40. Figure 10 illustrates the grant reliance peaked at 93.66 due to several health centers receiving large grants and having very little patient revenue in 2006. Despite the 2006 spike, the grant reliance climbed from 2007 at 9.93 to 24.04 in 2009. However an examination of the median grant reliance shows that grant reliance was constant over the years and even showed more self-sufficiency since the ratio was less than 1. Figure 11 illustrates that the percent of health centers has increased over the five-year period. In 2005, 56% of the health centers were grant reliant and the percentage grew to 61.4% in 2009.

Figure 10: Grant Reliance over Time

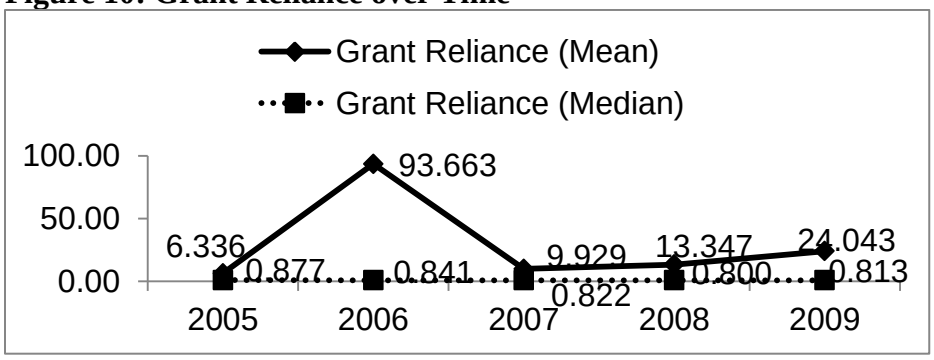


Figure 11: Percent of Grant Reliant Health Centers

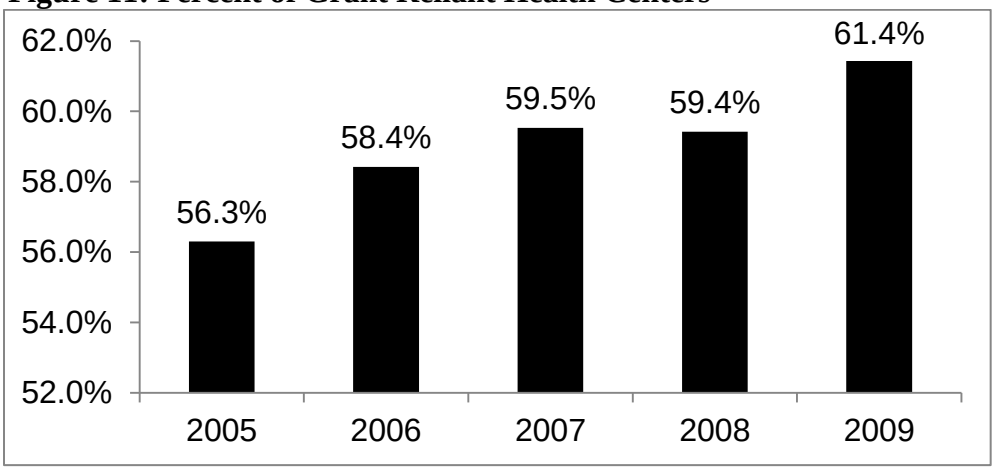


Table 28 presents the mean grant reliance by different health center characteristics. Few health center characteristics showed significant changes in their means over the years. This could be due to the large variation of grant reliance. There were two characteristics that had a significant difference between years: Community Health Centers and new health centers. These two characteristics had significant change from the study's baseline. In 2005, Community Health Centers had a grant reliance of 1.63, but the grant reliance ratio decreased to 1.11 in 2007. New health centers had a grant reliance of 6.28 in 2008 and their reliance a decreased ratio of 2.37, but still heavily reliant on grants as a revenue source. In 2006, urban established Homeless health centers that had a minority of Medicaid patients in the South received an increase amount of grant revenue and little to none patient revenue.

Table 28: Grant Reliance by Health Center Characteristics

Mean SE Std Dev LCI UCI	Urban	Rural	Com-munity Health Center	Migrant Health Centers	Homeless Health Centers	Public Housing Health Centers	New Health Center	Estab-lished Health Center	Majority Medicaid Patient Volume	Non-Majority Medicaid Patient Volume	Northeast	South	Midwest	West
2005	8.79 3.14 65.571 2.619 14.962	3.974 1.213 25.825 1.590 6.359	1.633 0.221 6.275 1.199 2.067	10.627 4.351 48.643 2.016 19.238	20.488 8.462 107.039 3.7750 37.200	2.225 0.543 3.261 1.122 3.328	6.275 1.750 19.880 2.812 9.739	6.347 1.920 52.929 2.578 10.116	1.392 0.351 3.628 0.696 2.087	7.013 1.886 52.743 3.311 10.715	4.431 2.233 25.751 0.014 8.848	9.491 3.927 73.255 1.767 17.213	3.267 0.810 10.274 1.668 4.866	4.919 1.834 28.830 1.306 8.532
2006	184.024 158.128 3301.80 -126.77 494.8	7.4545 3.236 69.186 1.095 13.815	1.315 0.183 5.183 0.957 1.6738	11.204 5.780 65.907 -0.232 22.641	479.241 407.721 5300.367 -325.675 1284.157	2.082 0.691 4.202 0.688 3.489	14.941 9.517 109.346 -3.886 33.769	107.318 90.615 2499.724 -70.567 285.20	1.228 .3198 3.293 0.5943 1.862	106.113 87.633 2458.42 -65.910 278.13	45.419 42.772 493.268 -39.188 130.02	214.408 195.806 3668.429 -170.697 599.51	2.727 0.799 10.137 1.149 4.305	7.679 3.316 52.220 1.147 14.209
2007	16.601 11.692 244.131 -6.379 39.580	3.563 1.491 31.864 0.634 6.492	1.111+ 0.0487 1.382 1.015 1.207	11.138 5.559 64.592 0.1432 22.133	36.699 28.081 377.792 -18.712 92.109	2.266 0.650 4.111 0.951 3.580	2.872 .849 9.752 1.193 4.551	11.15 6.757 186.402 -2.112 24.417	1.229 0.296 3.210 0.644 1.814	11.253 6.636 184.739 -1.773 24.280	2.848 1.158 13.359 0.556 5.138	17.943 14.487 271.409 -10.549 46.43	4.570 2.203 27.959 0.218 8.922	5.862 2.735 43.078 0.474 11.249
2008	23.923 20.162 416.629 -15.706 63.553	3.656 1.188 25.645 1.322 5.990	1.201 0.083 2.378 1.037 1.365	9.524 3.9654 46.580 1.683 17.365	53.478 46.517 632.703 -38.297 145.254	1.621 0.292 1.982 1.033 2.209	2.367+ 0.670 7.692 1.043 3.692	15.252 11.336 312.705 -7.001 37.505	0.930 0.169 1.857 0.596 1.264	15.294 11.174 310.475 -6.642 37.229	5.049 3.382 39.001 -1.641 11.73	27.319 24.523 459.441 -20.912 75.55	4.187 1.656 21.018 0.915 7.457	3.971 1.127 17.748 1.751 6.191
2009	41.089 28.581 623.560 -15.072 97.249	4.632 1.592 32.553 1.502 7.762	1.247 0.123 3.516 1.006 1.489	10.615 4.741 55.690 1.241 19.990	102.5518 72.250 990.648 -39.979 245.082	1.436 0.235 1.592 0.963 1.908	2.862 1.248 14.340 0.393 5.331	27.712 17.878 493.498 -7.383 62.807	1.422 0.488 5.540 0.457 2.388	27.857 17.808 492.548 -7.101 62.816	2.972 1.394 16.079 0.215 5.730	54.709 38.529 723.898 -21.067 130.48	3.119 1.286 16.318 0.579 5.659	5.200 2.388 37.527 0.497 9.904

Panel Analysis

The following paragraphs describe the fixed effects models for grant reliance. Table 29 Fixed Effects Models for Grant Reliance shows the results for the model, including the coefficient and standard error (SE) for health center grant reliance.

As described earlier in the chapter, the coefficients should be interpreted as the impact of change in the independent variables on the change in grant reliance within a health center. In addition to using fixed effects, the model includes a lagged dependent variable to assess whether if the current level of the dependent variable is determined by its past level. The model also contains time-fixed effects variables to explain by overall time trends or other time series (for instance seasonal) patterns. The dependent variable was also log transformed to flatten out the variation in the data.

The model indicates that 26.7% of the variation can be explained by the independent variables. Eight independent variables have a significant association with grant reliance. Unlike the fixed effects model for operating margin and the OLS model for net revenue per encounter, the grant reliance fixed effect model indicates two environmental factors are associated with reliance. As the per capita income of a county served by a health increases, there is an increase in grant reliance by 0.001%. The higher incomes would indicate that patients would have to pay more for the sliding fee scale or were able to afford care at private physician offices resulting in sicker more expensive patients coming to the health center. Two health center patient characteristics are associated with grant reliance. For every percentage increase in the uninsured patients, grant reliance would increase by 1.4%. An increase in the percent of patients who were above the 200% FPL would decrease the grant reliance by 0.4%. Patients over 200% FPL

would have to pay the full cost of care instead of a sliding fee and would more than likely be insured.

In terms of health center staffing, an increase in the percent of enabling service staff employed by a health center would increase grant reliance by 1.1%. Enabling services are generally not reimbursable and health centers would seek grants to cover the costs. An increase in encounters per non-physician clinician decreases grant reliance by 0.01%. Reimbursement from Medicaid and Medicare decrease the reliance on grants which makes sense since it would mean more revenues from third party payers. An increase in the Medicaid reimbursement rate would decrease grant reliance by 0. 4% and an increase in Medicare rate would decrease it by 0.2%.

Table 29: Fixed Effects Models for Grant Reliance

Number of Observations	1837		
Number of groups	823		
F	8.2		
Prob>F	0.00		
R-square (within)	0.2674		
	Coefficient	SE	Sig
Per Capita Income	0.000	0.000	*
Percent Uninsured	0.014	0.008	
Number of FQHCs	0.000	0.001	
Number of RHCs	0.001	0.002	
Percent PCP in Service Counties	0.004	0.004	
Emergency Department Visits per capita	0.075	0.174	
Urban Status	-0.001	0.033	
Number of Sites	0.000	0.002	
Number of Patients	0.000	0.000	
Migrant Grantee	0.002	0.144	
Homeless Grantee	-0.065	0.169	
% Dental Staff	-0.009	0.006	
% Behavioral Staff	0.008	0.012	
% Enabling Staff	0.011	0.004	**
Non-physician Clinicians to Physician Ratio	0.004	0.009	
Non-physician Clinician Productivity	0.000	0.000	**
% Patients w/ Limited English Proficiency	-0.003	0.002	
% Non-White Patients	-0.001	0.001	
% Patients under 100% FPL	0.002	0.002	
% Patients above 200% FPL	-0.004	0.002	**
% Uninsured Patients	0.014	0.003	***
% Medicaid Patients	0.002	0.003	
% Female Patients	0.000	0.007	
%Chronic Visits	0.000	0.002	
Medicaid Reimbursement Rate	-0.004	0.001	***
Private Insurance Reimbursement Rate	-0.002	0.001	*
Medicare Reimbursement Rate	-0.001	0.000	**
Lagged DV	0.012	0.033	
constant	-0.602	0.593	
2007	-0.034	0.030	
2008	-0.061	0.038	
2009	-0.035	0.041	

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

Pooled Analysis

Like the operating margins and net revenue, a five-year pooled average will be used to determine the long-term financial performance. The odds ratio allows the study

not only to understand the environment which health centers operate as it relates to performance, but also the magnitude in the odds of performance.

The first logistic regression model as displayed in Table 30 predicts grant reliance status (health centers with a reliance ratio of greater than 1). The pseudo R-squared value indicates that 45.6% of the variation in the model is explained by the independent values. There are 12 variables associated with predicting grant reliance. The service counties' percent of uninsured, health centers in the Northeast as well as the Midwest are the three environmental factors associated with grant reliance status. A percentage point increase in the county uninsured rate would increases the odds of being grant reliant by 8%. Health centers located in the Northeast and Midwest are 2.5 and 3 times as likely to be grant reliant than health centers located in the South.

Both variables estimating the scale of a health center (number of sites and number of patients) are positively associated with being grant reliant. As the number of sites increase, the odds of being grant reliant increased by 5.3%. The number of patients actually decreases the reliance on grants by 5.7%. In terms of health center staffing characteristics, behavioral health and enabling staff composition, the ratio of non-physician clinicians to physicians and the non-physician clinicians' productivity are found to be significantly associated with grant reliance. As the percent of behavioral health staff employed by the health centers increases, the odds of being considered grant reliant increases by 6.5%. As enabling services staff increases, health centers are 1.06 times likely to be grant reliant. The non-physician clinician to physician ratio increases the odds by 1.14. However, the productivity of non-physician clinicians decreases the odds of being grant reliant only slightly by 0.1%. A one percent increase in uninsured

patients is 1.09 times more likely that the health centers are grant reliant. However, a one percent increase in Medicaid patients would decrease the odds of being grant reliant by 2.7% since there would be supposedly more Medicaid revenue.

Table 30: Logistic Regression Predicting Grant Reliance Status

Number of Observations	850		
Chi^2	231.19		
$Prob>Chi^2$	0		
$Psuedo\ R^2$	0.4559		
Log Likelihood	-309.65736		
	Odds	SE	Sig
Per Capita Income	1.000	0.000	
Percent Uninsured	1.083	0.037	*
Number of FQHCs	0.993	0.005	
Number of RHCs	0.973	0.02	
Percent PCP in Service Counties	1.007	0.01	
Emergency Department Visits per capita	0.695	0.597	
Northeast	2.461	1.101	*
Midwest	3.07	1.221	*
West	1.141	0.393	
Urban Status	0.967	0.304	
New Health Center	1.209	0.364	
Number of Sites	1.053	0.027	**
Number of Patients	0.943	0.017	***
Migrant Grantee	1.397	0.492	
Homeless Grantee	1.034	0.337	
% Dental Staff	1.009	0.019	
% Behavioral Staff	1.065	0.022	**
% Enabling Staff	1.058	0.022	**
Non-physician Clinicians to Physician Ratio	1.142	0.045	***
Non-physician Clinician Productivity	0.999	0.000	**
% Patients w/ Limited English Proficiency	0.993	0.007	
% Non-White Patients	1.014	0.005	**
% Patients under 100% FPL	0.999	0.01	
% Patients above 200% FPL	1.000	0.016	
% Uninsured Patients	1.089	0.013	**
% Medicaid Patients	0.973	0.013	*
% Female Patients	1.001	0.022	
%Chronic Visits	1.021	0.018	
Medicaid Reimbursement Rate	0.996	0.004	
Private Insurance Reimbursement Rate	0.993	0.008	

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

The second logistic regression results as shown in Table 31 predicts Health Centers grant reliance in the top quartile of having the highest reliance on grants. The pseudo R-squared indicates that 88% of the model variation is explained by independent variables.

Table 31: Logistic Regression Predicting Health Centers Grant Reliance in the Top Quartile

Number of Observations	409		
Chi^2	121.41		
$Prob>Chi^2$	0.00		
Psuedo R^2	0.8584		
Log Likelihood	-39.919757		
	Odds	SE	Sig
Per Capita Income	1.000	0.000	
Percent Uninsured	1.077	0.099	
Number of FQHCs	0.968	0.015	*
Number of RHCs	0.945	0.039	
Percent PCP in Service Counties	1.027	0.026	
Emergency Department Visits per capita	6.446	19.114	
Northeast	3.132	4.475	
Midwest	9.166	13.687	
West	0.401	0.338	
Urban Status	0.277	0.277	
New Health Center	6.820	4.310	**
Number of Sites	1.073	0.045	
Number of Patients	0.941	0.058	
Migrant Grantee	0.395	0.347	
Homeless Grantee	0.281	0.334	
% Dental Staff	1.037	0.072	
% Behavioral Staff	1.182	0.077	*
% Enabling Staff	1.187	0.066	**
Non-physician Clinicians to Physician Ratio	2.189	0.788	**
Non-physician Clinician Productivity	0.999	0.000	*
% Patients w/ Limited English Proficiency	1.028	0.028	
% Non-White Patients	1.033	0.017	
% Patients under 100% FPL	1.003	0.028	
% Patients above 200% FPL	1.026	0.052	
% Uninsured Patients	1.234	0.050	***
% Medicaid Patients	0.915	0.045	
% Female Patients	0.902	0.068	
%Chronic Visits	1.087	0.049	
Medicaid Reimbursement Rate	0.995	0.008	
Private Insurance Reimbursement Rate	0.948	0.012	***
Medicare Reimbursement Rate	0.992	0.012	

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

The number of FQHCs in a county decreases the odds of being in the top quartile by 3.2%. A new health center has 6.8 times the odds that they will be in the top quartile. As the ratio of non-physician to physician increases, the odds increase by 2.2 times for being in the top quartile. However, the non-physician productivity decreases the odds of being in the top quartile by 0.1% for every encounter made to a non-physician clinician. Like in the grant reliance status model, an increase in the percent of uninsured patients served by the health centers increases the odds by 23%. However the private insurance reimbursement rate is the only payer reimbursement rate that is significant in the model. As the percentage in the private insurance reimbursement rate increases, the odds of being in the top quartile are decreased by 5.2%.

The third regression examines the risk of fluctuating grant reliance or being constantly grant reliant relative to being a self-sufficient health center (those centers with a grant reliance ratio of less than 1) as shown in Table 32. There were 44.8% of the health centers that were self-sufficient whereas there were 26% that their reliance on grants fluctuated over the years and 29% that were consistently reliant on grants. The pseudo R-squared value indicates that nearly 38% of the variation can be explained by the independent variables in the model.

The first examination shall be the risk of being a health center with fluctuating reliance. New health centers are 2 times at risk experiencing a fluctuation. An increase in the number of patients decreases the risk of fluctuation by 4.2%.

Non-physician clinician productivity has a reduction effect though it is very small. The percent of chronic visits increases the risk of fluctuating reliance by 4% for every

percentage increase in chronic visits. The private insurance reimbursement rate reduces the risk by 1.4% for every increase in the reimbursement rate.

For the risk of being constantly reliant on grant revenues, 12 factors are significantly associated with constant grant reliance. The percent of uninsured in a county is increases the risk by 10.7%. The number of health center sites operated by a health center increases the risk by 11.5% where the number of patients decreases the risk by 9%. The percentages of behavioral health and enabling staff increase the risk by 7.3% and 12.6% respectively. As the percent of non-white increases, health centers are 1.027 times at being at risk. The percent of Medicaid and uninsured patient served by health centers increases the risk by 9.5% and 12.7% for each group. The private reimbursement rate reduces the risk of constant reliance by 2.7%. The percent of chronic visits increases the risk by 4.2%. A health center's staffing model also has an influence on whether it relies on grants. As the ratio of non-physician clinicians to physicians increases, the risk also increases by 15%. However the productivity of non-physician clinicians decreases the risk but only nominal amount.

Table 32: Logistic Regressions comparing Health Centers with Fluctuating Grant Reliance with Constant Reliance and Self Sufficiency

Number of Observations	850.000					
Chi^2	242.530					
$Prob>Chi^2$	0.000					
Psuedo R^2	0.375					
Log pseudolikelihood	-563.010					
	Risk of Fluctuating			Risk of Constant Negative		
	RRR	SE	Sig	RRR	SE	Sig
Per Capita Income	1.000	0.000		1.000	0.000	
Percent Uninsured	1.032	0.032		1.107	0.046	*
Number of FQHCs	1.000	0.006		0.995	0.007	
Number of RHCs	0.983	0.011		0.985	0.030	
Percent PCP in Service Counties	1.007	0.011		1.011	0.013	
Emergency Department Visits per capita	0.589	0.529		1.174	1.350	
Northeast	1.780	0.694		3.019	2.075	
Midwest	1.428	0.501		2.860	1.542	
West	1.111	0.346		0.914	0.407	
Urban Status	1.177	0.361		0.771	0.307	
New Health Center	1.993	0.590	*	1.895	0.697	
Number of Sites	1.051	0.030		1.115	0.038	***
Number of Patients	0.958	0.014	**	0.910	0.021	***
Migrant Grantee	0.930	0.286		1.178	0.511	
Homeless Grantee	1.343	0.429		1.391	0.583	
% Dental Staff	1.011	0.017		1.029	0.026	
% Behavioral Staff	1.031	0.023		1.073	0.029	***
% Enabling Staff	1.040	0.022		1.126	0.029	***
Non-physician Clinicians to Physician Ratio	1.070	0.047		1.150	0.051	***
Non-physician Clinician Productivity	1.000	0.000	*	0.999	0.000	***
% Patients w/ Limited English Proficiency	0.996	0.007		0.994	0.009	
% Non-White Patients	1.007	0.005		1.027	0.007	***
% Patients under 100% FPL	1.004	0.009		1.010	0.013	
% Patients above 200% FPL	1.010	0.015		1.025	0.022	
% Uninsured Patients	1.068	0.012		1.127	0.019	***
% Medicaid Patients	1.006	0.012		0.949	0.018	***
% Female Patients	0.972	0.030		0.970	0.036	
%Chronic Visits	1.040	0.018	*	1.042	0.021	*
Medicaid Reimbursement Rate	0.998	0.003		0.995	0.004	
Private Insurance Reimbursement Rate	0.986	0.007	*	0.979	0.009	**
Medicare Reimbursement Rate	0.996	0.004		0.991	0.007	

*** Significant at the 0.001 level; ** Significant at the 0.01 level; ** Significant at the 0.05 level

Key Study Findings

Due to the length and density of the material, this section of the chapter seeks to highlight the key findings. This section will not discuss all significant variables, but those of interest. There were two questions the study sought to answer. The first was to identify patterns or trends in federally funded health center's financial and non-financial performance. The study found that health center operating margins decreased over first three years of the study with the biggest decrease in 2008. As Figure 8 indicates health centers revenues declined, but the costs continued to rise. Due to the gap between costs and revenues, health centers margins reached their lowest levels at -1.11%. In 2009, the influx of ARRA funds caused health center margins to reach their highest levels. The study also revealed, like non-profits, health center operating margins and net revenue per encounter fluctuates throughout the years. Due to the influx of ARRA funding, almost two-thirds of the health centers appear to have become reliant on grant funding which runs counter to the BPHC goals to assist health centers to become more self-sufficient.

Fixed effects, logistic regression and multinomial logistic regression models were three different strategies used to answer the second research question to predict which environmental factors and organizational characteristics related to financial performance of federally funded health center.

The study hypothesized that environmental factors influenced a health centers financial performance. As seen in Table 33: Fixed Effects Model Significant Findings, the study only found that there were two environmental factors that were found significant: county per capita income and Emergency Department visits per capita in

health center served counties. These findings would indicate that environmental factors don't have much influence on performance at least over time.

While the coefficient for the county per capita income was nominal, it shows an inverse association with grant reliance. As income per capita increased in a county, health centers became more reliant on grants. The other environmental factor found to be significant was the number emergency department visits per capita for health center served counties. As the number of ED visits increased, the total cost per patient decreased by $179.45. This finding could suggest that individuals are going to the ED for complex medical needs and use the health centers as a usual source of care.

Table 33: Fixed Effects Model Significant Findings

	Fixed Effects				
	Operating Margin	Net Revenue	Total Cost per Patient	Grant Reliance	Composite Score
County Per Capita Income				+	
Emergency Department Visits per capita			–		
Number of Health Center Patients		–	–		
% Enabling Staff				+	
Non-physician Clinicians to Physician Ratio		+			
Non-physician Clinician Productivity			–	–	
% Patients w/ Limited English Proficiency	+				
% Patients Above 200% FPL				+	
% Uninsured Patients				+	
Medicaid Reimbursement Rate	+	+		–	+
Private Insurance Reimbursement Rate	+			–	+
Medicare Reimbursement Rate				–	
% Health Center 330 Funding	+			N/A	–

+/– indicates the direction of the coefficient

Reimbursement is one of several organizational characteristics found to be significant in the fixed effects models. As reimbursement rates increased, health centers

experienced higher operating margins, net revenues per encounter and better financial health (as demonstrated in the composite score). The higher reimbursement rate also indicated health centers became less reliant on grants becoming more self-sufficient. Even though privately insured patients compose a small percentage of total health center patients, private insurance reimbursement was found to be significant in three of the models. Due to the share number of Medicaid patients served at health centers, it was not expected that Medicaid reimbursement rates were found to be significantly associated in four of the five models. A one percentage point increase in Medicaid reimbursement rates, resulted in:

- A 0.02 percentage point increase in operating margins.
- A 0.09 percentage point increase in net revenue per encounter.
- A 0.012 increase in the composite score indicating improvement in financial performance.
- A -0.004 reduction in grant reliance.

A second approach was needed to assess the differences in environmental factors and organizational characteristics. Logistic regressions were used to assess differences between the top and bottom quartiles, being grant reliant vs self-sufficient and having more than one poor indicator. There were 19 environmental factors (6) and organizational characteristics (13) variables that were associated with the seven different outcome models. Logistic regressions models predicting health centers in top quartile for total cost per patient and grant reliance status had the most independent variables associated with their outcome. Instead of belaboring over each significant variable, the

focus will be on variables that were significant across multiple models as shown in Table 34.

Table 34: Logistic Regression Significant Results

	Operating Margin Quartiles	Net Revenue Quartiles	Total Cost per Patient Quartiles	Grant Reliance Quartiles	Composite Score Quartiles	Multiple Poor Indicators	Grant Reliance Status
Per Capita Income			+		+		
Percent Uninsured			+				+
Number of FQHCs			–	–			
Northeast	+	+	+				+
Midwest			+				+
West		+	+				
New Health Center				+			
Number of Delivery Sites							+
Number of Health Center Patients			–				–
% Behavioral Staff			+	+	–		+
% Enabling Staff			+	+			+
Non-physician Clinician to Physician Ratio		+		+			+
Non-physician Clinician Productivity	+	+	–	–	+	–	–
% Non-White Patients			+				+
% Uninsured Patients			–	+	+	+	+
% Medicaid Patients							–
Medicaid Reimbursement Rate	+	+					
Private Insurance Reimbursement Rate				–			
% Health Center 330 Funding			–	N/A	+	+	

Health centers located in the Northeast had better odds of being in top quartiles for favorable performance in terms of operating margins and net revenue per encounter. However, they also had high odds of having the highest total cost per patients and being reliant on grants. Being a health centers in the Northeast, increases the odds of being:

- In the top quartile for operating margins by 2.94.
- In the top quartile for net revenue per encounter by 2.95.
- In the top quartile total costs per patient by 18.67.
- Grant reliant by 2.46. While not significant, Northeastern health centers are 3.1 times more likely of being in the top quartile for grant reliance.

Health center staffing has shown to influence several models. In particular, the percent of behavioral staff employed at a health center was significant in four of the logistic regressions. With increased the odds for being in the top quartiles for having high costs and depending more on grants than patient revenue, it is logical that an increase in behavioral staffing would decrease a health centers odds of being in the top quartile for above average financial health. For a one unit increase in the percent of behavioral health staff, health centers:

- Were 1.23 times more likely to be in the top quartile for total cost per patient Were 1.07 times more likely to be grant reliant but the odds increased for being in the top quartile for grant reliance top by 1.18.
- Were 0.94 times less likely to be in the top quartile of health centers with the composite scores.

Non-physician clinician productivity was found to be significant in all of the logistic regression models. As the number of visits per non-physician clinician increased, health

centers were more likely to have better financial performance as the odds increased for being in the top quartile for operating margin, net revenue per encounter and the composite score. Non-physician clinician productivity was also to be found to be a protective effect considering, health centers were less likely to have more than one poor indicator by 0.03%; less likely to be in the top quartile for total cost per patient; and less likely to be grant reliant or even in the top quartile for grant reliance.

Patient characteristics were shown to influence financial performance as well. The percent of health center uninsured patients is found to be significant in five of the models. First, an increase in the uninsured patient percentage results in less chance to be in total cost per patient top quartile since health centers are not likely offer as expensive services and uninsured are less likely to seek care. The percent of uninsured patients also increases the likelihood of being in the top quartile for grant reliance. Due to lack of reimbursement and the sliding fee scale, a health center may result to seeking more grants to cover the costs of the uninsured patients. However the findings are conflicting when examining the odds for the composite score and having multiple poor indicators. For instance, the percent of uninsured patients increases the odds of having a composite score in the top quartile (in other words having z-scores indicating their scores are above the mean) by 1.03. However, it is also associated with increasing the odds of having multiple poor indicators by 1.02. The conflicting findings could be explained by how we defined a poor indicator is defined as being negative.

Unlike logistic regression models on the average outcome measures, multinomial logistic regression models looks at the consistency of financial performance. The multinomial logistic regression models examined the risk of having a fluctuating outcome

compared to a constant positive outcome and the risk of a constant negative outcome compared to a constant positive outcome. As the study shows, health centers, like any other non-profit organization, experience fluctuating financial performance outcomes such as operating margins. While the relative risk ratio results are available for being at risk for fluctuating outcomes in their respective sections, Table 35 presents the results for the risk of being constantly negative.

Table 35: Multinomial Logistic Regression Significant Results

	Risk of Being Constantly Negative or Grant Reliant			
	Operating Margin	**Net Revenue**	**Grant Reliance**	**Composite Score**
County Per Capita Income				+
% Uninsured in in Service Counties			+	
Number of RHCs in Service Counties				
West				
Number of Sites			+	
Number of Patients			-	
Migrant Grantee				-
Homeless Grantee				
% Behavioral Staff			+	+
% Enabling Staff			+	
Non-physician Clinician to Physician Ratio		-	+	
Non-physician Clinician Productivity			-	-
%Patients with Limited English Proficiency		-		
% Non-White Patients	-		+	
%Uninsured Patients			+	
% Medicaid Patients			-	
%Chronic Visits			+	
Private Insurance Reimbursement Rate			-	
% Health Center 330 Funding	+			-_

Unlike the other models, there is not much overlap in significant results. Consistent with the finding from the logistic regression, the percent of behavioral health increases the risk of having negative composite score and being consistently grant reliant.

The percent of patients with limited English proficiency is one patient characteristic that is particularly striking. Patients with limited English proficiency had a positive association with operating margin in the fixed effects model and a protective effect in the net revenue per encounter multinomial logistic regression. The two findings suggest that health centers are aware that these patients require additional resources and therefore health centers must seek additional funding to cover the costs for the additional services.

Just like the logistic regression for top quartile for net revenue per encounter and grant reliance, the ratio of non-physician clinicians to physicians is significant. However, the sign is the opposite for net revenue per encounter which confirms both the logistic regression and the fixed effect model findings. For grant reliance, the increase in the non-physician clinician productivity decreases the risk of being constantly grant reliant by 0.999 which could indicate it is not the number of non-physician clinicians employed at the health center, but how they are utilized. The increase in the non-physician clinician productivity decreases the risk of being constantly poor financial health as indicated with the composite score.

Not all factors can be controlled by the health center to improve their financial performance. However the study does find several organizational characteristics regarding reimbursement and the non-physician clinician productivity as common themes which a health center is able to control. These factors and others will be further discussed in the next chapter as well as their policy implications.

Chapter 5: Discussion, Policy Implications, and Conclusion

The health care environment is rapidly changing, and the Affordable Care Act (ACA) is expected to cause significant increases in the demand for primary care, particularly in low-income communities. The struggle to maintain the financial viability of our care-providing organizations has worsened in many ways.

As non-profit health care organizations, health centers are equally vulnerable to poor financial performance which places their ability to provide health services to vulnerable populations in jeopardy. Health centers have limited access to financial resources, capital and reserves which prohibit them from withstanding financial losses. As demonstrated in the study, health center performance fluctuates over the years. The underlying business model for health centers is complex. The fundamental trade-off between serving every patient without concern for their ability to pay in return for receiving federal grant subsidies and full-cost Medicaid reimbursement has proven workable for the majority of health centers. While the industry continues to grow through the expansion of existing health centers and the addition of new sites, it has achieved an operating scale that reflects its evolution from a small "movement" to a sizable industry group that has the maturity and capacity for a greater volume of private investment. While health centers may becoming an mature industry group, it is alarming of the number of health centers that had operating margins less than -5% and the magnitude of health centers reliance on grant funding as a revenue source.

The study sought to identify the environmental factors and organizational characteristics influencing the variation in performance (e.g., operating margin, net revenue per visit, grant reliance and cost per patient). The study hypothesized that a

number of county-level environmental factors influenced health center financial performance. While four out of the six environmental factors were found to be significant, they centered on the non-financial measures of total cost per patient and grant reliance measures. A county's income per capita increased the odds of being in the highest total cost per patient quartile which was not originally expected since individuals in the areas with higher income would have gone to other sources of care. Income per capita was also associated with grant reliance and found that it too increased a health center's reliance on grants during the time period. One would assume health centers sought grants to cover the costs of individuals with underinsurance.

The percent of uninsured individuals in a county also influenced both cost and grant reliance. As hypothesized, the uninsured percent was found to increase grant reliance as the Section 330 grant formula is partially based on the uninsured population. It also proved that total cost per patient increases as the uninsured increased negating the assumption health would seek grants to cover only core services. Health center could be dealing with more complicated patients since the uninsured tend to receive care in later stages of the diagnosis. An interesting finding was that ED per capita decreased total cost per patients suggesting that individuals are going to the ED for complex medical needs and use the health centers as a usual source of care. This confirms with other research findings showing health centers reduce ED visits in counties and produce cost savings. The number of FQHCs in a county lowered costs as access to care increases one would expect to have lower costs.

The study identifies which regions of the country that should be closely monitored for financial struggles. The Northeast was more likely to be in the top quartiles for having

the highest operating margin and net revenue encounters. It was also the region that had high odds of having the highest costs per patient. The West was also a region that had high odds of being the top quartile for the highest net revenue per encounter. The South is a region that needs to be monitored closely. It experienced the most financial hardship during the study period. Most health centers that were dropped from the study (Kentucky (1), Tennessee (1), North Carolina (2), South Carolina (2), Georgia, Florida, Alabama, and Mississippi) were located in the South. The South performed poorly in a number of performance indicators. For example, Southern health centers had a significant decrease in their operating margins in 2008 compared to at the start of the study period which indicates the recession their margins had a significant impact on the margins. Health centers located in the South may have more of organizational and environmental characteristics that put health centers more at risk for poor financial performance.

Health centers' patient composition in terms of race and ethnicity was thought to impact their financial due to the additional required services to address language barriers or unmeasured socioeconomic status, discrimination, cultures or presumed biological differences. Because of the additional services needed to care for these populations, the hypothesis was that there would be a detrimental effect. However, the opposite was found to be true. The higher the percentage for non-white and patients with limited English proficiency meant health centers could expect a protective effect of the odds of having a consistently negative margin and for every increase in percent would find an increase in operating margin.

Payer Mix data establishes a lens through which to assess changing market and revenue influences, i.e. interpreting trends derived from demographics(age, economic

status, chronic vs. acute, etc.) and possible reimbursement dependencies. Because Medicaid reimburses at higher rate than other third party payers and health centers have a large Medicaid patient population, it makes sense that reimbursement is positively associated with financial performance. One would not expect that private insurance reimbursement would be a significant association with a health center's operating margin considering the relative small private insurance patient population.

The health center staffing model had a significant impact on performance. Health centers with higher percentage of behavioral health and enabling services staff were more reliant on grants. This is troubling as behavioral health services within health centers have been growing rapidly over the last four years, as measured by corresponding visits and FTEs. It seems reasonable to anticipate that these two service areas will continue to grow – especially behavioral health, as health centers adopt a more integrated model of care. Enabling services have largely been considered non-reimbursable services. Health centers have an opportunity to include enabling services in reimbursement methods as payers move to a more integrated and coordinated care models. The same can be said for behavioral health services. The productivity of non-physician clinicians had a profound impact on performance as it was nearly significant in all the models. The finding concurs with a productivity study that found higher encounter cost were associated with lower non-physician productivity.[92]

Policy Implications

Although both major political parties agree that budgets must be controlled, the parties have divergent views on how to do so. Nonetheless, as dependents of Medicaid funding, health centers face financially constricting influences in public policy. This

unfortunate certainty will necessitate that non-profit organizations focus on mission-effectiveness and margin-efficiencies. In other words, success will depend on becoming "high-performing" health centers. To become high performing, health centers must know what should be improved before they can determine how to improve it. The process of creating information from data is mostly a matter of tracking the relationship between inputs and outputs over a specified period of time.

A high-performance learning institute could be established where a learning modality not unlike legendary Toyota Production Model could educate the executives of poorly performing health centers. Innovative tools such as decision support systems and expert systems not only can accomplish that goal, but also can generate the knowledge base and data-warehousing functionality to sustain the gains. Ultimately, an executive decision support system developed from the evidence-based modeling approach, could make continued accountability to stakeholders feasible and enable ongoing evaluation of financial performance. BPHC should consider creating grant opportunities for such technology and staffing much like the grants for service expansions.

What may be more challenging is the adjustment necessary to move from a predominantly fee-for-service reimbursement environment to a managed care and/or risk-based payment model. Across the nation, public and private sector entities are recognizing payment reform as a pivotal catalyst and support for a transformed health care system which includes the development of Patient-Centered Medical Homes (PCMHs), and dual eligible demonstration programs. It also includes states using the flexibility given with 1115 waivers and Affordable Care Act Section 2703 funding to better integrate and coordinate care. While health centers are well positioned to provide

quality ‘patient-centered’ care, they will need to adjust from a reimbursement system that rewards more services to one that rewards better health outcomes. States may use an Alternative Payment Methodology (APM) agreed upon with the health center, but it must result in a payment to the health center that is at least equal to the amount to which it is entitled under the PPS. In a number of states, health centers are receiving supplemental payments on top of a PPS payment for either providing PCMH services or achieving performance on identified metrics. However, in the case of health centers, the statute does not allow states to pay underperforming health centers a rate less than the calculated PPS and states possess a limited set of tools to address consistently underperforming health centers. In fact, this notion runs contrary to the policies and processes states can employ with all other service categories and conflicts with general statutory requirements for Medicaid payments to be consistent with efficiency, economy, and quality of care. There needs to be flexibility and balance around allowing health centers to assume responsibility for more risk in their reimbursement models that transitions away from encounter based reimbursement, but also to ensures health center remain actuarial sound and does not jeopardize health centers pivotal role in the safety net. As payers seek to change the delivery system to become more efficient, reimbursement should be flexible to encourage the use of non-physician clinicians. Overall payment levels still need to be adequate to cover costs. Medicaid payments do not fully cover the costs of care and efforts to trim Medicaid payments to control costs could have harmful effects on health centers.

As many payers including Medicaid begin to transition to value-based purchasing, health centers must be able to demonstrate with data the overall systems savings,

improved access, and quality that accrue to the system from their care. Health centers will need to develop a robust set of analytic capabilities to support the assessment of payment reform opportunities and demonstrate the value they can contribute. Payment reform methodologies are heavily dependent on the availability of detailed and reliable data. Health centers will need access to inpatient, specialty care, long-term care, and ancillary data that has historically fallen outside their purview in order to understand the total cost of care and associated utilization drivers of their patient populations, and to assess their own successes and challenges in a transforming delivery system. Health centers will need to invest in staffing or technology resources that allow them to make full use of the data. In addition to data, staffing and technology, health centers will need to form partnerships with other health care provider groups as well as organizations and sectors that can impact social determinants, such as social services. In order to achieve these needs, health centers will need to invest their limited resources. An option could be for BPHC to factor in these needs when awarding new grants or providing direct technical assistance to explore opportunities for health centers as they pursue alternative payment models and new workflow capacity.

While Medicaid payments are more generous than Medicare or private insurance payments, private insurance reimbursement was found to influence health center performance. Health centers need to pursue contracts with private insurers to add a fee adjustment, so that low-income private users will not be such a burden on health center finances. In the Exchanges, QHPs must contract with at least one health center per county, and can negotiate payment rates with that health center. If a QHP does not include a health center in its network, it is expected to pay the health center its Medicaid

PPS rate. When negotiating potential contracts with QHPs, health centers should ensure that the QHPs are aware of the out-of-network provision and may help health centers negotiate adequate payment rates. Another scenario is to ask the BPHC to factor private insurance shortfalls into their annual health center grant. These shortfalls only take money away from the original targets of health center grants - the uninsured. In the current health care climate, private insurance is becoming increasingly limited in scope and in payments, so it makes sense that health centers would need money to support activities that will bring low-income privately insured patients into the health center for the health care they need.

Health centers' unique delivery model utilizes multiple health professionals with varied skills to increase capacity, reduce barriers, and thereby amplify access to essential, comprehensive primary care in their communities. Health centers are increasingly using NPs, PAs, and CNMs in the provision of primary and preventive care. The study found that the productivity of non-physician clinicians has a positive impact on financial performance not only improving operating margins and net revenue per encounter but also lowering total cost per patient. However, it was not the number of non-physician clinicians that were employed, but their utilization in the staffing model.

One option to meet primary care demands and ensure health centers continue to be financially viable is to expand the scope and standards of practice for care team members who are not physicians. Generally, the scope of practice refers to procedures, actions, and processes that a healthcare provider is permitted to perform, and is defined by state boards of medicine, nursing, or other professional boards, often with instruction by the state legislature. States can provide guidance on how providers are reimbursed by

Medicaid, how they are licensed, what they are authorized to do (e.g. sign death certificates, or certify disability), where they can practice, and whether they can practice independently. State legislation has included authorizing the type of services that a specific provider can provide, allowing licensure or reimbursement of certain practitioners for specific services, or investing in training that would expand the role of that practitioner. Expanding the scope of practice would improve access to and quality of primary care services and contribute to lower per-patient costs of care, generating significant savings to patients, payers, and taxpayers.[141]

Health centers are faced with a number of factors that influence their financial performance, but are not able to control. The Section 330 grant is designed to supplement payments from patients and insurers, so that health centers can provide uncompensated care to their target population. However, the grant is almost entirely based upon the center's caseload of uninsured patients and historical funding decisions. It does not incorporate factors such as underinsurance and non-reimbursable costs, demographics and environmental changes that may drive costs and increase demand for services. The study did not find factors that had a detrimental impact on operating margin and net revenue per encounter. BPHC could monitor and make grant adjustments based on the factors that were positively associated with performance. Any decreases in patient demographics such non-white patients or patients with limited English proficiency should be a red flag as an indicator that the health center may experience a

BPHC will need to be cautious about any increase in grants since a stated goal for health centers to become as self-sufficient as possible. Health centers have become more reliant on grants as a result of ARRA. With additional funding from the ACA, health

centers may rely more on those grants than seeking reimbursement from third party payers. One reason health centers are more reliant is due to the current funding formula as those health centers that had a larger percentage of uninsured patients and had more uninsured population in the counties they served were more likely to be grant reliant. Health centers were also likely to have higher odds of being grant reliant with higher percentage of behavioral health and enabling services staff. Grant dollars are being used to cover non-reimbursable services such as enabling services. Approximately a third of Medicaid programs report care coordination and case management services are not reimbursable under any payment methodology.[142] As states are pursing delivery transformation initiatives to better integrate and coordinate care, health centers have an opportunity to incorporate enabling services into reimbursement methodologies or at least the flexibility in the design that would allow the services to be covered. Behavioral health also presents an opportunity to for health centers to be more self-sufficient. Currently, there is a disparity in the way insurance companies reimburse behavioral health care at lower provider reimbursement rates than physical health care. The ACA contains many provisions aimed specifically at improving coverage for mental health services. Most private insurance plans must now offer a variety of free preventive services without charging a copayment or coinsurance. One of the most sweeping changes in the ACA is the expansion of the Mental Health Parity and Addiction Equity Act (MHPAE) of 2008. While the 2008 law represented a significant step forward in requiring coverage for mental illness to be comparable to that for physical ailments, there were many holes. MHPAE did not mandate mental health coverage; such coverage only applied to plans that had already opted to provide some mental health coverage. The ACA, in contrast,

identified mental health and substance use treatment as one of the ten "essential health benefits" for all health insurance plans in the individual and employer market. There needs to improvement in the historically low behavioral health reimbursement rates.

Study Limitations

Despite many of the advantages of the research design and the statistical methods used in this study, there are some important limitations to the research. This section describes these limitations.

Measurement Error Bias. The difference between accounting practices and UDS reporting was a limitation. Due to revenues and expenses being calculated differently (cash based revenue versus accrued costs), borderline centers may have been misclassified because of this method of reporting. This problem was addressed by pooling data over time for part of the analysis as well as the use of quartiles in order not to misclassify several performance categories that could underestimate the relationships between the independent variables and performance. This study might also include collection of billing data and other items that are not captured in the UDS.

Selection Bias. The study only included 897 health centers that were existing from 2005 to 2009. However there were 224 health centers that excluded from the study because 22 of them closed and 202 came into existence after 2005. The closed health centers would be an interesting subset to study, however, the group is too small to conduct any statistical analysis of the group. A qualitative study with interviews or health center or BPHC to understand what led to the closure. However with only 22 health centers that closed during the study period should indicate the resiliency of health centers. The financial performance of the 202 health centers could potentially impact the findings since they are new and came about during the economic recession.

Multicollinearity and Endogeneity. Due to the number of independent variables, there may issues with multicollinearity and endogeneity. Multicollinearity inflates the standard errors, making it impossible to determine the relative importance of the predictors. To remove collinearity from the model, one can remove highly correlated independent variables from the model. Correlation matrix revealed three groups of variables to be moderately correlated:

1) The number of delivery sites and number of patients were positively correlated (0.51);
2) The percent of primary care physicians in a served county and urban status were negatively correlated (-0.56); and
3) The patients with incomes under 100% FPL and patients with incomes above 200% were negatively (-0.63).

Endogeneity problem occurs when an explanatory variable is correlated with the error term. Endogeneity can arise as a result of measurement error, autoregression with autocorrelated errors, simultaneity and omitted variables. Two common causes of endogeneity are: 1) an uncontrolled confounder causing both independent and dependent variables of a model; and 2) a loop of causality between the independent and dependent variables of a model. Another issue that may arise due to the large number of variables in the model is that some of the findings, especially those with p between 0.05 and 0.01 might be due to chance and multiple testing.

Omitted Variable Bias. One of the biggest limitations to quantitative research in general and this study in particular is omitted variable bias. Many concepts and trends that are important determinants of social and economic outcomes simply do not lend

themselves to empirical measurement. In several places, this study has discussed the fact that there are cultural norms and ethos that are important determinants. The most serious consequences of omitted variables bias is its potential to bias the coefficients of variables included in the analyses. The lack of ability and availability to measure organizational culture and leadership could impact health center performance. The fact that some models had a R^2 that ranged from 0.08 to 0.17 indicates that there are variables that were not included that could potentially explain the variance. In addition to organizational culture and leadership, regional differences were pronounced throughout the study especially in the South. It is not clear what regional characteristics influence performance which could include not only socioeconomic and demographic factors but political factors as well.

No patient-specific data was used in the study. It is likely that the variability of performance may be accounted for by the variability of patients' health status and outcomes. Valid indicators of health centers' quality of care were lacking in the UDS in the study period. Today, health centers report on numerous clinical outcome measures similar to the National Committee of Quality Assurance (NCQA) Health Plan Employer Data and Information Set (HEDIS) scores in the UDS. These measures could be used to assess performance in terms of their quality of care. Unfortunately, however, no such data are available for assessing the quality of care or effectiveness of the health center delivery system. That serious shortcoming prevents comprehensive performance assessment of health centers.

Another omitted variable is the presence of health professional training programs. An inadequate primary care workforce has implications for the quality and cost of health

care. To support residency training, Medicare provides teaching hospitals approximately $10 billion annually. The primary care workforce is doubly disadvantaged in this situation. Health centers generally use patient-related revenue to fund for training activities. These training activities place budgetary constraints on health center operations.

Recommendation of Future Research

While this study was able to address many questions about health centers and their performance, there are even more possibilities to be considered in terms of further research. This section discusses new approaches that could be utilized, as well as the significance of the time period included in the study, changes in policy that should be pursued and monitored, and new strategies for data analysis.

As mentioned in Chapter 3: Methods, the current analysis dataset for 2005 to 2009 was chosen to examine health center operations for various reasons including prior to major policy change due to the ACA. In 2005, many health centers had implemented a prospective payment system (PPS), and the Bush Administration had increased health center funding from BPHC. Because of the increased investment in health centers occurring after 2010, a similar study conducted in 2010 to 2014 might exhibit very different findings, or measure the success of the new investment in health centers in terms of financial performance. Also, 2005 to 2007 data represents good economic conditions for health centers and the country. While the study captured the recession impacts in 2008 and 2009, it would be of interest to extend the study to examine the lingering effects of the recession on health centers and their communities. While this study was intentionally designed to examine performance prior to ACA implementation,

another study could examine subsequent years to assess the impact of implementation on performance and include variables on different aspects of the ACA such as Medicaid expansion, private insurance expansion through exchanges and implementation of a Medicare PPS for health centers.

In addition, a qualitative component should be conducted to gain insight from various stakeholders on how the study findings should be interpreted as well as to gather views on certain measures that are not available in administrative datasets such as organizational culture and leadership. These interviews would also be able to get an operational viewpoint that an individual simply cannot gain from quantitative data. The future study should establish separate panels for new health centers that are funded during the study period that may otherwise be excluded because they would not create a balanced panel. This study was the first study examining performance to take into consideration a health center service area using county-level data. Future research should explore smaller geographic areas since health center operations occur at a more granular level than at the county level. While this study looked into different opportunities for smaller geographic areas (American Community Survey and Dartmouth Atlas), the data was not available for the first few years of the study or was pooled and could not be used for the fixed effects models.

One other recommendation would to include health outcome measures as a part of factors that influence performance. The UDS has included several new clinical quality performance measures either the same or slightly modified national measures. Health centers must be able to balance financial viability while producing outcomes that meet or exceed stakeholder expectations. The inclusion of quality measures better measure health

center value to all its stakeholders and would serve the disparate interests of managers, patients, and third-party payers.

The more research conducted to measure the impact of their performance or service provision will only strengthen our understanding of the health centers resilience and durability of balancing their mission with their financial viability. Findings suggest there is no "silver bullet" in defining performance or the factors that contribute to it, but does shine a light on what were health center cost drivers and grant reliance. Stakeholders may find the study helpful in managing health center expansions in a changing health care landscape as well as dealing with future policy issues around payment and delivery system reform. Health centers are non-profits, so there should be no surprise that their financial performance should fluctuate between the years. Fluctuations can also occur as health centers try to hold down costs one year to build up reserves for recruiting purposes or capital improvements. Reimbursement especially from Medicaid has been found to be essential since these rates do not cover the costs of care. Any attempts to cut or restructure payments could be harmful to a health center's ability to accomplish its mission. Health centers not only face threats on reimbursement, but have grown reliant on grants. The threat of losing the Health Center Trust Fund would deteriorate health centers are a play a pivotal role in providing access to millions of patients.

References

1. Tuckman, Howard P., and Chang, Cyril F. A Methodology for Measuring the Financial Vulnerability of Charitable Nonprofit Organizations. *Nonprofit and Voluntary Sector Quarterl*y. 1991; 20 (4): 445-460.

2. Korkki P. Health costs: More burden on the worker. *New York Times*. September 13, 2008. Available at: http://www.nytimes.com/2008/09/14/business/14count.html. Accessed May 16, 2016.

3. Johnson L. Budget crunch could reduce TennCare rolls. Associated Press. November 25, 2008. Available at http://www.tennessean.com/article/20081125/NEWS0201/811250367/1009/NEWS02. Accessed October 6, 2011.

4. Lewin ME, Altman S, eds. *America's Health Care Safety Net: Intact but Endangered*. Washington, DC: National Academies Press; 2000.

5. United States Government Accountability Office. Community Health Centers: Adapting to Changing Health Care Environments Continued Success. HEHS-00-39. http://www.gao.gov/assets/230/228884.pdf. Published March 2000. Accessed October 17, 2011.

6. United States Government Accountability Office. Health Center Program: Improved Oversight Needed to Ensure Grantee Compliance with Requirements. GAO-12-546. http://www.gao.gov/products/GAO-12-546. Published: May 29, 2012. Accessed May 16, 2016.

7. McKevitt D, Lawton A. *Public Sector Management: Theory, Critique and Practice*. London: Sage Publications Ltd;1994.

8. Streeter S, Braithwaite S, Ipakchi N, Johnsrud M. The Effect of Community Health Centers on Healthcare Spending & Utilization. https://www.nachc.com/client/Avalere_NACHC_Report_Final_10.2.09.PDF. Published September 2009. Accessed May 16, 2016.

9. Hawkins D and Groves D. The Future Role of Community Health Centers in a Changing Health Care Landscape. *Journal of Ambulatory Care Management. 2011; 34*(1), 90-99 *28*(4): 295-303. DOI:10.1097/JAC.0b013e3182047e87

10. Lefkowitz, B. The health center story: Forty years of commitment. *Journal of Ambulatory Care Management. 2005; 28*(4): 295-303. DOI: 10.1097/00004479-200510000-00004

11. P.L. 104-299; P.L. 107-251.

12. National Association of Community Health Centers. A Sketch of Community Health Centers: Chartbook 2012.Available at https://www.aoa.org/documents/advocacy/Chartbook%202012.pdf. Accessed May 16, 2016.

13. Health Resource and Services Administration. Bureau of Primary Health Care. 2011 Uniform Data Systems. Available at: http://bphc.hrsa.gov/healthcenterdatastatistics/nationaldata/index.html. Accessed June 15, 2014.

14. Wilensky, S, Proser, M. (2008). Community approaches to women's health: Delivering preconception care in a community health center model. *Womens Health Issues. 2008 Nov-Dec;18(6 Suppl):S52-60. doi: 10.1016/j.whi.2008.06.007.*

15. Analysis of 2001 - 2010 Uniform Data System, Health Resource and Services Administration. Bureau of Primary Health Care.

16. National Association of Community Health Centers. The Safety Net on the Edge. http://www.nachc.com/client//SafetyNetRPT.pdf. Published August 2005. Accessed May 16, 2016.

17. Allison, M, Kaye, J. *Strategic Planning for Nonprofit Organizations: A Practical Guide and Workbook* .2nd ed. New York: Wiley; 1997.

18. Bart, C, Baetz, M. The Relationship Between Mission Statements and Firm Performance: An Exploratory Study. *J Manage Stud*. 1998; 36(6): 823–853.

19. Kearns, K. *Managing for Accountability: Preserving the Public Trust in Nonprofit Organizations*. San Francisco, CA: Jossey-Bass; 1996.

20. Oster, S. S*trategic Management for Nonprofit Organizations: Theory and Cases*. New York: Oxford University Press; 1995.

21. Moore, M. Managing for Value: Organizational Strategy in For- Profit, Nonprofit, and Governmental Organizations. *Nonprofit and Voluntary Sector Quarterly*. 2000; 29:183–204.

22. Phillips RL, Bazemore A. Primary Care and Why It Matters for US Health System Reform. *Health Aff (Millwood)*. 2010; 29(5):806-10.

23. Ku L, Jones E, Shin P, Byrne, Long S. Safety-Net Providers After Health Care Reform: Lessons from Massachusetts. *Arch Intern Med. 2011;* 171(15):1379-1384.

24. Kaiser Family Foundation. Community Health Centers: Opportunities and Challenges of Health Reform. https://kaiserfamilyfoundation.files.wordpress.com/2013/03/8098-03.pdf. Published August 2010. Accessed May 2016.

25. Hing E, Hooker RS, Ashman JJ. Primary Health Care in Community Health Centers and Comparison with Office-Based Practice. *J Community Health*. 2011; 36(3):406-13.

26. Goldman LE, Chu PW, Tran H, Stafford RS. Federally Qualified Health Centers and Private Practice Performance on Ambulatory Care Measures. *Am J Prev Med*. 2012; 43(2):142-149.

27. National Association of Community. Health Centers. Community Health Centers Lead the Primary Care Revolution. http://www.nachc.com/client/documents/Primary_Care_Revolution_Final_8_16.pdf Published August 2010. Accessed May 17, 2106.

28. Dobson DaVanzo & Associates, LLC. The Economic and Clinical Impact of Community Health Centers in Washington State: Analyses of the Contributions to Public Health and Economic Implications and Benefits for the State and Counties. http://www.chnwa.org/PolicyAdvocacy/ResearchAndReports/Impact%20of%20WA%20health center%20System%2012-03-08.pdf. Published December 3, 2008. Accessed May 17, 2016.

29. Forbes D. Measuring the Unmeasurable: Empirical Studies of Nonprofit Organizational Effectiveness from 1977 to 1997. *Nonprofit and Voluntary Sector Quarterly*.1998;27: 183–202.

30. Tinkelman D, Donabedian B. Street Lamps, Alleys, Ratio Analysis, and Nonprofit Organizations. *Nonprofit Manag Leadersh*, 2007; 18(1): 5-18.

31. Financial Accounting Standards Board. Statement of Accounting Concepts No. 4. Objectives of Financial Reporting by Nonbusiness Organizations. http://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132686&acceptedDisclaimer=true. Published December 1980. Accessed May 17, 2016.

32. Ittner CD, Larcker DF. Coming Up Short on Non-Financial Performance Measurement. *Harvard Bus Rev.* 2003; 81(11): 88–95.

33. Fisher J. Use of Non-Financial Performance Measures. *J Cost Manag*. 1992; 6(1):1–8.

34. Hussey P, de Vries H, Romley J, et al. A Systematic Review of Health Care Efficiency Measures. Health Serv Res. 2009 Jun;44(3):784-805. doi: 10.1111/j.1475-6773.2008.00942.x.

35. Greenberg L. Efficiency in Health Care: What Does it Mean? How is it Measured? How can it be Used for Value Based Purchasing? https://www.academyhealth.org/files/publications/EfficiencyReport.pdf. Updated November 2006. Accessed May 16, 2016.

36. National Association of Community Health Centers. Health Centers and the Uninsured: Improving Health and Access to Care. http://www.nachc.com/client//UninsuredFS.pdf Published March 2012. Accessed May 2013.

37. Shin P, Rosenbaum S, Paradise J. Community Health Centers: The Challenge of Growing to Meet the Need for Primary Care in Medically Underserved Communities. http://hsrc.himmelfarb.gwu.edu/cgi/viewcontent.cgi?article=1048&context=sphhs_policy_ggrchn. Published March 2012. Accessed May 17, 2016.

38. Kaiser Commission on Medicaid and the Uninsured. The Medicaid Program at a Glance. https://kaiserfamilyfoundation.files.wordpress.com/2013/03/7235-061.pdf. Published March 2013. Accessed May 2017.

39. Kaiser Commission on Medicaid and the Uninsured. 2012. Five Key Questions About Medicaid And Its Role in State/Federal Budgets and Health Reform. https://kaiserfamilyfoundation.files.wordpress.com/2013/01/8139-02.pdf. Published May 2012. Accessed May 17, 2016.

40. National Association of Community Health Centers. 2009 Update on the Status of the Medicaid and CHIP Prospective Payment System in the States. https://www.nachc.com/client/2009%20PPS%20Report1.pdf. Published September 2009. Accessed May 17, 2016.

41. National Association of Community Health Centers. Calculating the Cost: State Budgets and Community Health Centers. http://www.nachc.com/client//2011%20State%20Funding%20Report%20SPR394.pdf. Published September 2011. Accessed May 17, 2016.

42. Rosenbaum S, Wilensky S, Shin P, Roby D. Managed Care and Health Centers: An Overview and Analysis. Prepared for the Health Services and Resource Administration, Bureau of Primary Care by the George Washington University.

ftp://nhsc.hrsa.gov/bphc/docs/2002pals/2002-08.pdf. Published May 2002. Accessed May 17, 2016.

43. Ku, L., Richard, P., Dor, A., Tan, E., Shin, P. and S. Rosenbaum. Strengthening Primary Care to Bend the Cost Curve: The Expansion of Community Health Centers Through Health Reform. https://publichealth.gwu.edu/departments/healthpolicy/DHP_Publications/pub_uploads/dhpPublication_895A7FC0-5056-9D20-3DDB8A6567031078.pdf. Geiger Gibson/RCHN Community Health Foundation Research Collaborative Policy Research Brief No. 19. Published June 30, 2010. Accessed May 17, 2016.

44. Sections 1301 and 1302 of the ACA

45. Institute of Medicine. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington, DC: National Academies Press; 2001.

46. Salsberg E, Grover A. Physician workforce shortages: implications and issues for academic health centers and policymakers. *Acad Med.* 2006; 81(9):782-7.

47. Wayne S, Timm C, Solan B, Kalishman S. Medical students' attitudes towards underserved populations: changing associations with choice of primary care versus non-primary care residency. *J Health Care Poor Underserved.* 2010;21(2):438-47

48. National Association of Community Health Centers, Robert Graham Center. "Access Denied: A Look At America's Medically Disenfranchised. http://www.nachc.com/client/documents/issues-advocacy/policy-library/research-data/research-reports/Access_Denied42407.pdf. Published March 2007. Accessed May

49. United States Government Accountability Office. Community Health Centers: Adapting to Changing Health Care Environment Key to Continued Success. HEHS-00-39. http://www.gao.gov/assets/230/228884.pdf. Published March 2000. Accessed May 17, 2016.

50. McLearney, JS. (2002) The Financial Performance of Community Health Centers, 1996-1999. Health Affairs March/April 2002 219-225.

51. Shi, L, Collins, PB, Aaron KF, Watters, V, Shah LG. Health center Financial Performance: National Trends and State Variation, 1998-2004. *J Public Health Manag Pract*. 2007 Mar-Apr;13(2):133-50.

52. Fiscella K, Williams DR. Health Disparities based on socioeconomic inequalities; implications of urban health care. *Acad Med*. 2004; 79:1139-1147.

53. Brecher, C, Forman M. Financial Viability of Community Health Centers. *J Health Polit Policy Law*. 1981 Winter;5(4):742-68.

54. Goldman F, Grossman M. The Production and Cost of Ambulatory Care in Community Health Centers. *Adv Health Econ Health Serv Res*. 1983;4:1-56.

55. Abrams R, Savela T, Trinity, MT, Falik M, Tutunjian B, Ulmer C. Performance of CHCs Under Managed Care. *J Ambul Care Manage*. 1995 Jul;18(3):77-88.

56. Lesser C, Duke K, Luft H. *Care for the Uninsured and Underserved in the Age of Managed Care*. New York, NY: The Commonwealth Fund, 1997.

57. Ortiz J, Fottier MD, Hofler R. Performance of Health Centers in Networks. Health Care Manage R. 2005; 30(2): 126-138.

58. Stuart ME, Steinwachs DM. Patient-Mix Differences among Ambulatory Providers and Their Effects on Utilization and Payments for Maryland Medicaid Users." *Med Care. 1993;* 31(12): 1119-1137.

59. Ku L, Richard P, Dor A, Shin P, Rosenbaum S. Using Primary Care to Bend the Curve: Estimating the Impact of a Health Center Expansion on Health Care Costs. http://hsrc.himmelfarb.gwu.edu/cgi/viewcontent.cgi?article=1024&context=sphhs_policy_ggrchn. Geiger Gibson/RCHN Community Health Foundation. Policy Research Brief No. 14. Published September 2009. Accessed May 17, 2016.

60. National Association of Community Health Centers, the Robert Graham Center, and Capital Link. Access Granted: The Primary Care *Payoff*. http://www.nachc.com/access-reports.cfm. Published August 2007. Accessed February 12, 2013.

61. Aldrich, HE. *Organizations and Environments*. Englewood Cliffs, NJ: Prentice Hall; 1979.

62. Lawrence PR, Lorsch JW. Differentiation and Integration in Complex Organizations. *Admin Sci Quart*. 1967; 12(1): 1-47.

63. Scott WR. The Organization of Environments: Network, Cultural, and Historical Elements. In: Meyer JW, Scott WR, eds. *Organizational environments: Ritual and Rationality*. Newbury Park, CA: Sage Publications: 1992 :155-175.

64. Tolbert, PS, Zucker LG. The Institutionalization of Institutional Theory. In: Clegg SR, Hardy C, Nord WR, eds. *Handbook of Organization Studies.* London, UK: Sage Publications; 1996: 175-190.

65. Scott, W. R. The Adolescence of Institutional Theory. *Admin Sci Quart. 1987;32*(4):493-511.

66. Fennell M ,Warnecke R. *Diffusion of Medical Innovation: An Applied Network Analysis.* New York: Plenum; 1998.

67. Gulati, R. *Managing Network Resources: Alliances, Affiliations, and Other Relational Assets*. Oxford, UK: Oxford University Press; 2007.

68. Provan K. Technology and Interorganizational Activity as Predictors of Client Referrals. *Acad Manage J.* 1984; 27(4):811-829.

69. Gammm L, Kassab C, Brannon S, Fennell M. Linkage Strategies of Rural Hospitals - Independent Hospital, Local Health System, and/or Externally Linked Facility. *Hosp Health Serv Adm.* 1996 Summer; 41(2):236-54

70. Fennell M, Alexander J. Organization Boundary Spanning in Institutionalized Environments. *Acad Manage J*. 1987; 30(3): 456-476.

71. Zuckerman H, D'Aunno T. Hospital alliances: Cooperative Strategy in a Competitive Environment. *Health Care Manage* R. 1990; 15(2): 21-30.

72. Aldrich HE, Pfeffer J. (1976). Environments of organizations. *Annu Rev Sociol. 1976; 2*:79-105.

73. Pfeffer J, Salancik, G R. *The External Control of Organizations: A Resource Dependence Perspective.* New York: Harper & Row, Publishers; 1978.

74. Tolbert P. Institutional Environments and Resource Dependence: Sources of Administrative Structure in Institutions of Higher Education. *Admin Sci Quart. 1985; 30*(1): 1-13.

75. Perrow C. Markets, hierarchies and hegemony. In: Vandeven AH, Joyce WF, eds. *Perspectives in Organizational Design and Behavior*. New York: Wiley; 1981: 371-386.

76. Scott WR. *Institutions and Organizations.* Thousand Oaks, CA: Sage; 1995.

77. Selznick, P. *TVA and the Grassroots. A Study in the Sociology of Formal Organizations.* Berkeley: University of California Press; 1949.

78. Cohen, M., March, J., & Olsen, J. (1972). A Garbage Can Model of Organizational Choice. *Admin Sci Quart. 1972; 17:1*-25.

79. DiMaggio P, Powell W. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *Am Sociol Rev*. 1983; 48(2): 147-160.

80. Oliver C. The Antecedents of Deinstitutionalization. *Organ Stud.* 1992; 13:563-588.

81. Meyer JW, Scott WR, Deal TE. Institutional and technical sources of organizational structure: Explaining the structure of educational organizations. In: Stein HD, ed. *Organization and the human services: Cross-disciplinary reflections*. Philadelphia, PA: Temple University Press; 1981: 151-179.

82. Scott T, Mannion R, Davies H, Marshall M. The quantitative measurement of organizational culture in health care: A review of the available instruments. *Health Serv Res*. 2003; 38 (3): 923-45.

83. Thompson JD. *Organizations in Action*. New York: McGraw-Hill; 1967.

84. Pfeffer J, and Salancik GR. *The External Control of Organizations*. New York: Harper & Row; 1978.

85. Alexander JA, Morrisey MA, Shortell SM. The efforts of competition, regulation, and corporatization on hospital-physician relationships. *J Health Soc Behav*. 1986; 27:220-35.

86. Alexander JA, D'Aunno TA. Alternative perspectives on institutional and market relationships in the U.S. health care sector. In: Mick S, Wyttenbach M, eds. *Advances in Health Care Organization Theory*. San Francisco: Jossey-Bass; 2003: 45-77.

87. Cook, K, Shortell S, Conrad D, Morrissey M. A Theory of Organizational Response to Regulation. *Acad Manage Rev*. 1983; 8(2): 193-205.

88. Scott WR, Ruef M, Mendel PJ, Caronna CA. *Institutional Change and Healthcare Organizations: From Professional Dominance to Managed Care*. Chicago: Chicago University Press; 2000.

89. Carey K, Burgess JF, Young GJ. Hospital competition and financial performance: the effects of ambulatory surgery centers. *Health Econ*. 2011; 20(5):571-81. doi: 10.1002/hec.1617.

90. Roby, DH. *An analysis of the characteristics of health centers facing financial deficits* [dissertation]. Washington DC: The George Washington University; 2006.

91. Marathe, S, Wan T, Zhang, J. (2007). Factors Influencing Community Health Centers' Efficiency: A Latent Growth Curve Modeling Approach. *J Med Syst.* 2007; 31:356-374.

92. Martin, BC, Shi L, Ward RD. Financial Performance and Managed Care Trends of Health Centers. *J Health Care Finance*. 2009; 35(3):1-21.

93. Shortell SM, Schmittdiel J, Wang MC, et al. An Empirical Assessment of High-Performing Medical Groups: Results from a National Study. *Med Care Res Rev*. 2005 62: 407

94. Lo Sasso A and Byck G. Funding Growth Drives Community Health Center Services. *Health Aff (Millwood).* 2010 Feb;29(2):289-96. doi: 10.1377/hlthaff.2008.0265.

95. Shi L, Collins PB, Aaron KF, Watters V, Shah LG. Health center financial performance: national trends and state variation, 1998-2004. *J Pub Health Man*. 2007; 13(2):133.

96. Harrison MG, Montalvo CC: The financial health of California hospitals: a looming crisis. *Health Aff (Millwood)* 2002, 21(1):118-126.

97. Salit S, Fass S, Nowak M: Out of the frying pan: New York City hospitals in an age of deregulation. *Health Aff (Millwood).* 2002, 21(1):127-139.

98. Coughlin TA, Liska D: Changing state and federal payment policies for Medicaid disproportionate-share hospitals. *Health Aff (Millwood).* 1998, 17(3):118-136.

99. Dranove D, White WD: Medicaid-dependent hospitals and their patients: how have they fared? *Health Serv Res.* 1998, 33(2 Pt 1):163-185.

100. Gaskin DJ, Hadley J, Freeman VG: Are urban safety-net hospitals losing low-risk Medicaid maternity patients? *Health Serv Res.* 2001, 36(1 Pt 1):25-51.

101. Gruber J: The effect of competitive pressure on charity: hospital responses to price shopping in California. *J Health Econ.* 1994,13(2):183-212.

102. Medicare Payment Advisory Commission. March 2004 Report to Congress: Medicare Payment Policy. http://www.medpac.gov/documents/reports/Mar04_Entire_reportv3.pdf?sfvrsn=0 Published March 1, 2004. Accessed May 2017.

103. Zwanziger J, Melnick GA, Bamezai A: The effect of selective contracting on hospital costs and revenues. *Health Serv Res*. 2000, 35(4):849-867.

104. Congressional Budget Office. CBO Memorandum: Budgetary Implications of the Balanced Budget Act of 1997 https://www.cbo.gov/sites/default/files/105th-congress-1997-1998/reports/bba-97.pdf. Published December 1997. Accessed May 17, 2016.

105. Zwanziger J Khan N, Bamezai A. The relationship between safety net activities and hospital financial performance. *BMC Health Serv Res*. 2010 Jan 14;10:15. doi: 10.1186/1472-6963-10-15.

106. Hawkins DR, Jr., Rosenbaum S. The Challenges Facing Health Centers in a Changing Healthcare System. In: Altman S, Reinhardt U, Shields A, eds. *The Future U.S. Healthcare System: Who Will Care for the Poor and Uninsured?* Chicago, IL: Health Administration Press; 1998.

107. Gifford K, Smith VK, Snipes D, Paradise J. A Profile of Medicaid Managed Care Programs in 2010: Findings from a 50-State Survey. https://kaiserfamilyfoundation.files.wordpress.com/2013/01/8220.pdf . Published September 2011. Accessed May 17, 2016.

108. Shi L, Frick KD, Lefkowitz B, Tillman J. Managed care and community health centers. *J Ambul Care Manage*. 2000 Jan;23(1):1-22.

109. Henderson T, Markus AR. Medicaid managed care: how do community health centers fit? *Health Care Financ R*. 1996;17(4):135.

110. Shi L, Starfield B, Xu J, Politzer R, Regan J. Primary care quality: community health center and health maintenance organization. *South Med* J. 2003;96(8):787.

111. Sinay T. Productive efficiency of rural health clinics: the Midwest experience. *J Rural Health.* 2001;17(3):239-250.

112. Hing, E., Hooker, R., & Ashman, J. (June, 2011). Primary Health Care in Community Health Centers and Comparison with Office-Based Practice. *J Comm Health*. 36(3):406-413

113. Dall, T., Chen, Y., Seifert, R., Maddox, P., & Hagan, P. (2009). The economic value of professional nursing. *Med Care*. 2009 Jan;47(1):97-104. doi: 10.1097/MLR.0b013e3181844da8.

114. Cho S, Ketefian S, Barkauskas V, Smith, D. The effects of nurse staffing on adverse events, morbidity, mortality, and medical costs. *Nurs Res*. 2003 Mar-Apr;52(2):71-9.

115. Hadley, J., Zuckerman, S, Iezzoni, L. Financial Pressure and Competition. *Med Care*, 1996 Mar; 34(3):205-19.

116. McCue, M., Mark, B., & Harless, D. Nurse staffing, quality, and financial performance. *J Health Care Finance*, 2003 Summer; 29(4):54-76.

117. Porter, M. *Competitive Strategy: Techniques for Analyzing Industries and Competitors.* New York, NY: Free Press; 1980.

118. Everhart D, Neff D, Al-Amin M, Nogle J, Weech-Maldonado R.. The effects of nurse staffing on hospital financial performance: Competitive versus less competitive markets. *Health Care Manage Rev.* 2013 Apr-Jun;38(2):146-55. doi: 10.1097/HMR.0b013e318257292b.

119. Prager, FJ, Cowen, CJ, Beare, J, et al. *Strategic Financial Analysis for Higher Education*.6th ed. New York: KPMG LLP; Prager, Sealy & Co., LLC; & BearingPoint; 2005.

120. Maher CS, Nollenberger, K. Revisiting Kenneth Brown's '10-Point Test'. *Government Finance Review*. October 2009: 61-66.

121. Kaiser Commission on Medicaid and the Uninsured. The Uninsured: A Primer. October 2012. http://www.kff.org/uninsured/7451.cfm

122. Hall A, Harris Lemak C, Steingraber H, et al. Expanding the definition of access: It isn't just about health insurance. *J Health Care Poor Underserved*. 2008;19:625-638.

123. Steinbrook R. Easing the shortage in adult primary care -- Is it all about money? *N Engl J Med*. 2009; 360:2696-2699.

124. Baicker K, Chandra A. Medicare spending, the physician workforce, and beneficiaries' quality of care. *Health Aff*. 2004 Jan-Jun;Suppl Web Exclusives:W4-184-97.

125. California HealthCare Foundation. Overuse of emergency departments among insured Californians. http://www.chcf.org/~/media/MEDIA%20LIBRARY%20Files/PDF/PDF%20E/PDF%20EDOveruse.pdf. Published October 2006. Accessed May 17, 2016.

126. Petterson S, Rabin D, Phillips RL, Bazemore A, Dodoo MS. Having a Usual Source of Care Reduces ED Visits. *Am Fam Physician*. 2009 Jan15; 79(2):94.

127. McMorrow, S., Zuckerman, S. Expanding Federal Funding to Community Health Centers Slows Decline in Access for Low-Income Adults. *Health ServRes*. 2014; 49(3): 992-1010.

128. California Primary Care Association. Value of community health centers study: Partnership Health Plan of California Case Study. http://www.cpca.org/cpca/assets/File/Announcements/2013-01-29-ValueofCHCStudy.pdf. Published January 2013. Accessed February 12, 2013.

129. Hossain MM and Laditka JN. "Using hospitalization for ambulatory care sensitive conditions to measure access to primary health care: an application of spatial structural equation modeling. *Int J Health Geogr*. 2009 Aug 28;8:51. doi: 10.1186/1476-072X-8-51

130. LaVeist TA. Beyond dummy variables and sample selection: what health services researchers ought to know about race as a variable. *Health Serv Res.* 1994;29(1):1.

131. Cutler DM, Lleras-Muney A, Vogl T. Socioeconomic Status and Health: Dimensions and Mechanisms. http://www.nber.org/papers/w14333.pdf . National Bureau of Economic Research Working Paper w14333. Published September 2008. Accessed December 2012.

132. Otten Jr MW, Teutsch SM, Williamson DF, Marks JS. The effect of known risk factors on the excess mortality of black adults in the United States. *JAMA.* 1990;263(6):845.

133. Roach JL, Turenne MN, Hirth RA, Wheeler JRC, Sleeman KS, Messana JM. Using race as a case-mix adjustment factor in a renal dialysis payment system: potential and pitfalls. *Am J Kidney Dis.* 2010;56(5): 928-936.

134. Greene, W. H. *Econometric Analysis*. 2nd ed. Englewood Cliffs, New Jersey: Prentice-Hall, Inc; 1993.

135. Rabe-Hesketh, S., & Skrondal, A. Multilevel and Longitudinal Modeling Using Stata. College Station, Texas: Stata Press; 2005.

136. Baltagi, BH. *Econometric Analysis of Panel Data*. 5th ed. Chichester, UK: Wiley; 2013

137. Hennekens C, Buring J. *Epidemiology in Medicine*. Philadelphia, PA: LippincottWilliams and Wilkins; 1987.

138. Garrision, G.D. *Logistic Regression: Binary and Multinomial.* 2014 ed. Asheboro, NC: Statistical Publishing Associates; 2014.

139. Beck N, Katz JN, Tucker R.: Taking Time Seriously: Time-Series-Cross-Section Analysis with a Binary Dependent Variable. *Am J Pol Sci*. 1998; 42(4): 1260-1288.

140. Wooldridge, J. *Introductory Econometrics: A Modern Approach*. 2nd ed. Mason, OH: South-Western College Pub; 2003.

141. Bauer JC. Nurse practitioners as an underutilized resource for health reform: evidence-based demonstrations for cost-effectiveness. *J Am Acad Nurse Prac* 2010; 22:228-231.

142. National Association of Community Health Centers. 2014 Update on Implementation of the FQHC Prospective Payment System (PPS) in the States. http://www.nachc.com/client/2014%20pps%20report%20LE%20Edits%202%2020%2015.pdf. Published December 2014. Accessed May 17, 2016.

Appendix Table of Contents

Appendix A – Operating Margins

Appendix B – Net Revenue Analysis

Appendix C – Grant Reliance Analysis

Appendix D – Total Cost of Care

Appendix E– Fixed Effects Diagnostic Tests

Appendix A – Operating Margins

There are few differences between the means of health center characteristics. Over the five year study period, the mean difference gap between urban and rural health centers had increased over the years. In 2008, rural health centers had significantly higher operating margins than urban health centers with a mean difference in margins of 2.01 percentage points due urban areas most impacted by the recession. Migrant Health Centers had significantly higher margins than their counterparts (Community, Homeless, and Public Housing Health Centers) for three years with margins more than 2 percentage points higher in 2005 (3.04), 2007 (2.73) and 2008 (2.21). Beginning in 2008, health centers that did not have a majority of Medicaid patients had slightly better margins than those with Medicaid composing the majority of their patient volume. Health center financial performance had regional variations as well. Health centers in the West seemed to fare better than health centers in other parts of the country especially during the recession.

Table A-1: Operating Margin Mean Difference by Health Center Characteristics

Mean Std Dev LCI UCI	Urban Status	Community Health Center	Migrant Health Centers	Homeless Health Centers	Public Housing Health Centers	New Health Center	Majority Medicaid Patient Volume	Northeast	South	Midwest	West
2005	0.81 0 .87 -0.90 2.51	-1.19 2.25 -5.66 3.28	-3.04* 1.02 -5.05 -1.04	-0.32 1.34 -2.96 2.32	-0.48 1.80 -4.11 3.16	0.36 1.61 -2.82 3.54	-0.89 1.26 -3.37 1.60	0 .46 1.21 -1.93 2.85	-0.39 0.84 -2.03 1.25	1.58 1.31 -1.00 4.15	-0.99 1.03 -3.01 1.02
2006	1.12 0 .89 -0.62 2.87	0.38 2.35 -4.29 5.05	-2.62 0.86 -4.31 -0.92	1.52 1.49 -1.42 4.47	-0.93 1.87 -4.71 2.84	0.42 1.35 -2.25 3.08	1.35 1.58 -1.78 4.48	0.18 1.23 -2.24 2.60	0 .04 0.85 -1.62 1.71	0.33 1.21 -2.05 2.71	-0.41 1.11 -2.59 1.77
2007	2.49 1.06 0.42 4.56	-3.33 3.35 -9.98 3.32	-2.73* 0.90 -4.51 -0.96	2.96 1.93 -0.85 6.77	0.84 2.15 -3.50 5.17	0.90 1.27 -1.61 3.41	-1.32 1.65 -4.59 1.95	-0.31 1.13 -2.54 1.93	0.84 1.025 -1.16 2.85	0 .10 1.47 -2.79 3.00	-0.89 1.34 -3.51 1.74
2008	2.01* 0.89 0.26 3.76	-2.38 2.81 -7.96 3.20	-2.21* 0.90 -3.98 -0.43	1.32 1.44 -1.51 4.15	2.01 2.14 -2.30 6.32	-0.44 1.25 -2.90 2.03	0.20 1.17 -2.11 2.51	1.80 1.09 -0.35 3.95	1.52 0.92 -0.29 3.34	-0.67 1.09 -2.82 1.49	-2.47* 0.99 -4.42 -0.512
2009	1.66 0.89 -.09 3.41	-0.59 3.43 -7.42 6.23	-0.17 1.05 -2.23 1.89	2.02 1.56 -1.05 5.10	1.52 1.31 -1.11 4.14	-0.68 1.12 -2.89 1.52	0.47 0.97 -1.45 2.39	-0.20 0.98 -2.12 1.72	0.76 0.90 -1.00 2.52	-1.02 1.01 -3.02 0.97	-0.02 1.22 -2.43 2.38

Note: p-value: * <0.05 and **<0.001

A logistic regression, as demonstrated in Table A-2 predicts health centers with negative margins. There are only two variables that are statistically significant at the 0.05 level. Both the percent of non-white patients and the Medicare reimbursement rate are negatively associated with negative margins. The model indicates that a one percentage point increase in the non-white health center population would decrease the odds of having a negative margin by 0.01%. The model also indicates the same is true for the Medicare reimbursement rate.

Table A-2: Logistic Regression Predicting Health Centers with Negative Margins

Number of Observations	850		
Chi^2	46.67		
$Prob>Chi^2$	0.0454		
Psuedo R^2	0.0429		
Log Likelihood	-557.29626		
	Odds	SE	Sig
Per Capita Income	1.000	0.000	
Percent Uninsured	1.015	0.021	
Number of FQHCs	1.004	0.004	
Number of RHCs	1	0.006	
Percent PCP in Service Counties	0.991	0.008	
Emergency Department Visits per capita	1.538	1.072	
Northeast	0.703	0.21	
Midwest	0.809	0.207	
West	0.649	0.151	
Urban Status	1.054	0.248	
New Health Center	1.141	0.251	
Number of Sites	0.982	0.013	
Number of Patients	0.993	0.007	
Migrant Grantee	0.856	0.21	
Homeless Grantee	1.306	0.298	
% Dental Staff	1.002	0.014	
% Behavioral Staff	1.004	0.015	
% Enabling Staff	0.987	0.012	
Non-physician Clinicians to Physician Ratio	0.972	0.025	
Non-physician Clinician Productivity	1.000	0.000	
Patients w/ Limited English Proficiency	1.001	0.005	
% Non-White Patients	0.994	0.003	*
% Patients under 100% FPL	1.007	0.007	
% Patients above 200% FPL	1.006	0.011	
% Uninsured Patients	0.991	0.008	
% Medicaid Patients	0.994	0.009	
% Female Patients	1.015	0.014	
%Chronic Visits	0.988	0.012	
Medicaid Reimbursement Rate	0.997	0.003	
Private Insurance Reimbursement Rate	0.993	0.005	
Medicare Reimbursement Rate	0.993	0.004	*
% Health Center 330 Funding	0.999	0.007	

Appendix B: Net Revenue per Encounter

The t-test results in Table B-1 compare the net revenue per encounter between different health center characteristics. There are few differences between the mean net revenue per encounter across the health center characteristics. While rural health centers generally had larger net revenue per encounter, the only year that there was a significant difference was in 2008. Migrant Health Centers had significantly higher net revenue per patient than their counterparts (Community, Homeless, and Public Housing Health Centers) in 2005. After examining mean difference of margins by region, health centers in the West seemed to fare better than health centers in other parts of the country especially during the recession. In 2008, the mean difference between other health centers' net revenue per encounter was $4.82 lower than western health centers. Also in 2008, health centers in the Northeast experienced lower net revenue per encounter than other health centers with a different of $3.40.

Table B-1: Net Revenue per Encounter Mean Difference by Health Center Characteristics

Mean Std Dev LCI UCI	Urban	Community Health Center	Migrant Health Centers	Homeless Health Centers	Public Housing Health Centers	New Health Center	Majority Medicaid Patient Volume	Northeast	South	Midwest	West
2005	-0.687 2.699 -5.987 4.614	4.000 4.637 -5.192 13.19	-4.403* 2.021 -8.372 -0.433	-4.594 3.039 -10.576 1.387	-1.334 3.357 -8.071 5.403	3.112 8.521 -13.745 19.968	-3.649 2.618 -8.806 1.508	-0.218 2.293 -4.726 4.289	-1.434 2.452 -6.247 3.379	0.701 2.28 -3.78 5.181	1.331 4.487 -7.503 10.16
2006	0.126 1.597 -3.009 3.261	3.958 3.549 -3.083 10.99	-2.751 1.607 -5.915 0.412	-0.374 2.318 -4.942 4.193	-0.179 3.448 -7.145 6.78	-0.712 2.986 -6.613 5.188	2.533 2.606 -2.622 7.687	-1.213 1.9 -4.957 2.531	0.637 1.452 -2.212 3.486	1.009 1.839 -2.611 4.628	-0.731 2.368 -5.392 3.930
2007	2.949 1.948 -0.874 6.773	-3.13 4.238 -11.539 5.279	-2.492 1.597 -5.629 0.645	2.419 2.571 -2.643 7.48	0.52 3.854 -7.243 8.281	0.880 2.175 -3.406 5.166	-2.289 2.308 -6.842 2.264	-0.351 1.908 -4.106 3.403	1.683 1.744 -1.739 5.106	-0.019 2.198 -4.345 4.306	-1.77 3.068 -7.81 4.269
2008	2.868* 1.358 0.2038 5.53	-1.767 3.175 -8.076 4.542	-1.741 1.475 -4.646 1.164	1.096 1.807 -2.462 4.654	2.341 3.222 -4.131 8.813	-1.283 2.00 -5.231 2.665	1.039 1.773 -2.460 4.537	3.402* 1.551 0.346 6.457	2.57 1.369 -0.118 5.257	-0.53 1.69 -3.858 2.798	-4.832** 1.697 -8.170 -1.494
2009	3.55 2.135 -0.643 7.7	0 .773 4.752 -8.668 10.213	0.892 1.894 -2.833 4.615	3.537 2.417 -1.218 8.291	4.105 2.434 -0.75 8.959	-0.082 2.298 -4.610 4.446	1.822 1.896 -1.907 5.552	0.345 1.756 -3.107 3.797	3.251 1.845 -0.374 6.872	-1.416 1.863 -5.078 2.246	-3.057 3.36 -9.679 3.565

Table B-2: Logistic Regression Predicting Negative Net Revenue

Number of Observations	850		
Chi^2	38.93		
$Prob>Chi^2$	0.186		
Psuedo R^2	0.038		
Log Likelihood	-552.58625		
	Odds Ratio	SE	Sig
Per Capita Income	1	0	
Percent Uninsured	1.02	0.021	
Number of FQHCs	1.001	0.004	
Number of RHCs	0.997	0.007	
Percent PCP in Service	0.993	0.008	
Emergency Department Visits	1.374	0.963	
Northeast	0.799	0.241	
Midwest	0.918	0.237	
West	0.82	0.193	
Urban Status	1.01	0.238	
New Health Center	0.921	0.205	
Number of Sites	0.984	0.013	
Number of Patients	0.997	0.007	
Migrant Grantee	0.83	0.205	
Homeless Grantee	1.339	0.306	
% Dental Staff	1.004	0.014	
% Behavioral Staff	0.999	0.015	
% Enabling Staff	0.99	0.012	
Non-physician Clinicians to	0.959	0.034	
Non-physician Clinician	1.000	0.000	
% Patients w/ Limited English Proficiency	1.000	0.005	
% Non-White Patients	0.994	0.003	*
% Patients under 100% FPL	1.01	0.007	
% Patients above 200% FPL	1.004	0.011	
% Uninsured Patients	0.988	0.008	
% Medicaid Patients	0.991	0.009	
% Female Patients	1.013	0.014	
%Chronic Visits	0.992	0.012	
Medicaid Reimbursement Rate	0.995	0.003	
Private Insurance Reimbursement Rate	0.993	0.005	
Medicare Reimbursement Rate	0.993	0.003	*
% Health Center 330 Funding	0.997	0.007	

Appendix C: Grant Reliance

The t-test results in Table C-1 demonstrate that the only difference between the mean grant reliance across the health center characteristics occurred in 2005. Compared to other health centers designations, Community Health Centers and Public Housing Health Centers were less grant reliant, with a mean difference in the ratio of 49.2 and 4.3 respectively. Homeless Health Centers were more reliant on grants as a revenue source with a mean difference in the ratio 17.3 compared to other health center designations. The difference between health centers with a Medicaid majority patient volume and those with a minority of Medicaid patients grant reliance ratio was 5.6. A higher percentage of Medicaid patients – which would bring in a higher reimbursement rate compared to other payers – doesn't make health centers less reliant on grants.

Table C-1: Grant Reliance Mean Difference by Health Center Characteristics

Grant Reliance	Urban	Community Health Center	Migrant Health Centers	Homeless Health Centers	Public Housing Health Centers	New Health Center	Majority Medicaid Patient Volume	Northeast	South	Midwest	West
2005	-4.816 3.367 -11.429 1.796	49.186** 16.567 16.241 82.132	-4.993 4.707 -14.285 4.299	*-17.257** *8.497* *-34.037* *-0.477*	4.285** 1.814 0.725 7.845	.0713 2.598 -5.033 5.175	5.621** 1.918 1.856 9.387	2.240 2.940 -3.542 8.022	-5.183 4.059 -13.163 2.798	3.748 2.176 -.522 8.017	1.963 2.856 -3.643 7.569
2006	-176.570 158.161 -487.424 134.285	937.122 781.997 -617.182 2491.426	96.508 90.571 -81.287 274.3038	-475.581 407.722 -1280.5 329.338	95.533 80.574 -62.613 253.679	92.377 91.113 -86.481 271.23	104.885 87.634 -67.139 276.909	56.687 100.051 -139.679 253.05	-198.939 196.093 -584.601 186.72	110.937 94.219 -74.036 295.91	119.046 106.968 -91.002 329.09
2007	-13.038 11.786 -36.201 10.126	90.509 58.702 -26.186 207.2045	-1.425 8.717 -18.545 15.695	-33.575 28.101 -89.024 21.873	8.022 6.065 -3.881 19.925	8.281 6.810 -5.088 21.649	10.024 6.6426 -3.015 23.064	8.320 6.863 -5.151 21.792	-13.205 14.558 -41.835 15.425	6.538 7.348 -7.886 20.960	5.630 8.366 -10.792 22.05
2008	-20.267 20.197 -59.965 19.430	*135.583* *107.473* *-78.337* *349.503*	4.522 12.074 -19.176 28.220	-50.617 46.524 -142.406 41.171	12.363 10.189 -7.636 32.362	12.885 11.355 -9.406 35.176	14.364 11.176 -7.575 36.302	9.751 11.83 -13.468 32.969	-23.019 24.547 -71.298 25.259	11.176 11.896 -12.177 34.528	12.982 13.416 -13.362 39.325
2009	-36.457 28.625 -92.703 19.789	257.965 171.211 -82.889 598.820	15.879 18.616 -20.660 52.417	-99.415 72.257 -241.958 43.127	23.8331 16.06822 -7.705083 55.3712	24.850 17.921 -10.330 60.030	26.435 17.815 -8.537 61.40	24.753 17.955 -10.494 59.999	-50.676 38.548 -126.489 25.136	25.520 18.628 -11.0502 62.090	26.036 21.172 -15.536 67.60

Appendix D: Total Cost per Patient

There is significant difference in the means between health center characteristics. For example, Migrant Health Centers have lower total costs per patient than other health center designations for all five years of the study. Health centers with a Medicaid majority patient volume had significantly higher cost per patient than those that did not for all five years of the study. Health centers in the Midwest had lower costs than their counterparts. Cost difference was significant in 2005, 2006, 2008 and 2009. Health centers in the West region had significantly higher costs than their counter parts in 2006, 2008 and 2009. Urban health centers tended to have higher costs than their rural counterparts but only significant difference in 2006 and 2008 which is expected since urban areas have a higher cost of living.

Table D-1: Total Cost per Patient Mean Difference by Health Center Characteristics

TC	Urban	Community Health Center	Migrant Health Centers	Homeless Health Centers	Public Housing Health Centers	New Health Center	Majority Medicaid Patient Volume	Northeast	South	Midwest	West
2005	-34.516 27.506 -88.501 19.468	48.133 54.278 -59.495 155.760	105.024** 22.055 61.678 148.370	*-33.627* *38.683* *-109.854* *42.599*	-38.107 45.367 -129.597 53.383	-82.025 45.105 -171.101 7.052	-133.892* 57.082 -246.920 -20.865	-75.901 28.395 -131.807 -19.994	173.592 25.544 123.458 223.726	99.847** 22.737 55.185 144.509	-231.8457 39.67774 -309.9367 -153.7548
2006	-53.137* 24.184 -100.601 -5.6740	52.869 52.352 -50.976 156.713	90.833** 20.256 51.014 130.651	-52.490 35.740 -122.921 17.941	-78.640 56.991 -193.854 36.574	-54.947 39.140 -132.233 22.338	-93.134* 36.935 -166.176 -20.092	-115.752 29.537 -173.980 -57.523	186.303 21.483 144.138 228.468	105.759** 20.502 65.479 146.039	-226.159** 34.605 -294.265 -158.054
2007	-47.584 24.621 -95.905 .737398	57.843 53.023 -47.345 163.030	89.733** 21.329 47.80035 131.6656	-48.902 33.966 -115.794 17.990	-72.141 51.18623 -175.2816 30.9997	-50.173 39.343 -127.856 27.510	-66.024* 32.773 -130.723 -1.326	-131.547 29.309 -189.315 -73.779	198.620 21.503 156.415 240.825	109.010 20.433 68.873 149.147	-233.152 35.9521 -303.916 -162.388
2008	-50.456* 24.113 -97.781 -3.1310	*81.775* *58.407* *-34.254* *197.805*	87.625** 22.593 43.184 132.067	-54.992 33.484 -120.931 10.947	-67.760 44.629 -157.274 21.753	-53.049 38.082 -128.238 22.139	-79.657* 33.418 -145.635 -13.679	-139.446 31.242 -201.058 -77.834	197.930 20.934 156.840 239.019	110.266** 19.970 71.0375 149.494	-228.205** 34.852 -296.801 -159.609
2009	-34.961 25.753 -85.510 15.588	92.352 65.545 -37.923 222.628	92.671** 22.743 47.948 137.393	-56.231 36.152 -127.428 14.967	-69.038 45.301 -159.872 21.795	-58.810 40.144 -138.071 20.4501	-81.784* 34.657 -150.171 -13.397	-137.990 32.332 -201.744 -74.236	201.992 21.760 159.279 244.706	113.938** 19.803 75.053 152.822	-236.686** 37.697 -310.890 -162.482

Appendix E: Fixed Effects Diagnostic Tests

Table E-1: Diagnostics for Operating Margin

		Operating Margin			
Hausman	Chi^2	239.66			
	Prob > Chi^2	0.0000			
	Model	Fixed			
Time-Fixed effects	F	2.38			
	Prob > F	0.0503			
	variable	Time variables not required			
Breusch-Pagan Lagrange Multiplier	$Chibar^2$	98.16			
	Prob > $Chibar^2$	0.0000			
	Model	reject OLS			
Groupwise Heteroskedasticity	Chi^2	2.10E+33			
	Prob > Chi^2	0.0000			
	Adjustment	Use vce(robust)			
Serial Correlation	F	31.05			
	Prob > F	0.0000			
	option	Use xtregar			
Hausman Coefficients	Variable	Fixed	Random	Difference	SE
	Per Capita Income	-0.0001	0.0000	-0.0001	0.0001
	Percent Uninsured	0.4787	0.0621	0.4166	0.1826
	Number of FQHCs	0.0069	0.0002	0.0066	0.0168
	Number of RHCs	-0.0174	-0.0065	-0.0109	0.0582
	Percent PCP in Service Counties	-0.0194	0.0350	-0.0544	0.0830
	Emergency Department Visits per capita	5.6787	3.0529	2.6258	4.0152
	Urban Status	0.7244	-0.4149	1.1393	1.1483
	Number of Sites	0.0352	0.0245	0.0107	0.0346
	Number of Patients	-0.0002	0.0000	-0.0001	0.0001
	Migrant grantee	-0.0701	-0.0290	-0.0411	3.8384
	Homeless Grantee	2.0553	0.5361	1.5191	3.4124
	% Dental	-0.3062	-0.0681	-0.2382	0.1510
	% Behavioral	0.0547	-0.0253	0.0800	0.1766
	% Enabling	0.3033	0.1554	0.1479	0.1009
	Non-physician to Physician	0.4646	0.1643	0.3002	0.2508
	Non-physician Productivity	0.0010	0.0014	-0.0004	0.0005
	% LEP	0.1969	0.0282	0.1686	0.0372
	Percent Non-White	0.0324	0.0196	0.0128	0.0153
	Percent under 100% FPL	0.0748	-0.0133	0.0880	0.0381
	Percent above 200% FPL	0.0856	0.0155	0.0702	0.0471
	Percent Uninsured	0.0123	0.0076	0.0047	0.0652
	Percent Medicaid	0.1525	0.0149	0.1376	0.0718
	Percent Female	0.1765	-0.0240	0.2005	0.1405
	Percent Chronic Visits	0.0571	0.0491	0.0080	0.0570
	Medicaid Reimbursement Rate	0.0787	0.0551	0.0235	0.0113
	Private Insurance Reimbursement Rate	0.0218	0.0193	0.0025	0.0100
	Medicare Reimbursement Rate	0.0244	0.0219	0.0024	0.0098
	% Health Center 330 Funding	-0.8656	-0.1402	-0.7254	0.0616

Table E-2: Diagnostics for Net Revenue per Encounter

		Net Revenue per Encounter			
Hausman	Chi^2	80.67			
	Prob > Chi^2	0.0000			
	Model	Fixed			
Time-Fixed effects	F	2.61			
	Prob > F	0.0347			
	variable	Time variables required			
Breusch-Pagan Lagrange Multiplier	$Chibar^2$	244.31			
	Prob > $Chibar^2$	1.0000			
	Model	OLS			
Groupwise Heteroskedasticity	Chi^2	1.90E+34			
	Prob > Chi^2	0.0000			
	Adjustment	Use vce(robust)			
Serial Correlation	F	4.262			
	Prob > F	0.0415			
	option	Use xtregar			
Hausman Coefficients	Variable	Fixed	Random	Difference	SE
	Per Capita Income	5.79E-06	0.0000132	-7.41E-06	0.000023
	Percent Uninsured	0.072162	0.0204738	0.051689	0.040083
	Number of FQHCs	-0.00724	-0.002911	-0.00433	0.003285
	Number of RHCs	0.0164	-0.001332	0.017732	0.012238
	Percent PCP in Service Counties	0.083896	0.0177909	0.066105	0.015117
	Emergency Department Visits per capita	-1.29256	0.2772559	-1.56981	0.749629
	Urban Status	-0.07917	0.0504689	-0.12964	0.243302
	Number of Sites	0.021091	0.011788	0.009303	0.006301
	Number of Patients	-5.39E-06	-5.15E-06	-2.44E-07	2.14E-05
	Migrant grantee	-0.53302	-0.071133	-0.46189	0.902236
	Homeless Grantee	-0.82542	-0.246493	-0.57893	0.69382
	% Dental	0.024588	0.0294667	-0.00488	0.032756
	% Behavioral	0.089234	0.0315426	0.057692	0.031164
	% Enabling	0.03226	0.0009786	0.031281	0.023799
	Non-physician to Physician	-0.01129	0.0073334	-0.01863	0.04124
	Non-physician Productivity	-0.00024	-7.47E-05	-0.00016	0.000116
	% LEP	0.007484	-0.002663	0.010147	0.007553
	Percent Non-White	0.003438	0.0025793	0.000859	0.002891
	Percent under 100% FPL	-0.00053	-0.002604	0.002075	0.008876
	Percent above 200% FPL	0.004929	0.0042351	0.000694	0.010143
	Percent Uninsured	-0.00613	0.0039892	-0.01012	0.013314
	Percent Medicaid	0.014006	-0.002142	0.016148	0.016231
	Percent Female	0.03471	0.0138471	0.020863	0.033775
	Percent Chronic Visits	-0.0221	-0.01114	-0.01096	0.013347
	Medicaid Reimbursement Rate	0.001259	0.0030663	-0.00181	0.002684
	Private Insurance Reimbursement Rate	0.001134	-0.003695	0.004829	0.0033
	Medicare Reimbursement Rate	0.002929	0.0026605	0.000269	0.002279
	% Health Center 330 Funding	-0.05252	0.0016276	-0.05415	0.013823

Table E-3: Diagnostics for Grant Reliance

		Grant Reliance			
Hausman	Chi^2	155.93			
	Prob > Chi^2	0.0000			
	Model	Fixed			
Time-Fixed effects	F	6.43			
	Prob > F	0			
	variable	Time variables required			
Breusch-Pagan Lagrange Multiplier	$Chibar^2$	906.22			
	Prob > $Chibar^2$	0.0000			
	Model	reject OLS			
Groupwise Heteroskedasticity	Chi^2	1.50E+35			
	Prob > Chi^2	0.0000			
	Adjustment	Use vce(robust)			
Serial Correlation	F	14.578			
	Prob > F	0.0002			
	option	Use xtregar			
Hausman Coefficients	Variable	Fixed	Random	Difference	SE
	Per Capita Income	1.29E-06	1.04E-05	-9.13E-06	2.22E-06
	Percent Uninsured	0.0162701	0.015055	0.001215	0.003997
	Number of FQHCs	-0.000152	1.89E-05	-0.00017	0.000316
	Number of RHCs	0.0012526	-0.00142	0.002668	0.001259
	Percent PCP in Service Counties	0.0023652	0.003651	-0.00129	0.001788
	Emergency Department Visits per capita	0.0185539	-0.026	0.044555	0.075827
	Urban Status	-0.016648	0.035594	-0.05224	0.020943
	Number of Sites	-0.0019123	-8.83E-06	-0.0019	0.00053
	Number of Patients	-6.15E-06	-6.56E-06	4.13E-07	2.34E-06
	Migrant grantee	-0.0472311	-0.1433	0.09607	0.089785
	Homeless Grantee	-0.081628	0.039732	-0.12136	0.079448
	% Dental	-0.0109708	-0.00552	-0.00545	0.003331
	% Behavioral	0.0072735	0.01726	-0.00999	0.003926
	% Enabling	0.0098995	0.014876	-0.00498	0.00203
	Non-physician to Physician	0.0048591	0.008169	-0.00331	0.006124
	Non-physician Productivity	-0.0000626	-8.7E-05	2.41E-05	8.76E-06
	% LEP	-0.0020323	-0.00121	-0.00082	0.000775
	Percent Non-White	-0.0008606	0.000272	-0.00113	0.000296
	Percent under 100% FPL	0.0003245	0.000568	-0.00024	0.000707
	Percent above 200% FPL	-0.0031513	-0.00213	-0.00102	0.000843
	Percent Uninsured	0.0117772	0.019056	-0.00728	0.001396
	Percent Medicaid	0.0010233	0.000568	0.000455	0.001524
	Percent Female	0.0014304	-0.00905	0.010477	0.00303
	Percent Chronic Visits	0.000467	0.000276	0.000191	0.001023
	Medicaid Reimbursement Rate	-0.0032575	-0.00282	-0.00043	0.000199
	Private Insurance Reimbursement Rate	-0.000763	-0.001	0.000234	0.000159
	Medicare Reimbursement Rate	-0.0009731	-0.00119	0.000216	0.000155
	% Health Center 330 Funding	0.0114365	0.016837	-0.0054	0.001288

Table E-4: Diagnostics for Total Cost per Patient

		Total Cost			
Hausman	Chi^2	143.51			
	Prob > Chi^2	0.0000			
	Model	Fixed			
Time-Fixed effects	F	193.43			
	Prob > F	0.006			
	variable	Time variables required			
Breusch-Pagan Lagrange Multiplier	$Chibar^2$	958.8			
	Prob > $Chibar^2$	0.0000			
	Model	reject OLS			
Groupwise Heteroskedasticity	Chi^2	8.80E+34			
	Prob > Chi^2	0.0000			
	Adjustment	Use vce(robust)			
Serial Correlation	F	23.165			
	Prob > F	0.0000			
	option	Use xtregar			
Hausman Coefficients	Variable	Fixed	Random	Difference	SE
	Per Capita Income	0.0025	0.0052	-0.0027	0.0005
	Percent Uninsured	-0.5788	2.1303	-2.7091	0.9553
	Number of FQHCs	0.3398	0.3489	-0.0091	0.0576
	Number of RHCs	0.3761	-0.2243	0.6003	0.2947
	Percent PCP in Service Counties	3.5394	3.5534	-0.0141	0.4114
	Emergency Department Visits per capita	-81.8133	-148.8727	67.0594	13.8795
	Urban Status	2.7914	3.9314	-1.1400	3.7269
	Number of Sites	0.1455	0.7550	-0.6095	0.0000
	Number of Patients	-0.0036	-0.0022	-0.0014	0.0007
	Migrant grantee	24.9657	21.2778	3.6879	23.8585
	Homeless Grantee	2.7322	3.1900	-0.4578	21.0765
	% Dental	1.0312	-0.4441	1.4753	0.7923
	% Behavioral	6.8438	12.5878	-5.7440	0.9495
	% Enabling	0.8097	1.6400	-0.8302	0.4106
	Non-physician to Physician	3.2489	3.1079	0.1410	1.7516
	Non-physician Productivity	-0.0249	-0.0401	0.0151	0.0012
	% LEP	-2.4198	-1.2287	-1.1912	0.1715
	Percent Non-White	-0.0581	0.4470	-0.5051	0.0585
	Percent under 100% FPL	-0.1676	-0.4160	0.2484	0.1193
	Percent above 200% FPL	0.0357	0.1046	-0.0689	0.1261
	Percent Uninsured	-1.0701	-0.3610	-0.7091	0.3267
	Percent Medicaid	-0.8440	0.1483	-0.9922	0.3520
	Percent Female	-0.2417	-3.8066	3.5650	0.7062
	Percent Chronic Visits	0.6795	-0.5552	1.2347	0.1541
	Medicaid Reimbursement Rate	0.3094	0.3381	-0.0287	0.0268
	Private Insurance Reimbursement Rate	0.0587	0.0281	0.0305	.
	Medicare Reimbursement Rate	-0.1031	-0.3384	0.2353	.
	% Health Center 330 Funding	-2.6380	-4.2864	1.6484	0.2822

Table E-5: Diagnostics for Composite Score

		Composite			
Hausman	Chi^2	318.95			
	Prob > Chi^2	0.0000			
	Model	Fixed			
Time-Fixed effects	F	51.42			
	Prob > F	0			
	variable	Time variables required			
Breusch-Pagan Lagrange Multiplier	$Chibar^2$	33.51			
	Prob > $Chibar^2$	0			
	Model	reject OLS			
Groupwise Heteroskedasticity	Chi^2	2.50E+32			
	Prob > Chi^2	0			
	Adjustment	use vce(robust)			
Serial Correlation	F	35.57			
	Prob > F	0			
	option	use xtregar			
Hausman Coefficients	Variable	Fixed	Random	Difference	SE
	Per Capita Income	3.02E-05	1.19E-06	0.000029	1.94E-05
	Percent Uninsured	0.196399	0.009496	0.186903	0.03347
	Number of FQHCs	0.00691	0.004219	0.002691	0.003102
	Number of RHCs	-0.01287	0.000377	-0.01325	0.010676
	Percent PCP in Service Counties	0.009765	0.000708	0.009057	0.015231
	Emergency Department Visits per capita	2.087161	1.516181	0.570981	0.739828
	Urban Status	0.439761	0.244417	0.195344	0.212048
	Number of Sites	-0.00493	-0.01216	0.007223	0.006395
	Number of Patients	3.87E-05	1.56E-06	3.72E-05	1.78E-05
	Migrant grantee	0.091947	-0.08583	0.177776	0.702066
	Homeless Grantee	0.338088	0.062198	0.27589	0.624274
	% Dental	-0.04882	0.000463	-0.04928	0.027667
	% Behavioral	0.02054	-0.04467	0.065211	0.032348
	% Enabling	0.020211	0.012292	0.007919	0.018556
	Non-physician to Physician	0.055792	0.017644	0.038148	0.045796
	Non-physician Productivity	0.000127	0.00041	-0.00028	9.15E-05
	% LEP	0.044603	0.000741	0.043862	0.006842
	Percent Non-White	-0.00147	-0.00592	0.00445	0.002821
	Percent under 100% FPL	0.027816	0.006333	0.021483	0.007034
	Percent above 200% FPL	0.01294	0.002273	0.010667	0.008686
	Percent Uninsured	0.030164	0.003622	0.026542	0.01197
	Percent Medicaid	0.047881	0.003774	0.044107	0.013182
	Percent Female	0.007829	0.014772	-0.00694	0.025765
	Percent Chronic Visits	0.001514	0.016245	-0.01473	0.010516
	Medicaid Reimbursement Rate	0.009227	0.005811	0.003417	0.002088
	Private Insurance Reimbursement Rate	0.00523	0.002602	0.002627	0.001852
	Medicare Reimbursement Rate	0.004535	0.006082	-0.00155	0.001804
	% Health Center 330 Funding	-0.13083	0.000113	-0.13094	0.011315