Migration, Remittances, and Household Health: Evidence from South Africa

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Abstract of Dissertation

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This dissertation investigates the role of private transfers in influencing household consumption and the household's ability to smooth consumption in South Africa. It examines the general relationship between remittances and household health promoting expenditure patterns including health care utilization. It also examines remittances as a household coping strategy to insure income against a health shock. Given the multiple paths through which ill-health is a cause and a consequence of poverty, the ultimate goal of the research is to address the public policy implications of migration and remittances from both poverty and health perspectives. The need for better informed pro-poor health and social protection policies is relevant for a health system characterized by high levels of inequality in access, quality of care, and health care outcomes.

The research takes advantage of panel data spanning from 1993 to 2004 from KwaZulu-Natal province to explore these questions in three independent but closely related papers. The first paper reviews the migration literature and proposes a framework for bringing together the remittances, health, and poverty streams in the literature. This paper also investigates the context of migration in South Africa, and the role of public transfers targeted to improve household welfare outcomes for the poorest households.

The second paper explores whether remittance-receiving households consume more health promoting goods and have better health seeking behavior. The three main conclusions reported are: (1) remittance receiving households spend a larger budget share on food and health expenditures, (2) remittances enable poorer households to access

better quality medical care, and (3) remittances may be a more efficient way than state transfers to target the financial needs of poorer households.

The third paper analyzes whether remittance receiving households are better able to insure consumption against a health shock. In the absence of informal household safety nets from public or private transfers, health shocks reduce food consumption because households are unable to insure the economic cost of illness. The research shows that there is some evidence of state transfers crowding out private transfers, indicating that there is room for policy makers to improve social safety nets to enable poorer households to better insure consumption.

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Introduction

The role of migration in economic development continues to be an important issue for policymakers and researchers. The policy debate mainly focuses on the repercussions developing countries face when losing trained professionals to developed countries. While human capital flight can have detrimental long run ramifications, research has highlighted paths through which migration positively impacts economic development and poverty alleviation in the third world. Migration enables the transfer of knowledge, resources, and networks that are otherwise inaccessible to rural or isolated households. These paths can improve household and market productive efficiency, relieving resource constraints that can reduce poverty and promote human capital investment.

Remittances are one of the least controversial links through which migration can improve living standards and human capital outcomes. Remittances include individual, private, non-market income transfers. Economic migration is undertaken largely in response to resource constraints, evident from the volume of remittances sent back to source households.[1] Remittance flows from migrants to developing countries are larger than foreign investment and overseas aid (McKenzie and Sasin, 2007).[2] In 2006, recorded remittances received by developing countries reached $206 billion – an estimated $9 billion flowed to Sub-Saharan Africa (Ratha and Shaw, 2007). South Africa recorded $700 million in remittance flows, placing it in the top ten of remittance recipient

[1] A highly mobile labor force is presumed to respond elastically to wage differentials and changing economic incentives between sectors and regions. In 2003, the ratio of OECD unskilled wage rates to those in sub-Saharan Africa was about 5:1 (Hatton and Williamson, 2003).

[2] The share of migrants in industrial countries' populations doubled over the past three decades (McKenzie and Sasin, 2007). In some developing countries, remittances surpass foreign aid and foreign direct investment as a source of foreign currency.

countries in Sub-Saharan Africa during 2007 (Ratha and Xu, 2008).[3] The most obvious channel for remittance flows are its contribution to household income.[4]

Remittances can be a more efficient way to target the financial needs of recipient households. For instance, migrants may remit extra funds to help their family and friends during natural disasters, economic crisis, or to avoid periodic income shocks. Remittances enable households to diversify their income sources, which can translate into better risk bearing capacity for households otherwise facing uninsured income risk. This is especially pertinent in agricultural settings where poorer households are more susceptible to income shocks and shortfalls. Remittances should also have a positive impact on poverty reduction and human capital formation, by smoothing consumption and increasing investment in health and education. Remittances can allow households and entrepreneurs to pursue more risky asset accumulation strategies, and therefore contribute to a country's long run growth potential through higher rates of capital accumulation (Acosta et al., 2007).

The economic burden of illness, defined as the expenditure on seeking care and related coping strategies, production, and income losses, can deter health seeking behavior. Individuals may purposely forego treatment if they lack sufficient resources to access care, pay for medicines, or may be unwilling or unable to reallocate household resources for their treatment.[5] Research has identified two important channels through which migration can directly impact healthcare access (Amuedo-Dorantes et al, 2007;

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[3] In 2000, South Africa was in the top 10 of countries sending physicians abroad, recording 4,400 emigrated physicians, 13% of total physicians trained in the country (Docquier and Bhargava, 2006).

[4] Oucho (1996) estimated that remittances from Kenyan migrants accounted for 10-20 percent of urban family income.

[5] Reduced food consumption may interfere with a patient's treatment and recovery, and compromise the health of other household members.

Kanaiaupuni and Donato, 1999). Remittances can alleviate household income constraints and finance the costs of accessing healthcare, reduce inequities in accessing health care, or help maintain household consumption during an unexpected health shock (Wagstaff, 2005; Gertler and Gruber, 2002). Social and migrant networks also provide informational resources, which could motivate households to adopt healthier lifestyles or better health seeking behavior (Hildebrandt and McKenzie, 2005).

There is a need for incentivizing and mainstreaming remittances into national development strategies in order to promote the growth enhancing effects of remittances. Given the development community's commitment to poverty reduction, understanding how remittances influence household health expenditures, access to healthcare, and ability to insure consumption against health shocks, will better inform pro-poor health and social protection policies.

Research has documented how households use migration as a means to diversify household income, and improve their capacity and flexibility to respond to external shocks that might otherwise disrupt consumption (Waddington, 2003). This research will contribute to the existing literature by analyzing whether migration in KwaZulu-Natal, South Africa has helped to improve (1) Household consumption and investment in health promoting goods, including healthcare access; and (2) The household's ability to insure consumption against a health shock.

The first paper has three purposes: (1) to review the literature analyzing migration, health, and poverty, including vulnerability to poverty; (2) to propose a framework that links these literatures and where this dissertation will fall within that framework; and (3) to introduce the South African context and KwaZulu-Natal data set

that will be used to investigate the framework in the following two papers. The second paper will analyze the impact of migration on health expenditures by comparing household consumption and budget shares between households that receive remittances and those that do not.[6] The second paper will also examine access to health care by examining whether remittances influence health care utilization. The third paper will investigate whether households that receive remittances are better able to insure their consumption against unexpected health shocks. Further, the third paper will attempt to analyze whether migration has improved the household's capacity to cope with unexpected health shocks, reducing vulnerability to future poverty.

[6] Effectively this paper will test whether remittance-receiving households are less consumption-poor than households that do not receive remittances.

PAPER 1

Impact of migration and remittances: Review of literature and the case of KwaZulu Natal, South Africa

Abstract: This paper explores the paths through which health can influence the impact of migration and remittance receipt on household poverty. It provides a framework for organizing the migration literature and addresses the gaps in the current literature that motivate investigating the remittance-health-poverty link. The paper introduces the context of migration in South Africa and the KwaZulu-Natal Income Dynamic Study which will be used to test whether health is a channel through which remittances influence household welfare and vulnerability to poverty in KwaZulu-Natal, South Africa.

Section 1: Introduction

Migration has always been a path to change throughout human history. Advances in globalization, communication, and transportation have increased motive, opportunity, and capacity of individuals to move. As society and labor markets become more global, governments are being forced to re-examine their immigration policies in order to take advantage of new opportunities and overcome new challenges. These include developing more responsive and innovative financial, legal, professional, and institutional policies that enhance the development impact of migration. Receiving countries are experimenting with various forms of visas to reduce restrictions on migrants.[7, 8] Sending countries are seeking ways to attract expatriates home, facilitate remittance and resource transfers, and capitalize on transnational networks to help local economic development in

[7] The legal status of migrant workers can impact the amount earned and therefore remitted to origin countries. If legal status impedes their ability to return home periodically, it can also lessen migrant ties with origin communities.

[8] Developed countries facing unmet demand for skilled or unskilled labor can either train natives, or permit migration. High-skilled migrant labor directly increases economic productivity. Low-skilled migrants perform tasks at lower wages, allowing native workers to engage in more productive, higher-earning employment- indirectly contributing to increased economic productivity for developed countries.

origin communities.[9, 10] In Sub-Saharan Africa, remittances have been one of the most stable private flows to the region, consistently less volatile than official aid and foreign direct investment (Gupta, Wagh, and Pattillo, 2007).[11]

International migration's potential to improve household outcomes and promote economic development in developing countries has received greater attention than internal migration.[12, 13] Regardless, both international and internal remittances have the potential to impact poverty and human capital investment in communities of origin along with recipient households. For every remittance dollar spent on consumption of goods or services from the local economy, multiplier effects can create two or three additional dollars of income for the community.

Internal migration constitutes in- and out-migration between rural-to-rural, rural-to-urban, urban-to-rural, and urban-to-urban areas.[14] Migrants respond to pull and push incentives, migrating for better employment or educational opportunities, to earn more income, and/or to improve living standards. In rural areas with fewer jobs, distorted markets, and little access to land, migration to urban areas or larger rural settlements present greater economic opportunities.

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[9] Developing countries face the challenge of converting remittance income into sustainable productive capacity- remittances generally finance consumption rather than investment in income earning activities.

[10] Resources sent home include skills, technological, and institutional knowledge. India's software industry growth can be attributed to intensive networking among expatriates, returning migrants, and Indian entrepreneurs at home and abroad (UN Report, 2006).

[11] Remittances are made up of millions of individual, private, non-market income transfers.

[12] International transfers remitted home are generally greater in magnitude than internal transfers, resulting in more easily quantifiable impacts on income poverty, inequality, and human capital investment.

[13] Approximately three quarters of global remittances flow from wealthy nations to developing countries in 2005 (UN Report, 2006).

[14] There are also various types of time bound migration, like seasonal migration. Natural calamities and war force individuals to move, but this research will focus on economic migration.

African international migration is mostly within low-wage Africa rather than from Africa to high-wage developed world (Hatton and Williamson, 2003). Distance between origin and destination locations can be the most important migration cost (Mayda, 2007). Internal migration or relocation to a neighboring country is likely to incur fewer costs than overseas international migration; individuals from poorer households in migrant-source areas have greater access to domestic migrant labor markets.[15] Aside from the prohibitive cost of relocating overseas that precludes poorer individuals from migrating, receiving countries have selectivity requirements and legal restrictions. These include screening criteria such as age, gender, education, and skill levels.[16]

Over the last three decades, Sub-Saharan Africa (SSA) has suffered environmental, political conflict, and socio-economic shocks that have contributed to migration flows in this region. The desertification of arable land has displaced people and reduced agricultural productivity.[17] The resulting loss of agricultural income and increasing demographic pressures have resulted in out-migration to urban areas, despite worsening urban employment conditions.[18]

South Africa's political and economic complexities set its migration patterns apart from the rest of the region and continent. Positioned as a relatively healthy economy and stable democracy within Africa, it is both a sender and receiver of migration- labor

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[15] Findlay and Sow (1998) show that the poorer the family, the more likely its immigrants would remain in Africa rather than emigrating abroad, indicating that poverty constraints overseas migration.

[16] Households at the top of a sending area's income are more likely to meet the education and skill levels required by receiving countries, which could exacerbate income inequality in origin communities.

[17] By the late 1980s, there were 10 million environmental refugees in Africa, and 135 million people living on land vulnerable to desertification- land productivity is estimated to have declined by 25% in the last two decades (Adepoju, 2007).

[18] In 2006, SSA's unemployment rate was 9.8% and the number of working poor increased by 14 million from 2001-2006 (ILO, 2007).

migration across borders in Southern Africa is especially fluid.[19] Migrant in-and outflows are characterized by varying skill mixes, racial, and geographic composition, resulting in brain and skills circulation in South Africa.[20] Along with social assistance from its well developed welfare system, remittances and public transfers contribute a significant component of South African household income (Maitra and Ray, 2003).

This paper is structured as follows: Section 2 proposes a framework that organizes the current literature on migration and remittances on poverty, incorporating the impact of remittances on health and as a strategy for income smoothing. This section explores the respective literatures which motivate and frame the dissertation research. Section 3 will discuss the institutional context within which migration has taken place in South Africa. Section 4 introduces the KwaZulu-Natal Income Dynamics Survey (KIDS) data set, and explores the trends which make applying the dissertation framework pertinent.

Section 2: Conceptualizing Migration, Remittances, and Poverty

In reviewing the literature regarding migration and remittances, the focus has been on the motivation to migrate and remit assets. There is no generic body or unifying framework that assesses the impact of migration or remittances on poverty; empirical studies have been restricted to transmission of pecuniary assets and neglected to

[19] The UN sub-region of Southern Africa includes Botswana, Lesotho, Namibia, South Africa, and Swaziland. Sometimes Zimbabwe and the southern half of Mozambique are also included in this region.

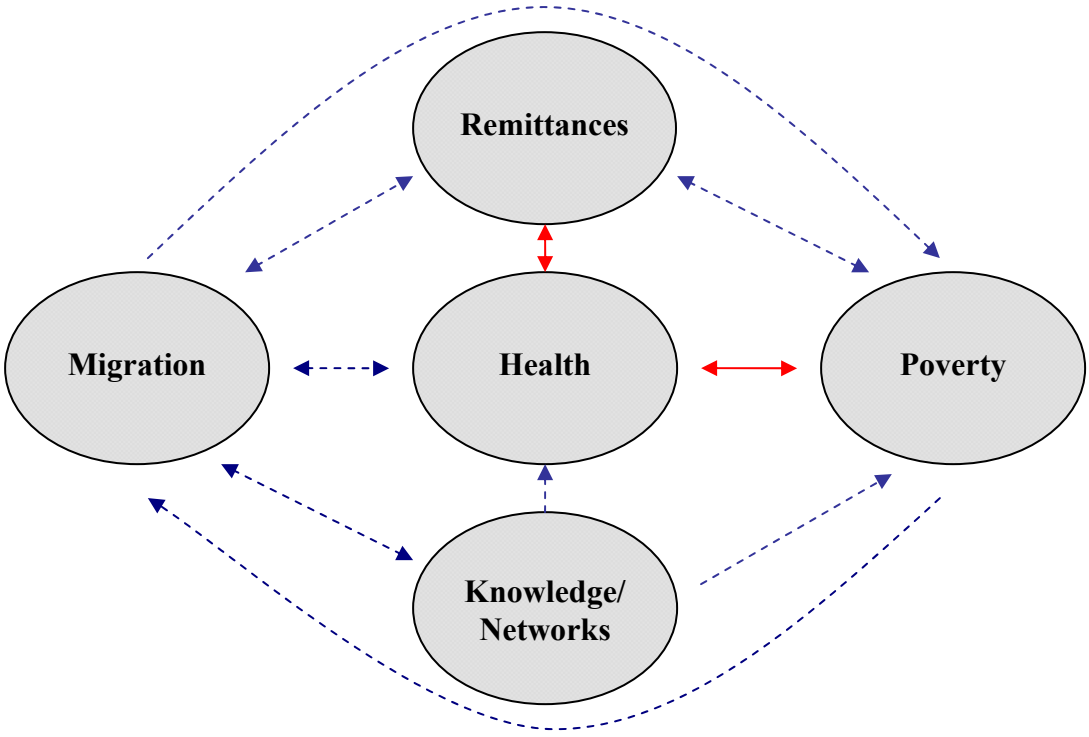
[20] This happens in countries that invest heavily in human resources development: While South Africa exports skilled migrants; it attracts skilled migrants from other parts of Africa. Of the recorded 343,000 South African expatriates living in OECD countries in 2001, 47.9% were highly skilled (OECD, 2005).

incorporate the informal and non-monetary forms of remittance transfers that also impact poverty (Chimhowu et al., 2003).[21]

2.1 Dissertation Framework

The framework presented below organizes the different theoretical and empirical streams that the migration-remittance literature has investigated. The dashed arrows indicate avenues that have been explored in the literature; the solid arrows indicate the relationships that this dissertation intends to explore. This includes (1) the role of remittances in shaping current household health promoting expenditures, and (2) whether remittance receiving households are better able to consumption smooth against health shocks, reducing vulnerability to future poverty.

Figure 1 - Inter-Relationships of Migration, Remittances, Health and Poverty



[21] Most remittances go unrecorded because they are transmitted through informal channels (Bracking, 2003). This constitutes important information loss, especially given estimates that official recorded remittances comprise less than half of the actual total transfers often received (Taylor, 1999).

The following sub-sections will (1) synthesize the empirical and theoretical relationships explored in the literature streams indicated by the dashed arrows, and (2) focus on analyzing the literature that has investigated the role of migration and remittances on further migration, health, poverty, and vulnerability to poverty. The motivation for exploring the relationships indicated by the solid arrows will be drawn from this analysis; Section 2.8 of this literature review will explain how the proposed dissertation contributes to the above framework.

2.2 General Migration Theory

The theoretical literature on migration and remittances has followed different paths. The migration literature originates with Becker's (1965, 1974, 1993) economics of the family, in which a representative unitary household allocates resources and distributes income so as to maximize total household welfare. The relationship between migrant and family is characterized by altruism. This implies that migrants send home remittances during economic downturns and to help families avoid periods of income shortfall. The decision to migrate has also been modeled as an individual decision: after adjusting for the cost of migration, the differences in expected future incomes between two labor markets drives migration (Harris and Todaro, 1970; Péridy, 2006; Mayda, 2007). Traditional migration theories, however, do not explicitly model or incorporates remittances into their predictions.

The New Economics of Labor Migration (Stark and Bloom, 1985) formalizes the microeconomic approach, recognizing that the family shares the trade-offs, costs, and benefits. The decision to migrate is a joint decision by the migrant and family; the

household is the unit of analysis in remittance and migration questions. Families enter into self-enforcing, mutually beneficial contracts: remittances are ex post flows that result from the family's ex ante migration strategy, which include maximizing collective income or smoothing consumption (Stark, 1991; Agarwal and Horowitz, 2002; Jensen, 2003; Beaudouin, 2005).

Other branches of the literature have focused on motives other than altruism that influence a migrant's decision to remit. The assumption of altruism does not explain the variance in magnitude or frequency of remittances sent home by migrants, nor does it address the strength of ties between remitters and origin households. The original model of altruism was extended to include self-interested motives for remitters. Migrants frequently remit to individuals within households, and not to the household itself, indicating their sensitivity to the needs of some family members over others.[22] These motives are important for better gauging the strength of migrant-origin household ties, in order to assess the development potential of migration (Posel, 2001). The change in magnitude and flows of remittances over time can then be better explained and forecasted, with greater understanding of what motivates migrants to remit.

Lucas and Stark (1985) suggest self-interested motives for remitters to maintain ties with their origin households. Remitters may use household members as agents to look after properties or investments back home that require attention. Transfers sent home may then be a form of compensation to these agents. In the case where household funds were required to finance migration, the remitter may send home transfers in order

[22] For example, parents who have migrated may send extra resources back to origin households to cover expenses of caring for children left behind. Similarly, grown children may remit resources intended to be used by parents, and not extended family members residing in the household.

to repay loans (Poirine, 1997; Ilahi and Jafarey, 1999).[23] The household is a financial intermediary: the money that is repaid is then put towards loans for other family members willing to migrate. Remitters may also keep ties with origin households to maintain claims on inheritances (Hoddinott, 1994; de la Briere et al., 2002), or as a form of risk management in case of a negative shock that forces them to return home. Empirically it is difficult to discriminate between these motives without adequate information regarding socio-demographic and economic characteristics of migrant and origin households. These include household surveys that collect detailed information about migrant and origin households' assets and wealth, pre-transfer income levels, or timing of transfers.

Chami et al. (2005) test whether remittances are compensatory transfers using a panel of 113 countries spanning 29 years. They conclude that remittances are countercyclical in nature and have a negative relationship with GDP growth, consistent with the model's implication that remittances are compensatory and not a form of capital flow – this supports the theory that altruism drives remittance sending behavior.[24] Other empirical evidence supports the finding that economic conditions motivate the magnitude and timing of remittance flows. Kapur (2004) finds an increase in remittance flows in response to economic downturns in Ecuador. Yang (2006) finds that an appreciation in a migrant's currency against the Filipino Peso led to an increase in the amount of remittances received from abroad.

The literature on migration and remittances has also considered their effects on household behavior and outcomes. Remittances can influence household decisions

[23] Ilahi and Jafarey (1999) show the importance of extended families for financing migration costs in Pakistan.

[24] Capital flows like foreign direct investment are profit driven, and have a positive correlation with GDP growth. This would indicate that remittances were more investment driven.

regarding labor supply, migration, consumption, investment, and savings. Chami et al. (2005) find evidence of adverse incentive problems in a cross section of 113 countries: recipients use remittances as a substitute for labor income and reduce their work effort.[25] Azam and Gubert (2004) find similar evidence of moral hazard in Western Mali, where recipient households reduce their labor supply in response to remittance receipt.[26] Acosta (2006) finds that child and female labor supply decrease with remittances in El Salvador, but that male labor supply is not affected by private transfer receipt. Cox, Eser, and Jimenez (1998) do not find evidence that private transfer receipt influences labor supply decisions in Peru.

Recent literature has investigated whether remittances alleviate liquidity constraints that then allow households to invest in other dimensions of well-being, including human capital accumulation. In this vein, migration has been associated with higher levels of micro-enterprises, entrepreneurship, and new business formation (Woodruff and Zenteno, 2001; Yang, 2006; Samson et al., 2006),[27] educational attainment in children (Yang, 2003; Hanson and Woodruff, 2003; Lopez-Cordova, 2005; Acosta, 2006; Mansuri, 2006a**,** McKenzie and Rapoport, 2006),[28] and health outcomes in

[25] It has been argued that these authors disregard the possibility that remittances could affect investments and human capital formation (Rapoport and Docquier, 2005), or that reduced formal labor supply could free up time for families to devote to other productive welfare improving activities.

[26] The authors conclude that migration has a negative impact on crop production.

[27] In Mexico, about a fifth of the capital invested in microenterprises was associated with remittances (Woodruff and Zenteno, 2001)

[28] McKenzie and Rapoport (2006) find that migration reduces educational inequalities in Mexico by providing a disincentive for schooling at the top end of the distribution, not by increasing education at the bottom of the distribution from relaxing credit constraints through remittances. The other papers find a positive relationship between remittance receipt and increased educational attainment in children, including improved literacy levels and school attendance.

infants and children (Kanaiaupuni and Donato, 1999; Frank and Hummer, 2002**;** Hildebrandt and McKenzie, 2005; Mansuri, 2006b).[29]

2.3 Migration and Networks

Remittances have been found to finance and encourage the decision to migrate for other household members (Poirine, 1997; Ilahi and Jafarey, 1999; Beaudouin, 2005). Van Dalen et al. (2005) find that remittances contribute to net flows of emigration in Egypt, Morocco, and Turkey: worker's remittances signal to members in origin households that it is lucrative to migrate and join the remitter. Akkoyunlu and Siliverstovs (2007) investigate the effects of remittances on the decision to migrate from Turkey to Germany from 1964-2004. They find that workers' remittances are an important financing source for future migration, and trigger additional migration by signaling financial success for those that have emigrated.

Migration has also been studied in the demographic and sociological literature, using social network theory (Massey et al., 1994). This theory postulates that the probability of migration from an origin community increases as its migrant network in a destination area or region grows stronger. The greater presence of individuals in a destination area from an origin community lowers the entry costs and risks for newcomers. The network provides support and information that eases new entrants' integration into labor markets in destination areas. Networks can also increase the economic returns to migration (Munshi, 2003; McKenzie, 2005). Over time, access to

[29] In South Africa, children living in households receiving remittances were significantly less likely to drop out of primary or secondary schools than children living in households without migrants (Sibanda, 2004).

networks spreads from relatives and friends to institutions that promote and sustain migration (Woodruff and Zenteno, 2001; McKenzie and Rapoport, 2007).

Findlay and Sow (1998) show that households with previous emigration experience to France were more likely to send new migrants to France. Winters et al. (2001) find that the probability of emigration is higher for households residing in Mexican communities that have greater migration experience. Munshi (2003) finds that in Mexico, access to family and community networks helps migrants to enter and succeed in the United States. As the migration network from an origin community increases, it can exert pressure on migrants to continue remitting. Azam and Gubert (2006) find that in Senegal villages with large numbers of emigrants, there is competition to maintain families' relative income and living standards.

In a similar vein, observation of successful migration is an important path through which migration can improve human capital outcomes. The perceived positive impact of migration on household outcomes can change expectations about the benefits of education, influencing schooling decisions (Mansuri, 2006a). When more educated individuals are migrating, this positive selection should translate into higher expected returns to education in migrant source areas.[30] Migrants can also transfer knowledge about better technologies to improve efficiency in home or agricultural production, or increase awareness about health and education issues that can result in improved human development outcomes (McKenzie and Sasin, 2007).

[30] Adams (1993) finds that given the incentive to rural-urban migrate in Egypt, the more educated tend to migrate due to higher returns to education in cities.

2.4 Impact of Migration and Remittances on Poverty

The literature that considers the long term development potential of remittances has primarily focused on how they contribute to poverty alleviation, particularly the impact of remittances on income poverty and household expenditure decisions. The expenditure categories analyzed have tried to distinguish between consumption and investment goods, to determine whether households' spending behavior has short or long-term impacts. In the literature, investment activities are assumed to be productive and have greater local development impact for migrant sending communities, whereas increased consumption is seen to foster household dependence on private transfers.

The link between migration and poverty in Africa is often viewed negatively – it is assumed that poverty forces poor people to migrate, rather than migration being a potential route out of poverty (Black et al., 2006). There is evidence, however, that at the local level, remittances have a positive effect on poverty: apart from possibly increasing social inequality and differentiation, remittances can reduce poverty or vulnerability in the majority of households and communities (Chimhowu et al., 2003). Gustafsson and Makonnen (1993) estimate a 15% increase in poverty in Lesotho if migrants working in South African mines stopped sending remittances. Many studies conclude that remittances are primarily used to finance household expenditures, such as consumption and investment (Maitra and Ray, 2003; Adams, 2005; Taylor and Mora, 2006; Castaldo and Reilly, 2007).

The standard poverty analysis looks at one or more of three different poverty measures, each of which are calculated relative to a defined national poverty line. These

include measures which capture the incidence, depth, and severity of poverty.[31] A cross-country analysis of international migration and poverty finds that a 10 percent increase in the share of international remittances in a country's GDP leads to a 1.6% decline in poverty incidence (Adams and Page, 2005). The authors use a panel of 74 low- and middle-income developing countries, and after controlling for income and inequality, find that the depth and severity of poverty were also strongly reduced by increased in migration and remittances.

Adams (1991) finds that international remittances had a small but significant impact on poverty reduction in a small sample of households in rural Egypt. In Burkina Faso, international remittances reduced the poverty headcount by 7.2% for rural households (Lachaud, 1999). Adams (2004) finds that both international and internal remittances reduce poverty in Guatemala, but have a greater impact on the severity rather than incidence of poverty. Lopez-Cordova (2005) finds a positive correlation between poverty reduction and the number of households receiving remittances, in a study of 2,400 municipalities in Mexico. Taylor et al. (2005) use rural Mexican household survey data to estimate the effect of marginal changes in migrant remittances on poverty in regions with different levels of migration prevalence. They find that among 14 states, states with higher levels of migration saw a significant reduction in poverty. Acosta et al. (2007) find that remittances lower poverty levels in 11 Latin America countries: communities with higher percentage of remittance receiving households and households in the lowest income quintiles benefited the most. Esquivel and Huerta-Pineda (2007)

[31] The incidence of poverty captures the share of the population whose income or consumption falls below the poverty line; depth of poverty measure captures how far off households are from the poverty line; the severity of poverty measure captures the distance separating the poor from the poverty line and the inequality amongst the poor.

analyze the role of remittances on three definitions of poverty in rural Mexico: food-based, capabilities based, and assets-based. They find that remittances reduce all three observed poverty rates and conclude that remittances are an important mechanism for rural households to get out of poverty.

2.5 Migration and Relative Poverty

The empirical literature on migration and remittances has investigated their impact and causality on income distribution and relative poverty. Research indicates that migration strategies are not random across households; they are likely to be related to household characteristics like socioeconomic status and community characteristics. Migration entails cost and risk, which include political, legal, cultural, and geographic barriers to migration. Households at the upper-middle or top of a sending area's income distribution are likely to face less liquidity, risk, and other constraints that prevent access to migrant labor markets (Stark et al., 1988; Taylor et al., 2005).[32] These obstacles can limit migration from the lowest quintile of the income distribution, in which case remittances will not flow to the poorest. Instead, depending on their magnitude, remittances can widen income inequality in migrant-source areas, at least in the short-run.

If households at the middle or bottom of the income distribution gain access to migrant labor markets, then this asymmetric effect of remittances can be mitigated or reversed. This might happen with time, as community migrant networks grow and lower the associated costs and risks of migration. Diffusion theory posits that the impact of

[32] Lachaud (1999) finds that households in Zimbabwe with migrants had higher levels of educational attainment.

remittances should have a more equalizing and have a larger effect on alleviating poverty as the share of households with access to remittance income increases.

This "trickle-down" effect of remittances on inequality might explain conflicting empirical evidence. Bates (1976) finds that after controlling for demographic composition, poorer households in Zambia receive more remittances from urban migrants than wealthier households. In contrast, evidence from rural Kenya suggests that households with more assets and productive capital receive more remittances (Collier and Lal, 1984). Stark et al. (1988) find that though remittances reduce income inequality in a Mexican village, the poorest households are not able to afford migration to the United States. Studies within rural sectors of both Egypt and Pakistan indicate that remittances sharpen inequality; in Egypt the richest 40 percent of households produced more than their share of international emigrants (Adams, 1993). Taylor et al. (2005) find evidence that income inequality decreases when migration becomes more widespread in rural Mexico. Studies in other settings corroborate these findings (Ozden and Schiff, 2006). MacKenzie and Rapoport find that remittances reduce inequality in communities with relatively high levels of past migration.

As will be discussed in Section 3, income inequality is an important socio-economic issue facing South Africa, a legacy of apartheid. Important for policy makers is understanding whether remittances are enabling (1) the poorest households to "catch up" with wealthier counterparts in their communities; and (2) allowing poorer communities to develop economically and "catch up" with wealthier communities in other parts of South Africa. Of equal importance is whether historic apartheid circulation migration is influencing current migration patterns, as well as the propensity to remit.

2.6 Migration and Vulnerability to Poverty

Static poverty assessments characterize the current welfare situation of the poor, but they are insufficient measures for describing their long-term welfare. The standard Foster Greer Thorbecke (FGT) poverty measures applied to cross-sectional data capture the extent, depth, and level of current poverty.[33] Dynamic concepts of poverty treat the poverty problem in the contexts of risks, shocks, and vulnerability. There are, however, numerous dimensions, definitions, and indicators of vulnerability. The concept of vulnerability lacks a comprehensive and empirically well-founded framework in the development economics literature. There is no consensus on a particular theoretical framework, further complicated by the dearth of intertemporal data on shocks, risks, and household or community level coping mechanisms. This has resulted in a growing body of literature made up of various empirical studies that analyze different dimensions of the concept of vulnerability

With this in mind, the literature has also modeled remittances as a form of income insurance (Stark, 1991; Agarwal and Horowitz, 2002; Beaudouin, 2005). Families diversify income sources through migration and remittances to protect the household against income shocks. The migrant is part of a spatially extended household that reduces risk of impoverishment by diversifying across geography and activities (Chimhowu, 2003). Urban or foreign jobs are generally subject to risk uncorrelated with agricultural or employment activities in origin communities (Docquier and Rapoport, 2005). Households rely on migration networks as an important source of resources in

[33] The FGT measures of poverty encompass three different indices: (1) The Head-Count Index of poverty, which captures the percentage of individuals below the poverty line; (2) The Poverty Gap Index, which captures the acuteness of poverty by analyzing the shortfall of the poor from the poverty line; and (3) The Square Poverty Gap Index, which captures severity of poverty.

times of transitory income shocks due to unforeseen events. This is especially important to households living in rural areas, which frequently face idiosyncratic and covariate shocks that result in household consumption volatility.[34] A household's inability to smooth or insure consumption against an income shock is a better indicator of vulnerability to poverty than its current observed poverty status: the migration decision is a form of risk minimization.

There is evidence that internal and international migration within the African continent is generally a household strategy to enhance livelihood security through income diversification (Azam and Gubert, 2006; de Haas, 2007).[35] Poirine (1997) finds evidence that remittances are a part of an implicit family loan arrangement, supporting the collective organization of financial flows within a family. Evidence supports the view that private transfers from migrants have a large insurance component, and react to household and village level shocks. Remittances are a coping strategy, used as imperfect substitutes for credit in many parts of sub-Saharan Africa, including Nigeria and Malawi (Udry, 1990; Devereux et al., 2006). Harrower and Hoddinott (2005) find that asset poor households in rural Mali use remittances to partially insure idiosyncratic and covariate shocks. Pan (2007) finds that remittances are used to insure negative idiosyncratic shocks to household income in rural Ethiopia, but that covariate (village level) shocks are not insured.

There is empirical evidence that focuses on whether households are insured against health shocks (Townsend, 1994; Dercon and Krishnan, 2000; Gertler and Gruber,

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[34] Idiosyncratic risk refers to household or individual specific risk, like an illness, whereas covariate risk refers to group or community level risk, like a drought.

[35] Migration to Europe and OECD countries allows households to accumulate wealth.

2002; Asfaw and Braun, 2004; Dercon, 2005; De Weerdt and Dercon, 2006; Linnemayr, 2007). This body of literature does not investigate whether migration and remittance receipt are an informal coping mechanism households use to insure consumption against health shocks. Paper 3 of this analysis will fill in this gap by investigating whether remittance receiving households in rural South Africa are better able to insure consumption against health shocks. It will also investigate whether remittance receiving households are better able to avoid costly risk coping strategies, like drawing down savings or borrowing to cover expenses.

2.7 Impact of Migration and Remittances on Health

The literature investigating the impact of migration and remittances on health have focused on their impact on child health outcomes, mainly infant and child survival (Brockerhoff, 1990; Kanaiaupuni and Donato, 1999; Ssengonzi, De Jong, and Stokes, 2002; Frank and Hummer, 2002**;** Hildebrandt and McKenzie, 2005; Mansuri, 2006b).

Brockerhoff (1990) investigates the effect of female migration on child survival in Senegal, concluding that rural-urban migration significantly increases child survival rates. Ssengonzi, De Jong, and Stokes (2002) find similar results when looking at the impact of female migration on child survival in Uganda. Kanaiaupuni and Donato (1999) conclude that though remittances reduce infant mortality in Mexico, the village impact of intense migration increased infant mortality rates. Lopez-Cordova (2005) finds that communities with larger proportions of migrant households are associated with lower rates of infant mortality.

Frank and Hummer (2002) look at the effect of migration on the incidence of low birth weight and find it less likely for migrant children in Mexico to be underweight.

Using the same data set, Hildebrandt and McKenzie (2005) find that migrant households have lower infant mortality and higher birth weight rates. They find that health improvements operate through income and wealth effects, as well as sizeable increase in health knowledge. Mansuri (2006) finds that migration has a large positive impact on sustained growth outcomes for young girls in rural Pakistan, after controlling for selection into migration. Remittances were also found to improve children's health in both Nicaragua and Guatemala, particularly among low-income households (Acosta et al., 2007).

Based on the literature that links improved child health outcomes with increased future productivity and better household poverty outcomes (Haddad et al., 1997; Bhargava, 1998; Thomas and Strauss, 1998; Akachi and Canning, 2007), the research indicates that migration and remittances have an indirect impact on long term development by improving child health. What remains unclear is through which channels remittances result in improved child health outcomes: are remittances being used to purchase higher quality foods, access more frequent or better quality medical treatment, or to improve sanitation and overall household environment?[36] Paper 2 of this analysis will fill this gap by looking at (1) whether remittance receiving households in rural South Africa are spending more on health improving consumption, including investing in health care consumption; and (2) the composition and nature of medical treatment remittance-receiving households are choosing. Amuedo-Dorantes et al. (2007) find that healthcare expenditure rises in response to remittance receipt in Mexico. Both

[36] This could include switching from well water to piped water, using better housing materials, etc.

hospitalization and primary care expenditures are significantly responsive to remittance receipt.

2.8 Dissertation Research

As mentioned above, the literature analyzing remittances' impact on household expenditures has focused more on the investment-consumption tradeoff. Less attention has been paid to the nature of the consumption, in particular whether increased consumption is for health promoting goods, like food, housing, or sanitation. Consumption of these types of good may reduce a household's susceptibility to illness, and promote better health outcomes, both of which should increase household productivity.

Insight into the channels through which private transfers may result in better household health can be garnered by looking at the literature on health impacts of public transfers. This is highly relevant in South Africa, whose social welfare system is intended to target the same populations for the same reasons that remittances are purported. Research on public transfers in South Africa indicates that social grants are associated with significantly better household health outcomes. These include improved weight-for-height indicators for girls, higher expenditure shares on food and education, and better health, education, and nutrition outcomes for children (Maitra and Ray, 2003; Duflo, 2003; Samson et al., 2004; Case and Menendez, 2007). For households that pool income, state pension income protects the health of all household members, specifically improving the nutritional status, living conditions, and reducing stress for adult household members (Case, 2001). Case and Menendez (2007) find similar evidence that

the presence of a pensioner reduces the number of meals missed by both children and adults, indicating that the extra income helps smooth food consumption.

Additionally, remittance income has been studied for its potential to enable households to smooth consumption against uninsured income shocks which could otherwise leave the household vulnerable to poverty (Dercon, 2003). Illness is one of the most sizeable and least predictable shocks to household income in developing countries (Gertler and Gruber, 2002). Ill health can damage traditional social support networks and increase household expenses, impacting the household's capacity to escape poverty or move households below the poverty line (Jalan and Ravallion, 2000; Sen, 2003; Lawson, 2004). Understanding whether households use remittances to cope with health shocks or to smooth consumption can provide insight into whether remittances are protecting households from vulnerability to poverty due to health-related shocks.

As a result, there are at least two main reasons for exploring the impact of remittances on health: (1) health is a non-monetary dimension of poverty, especially in rural areas; and (2) through its effect on health, which can have lagged effects on household income, this addresses a channel through which remittances may influence future poverty.

Section 3: The South African Context

3.1 Pre-apartheid history of migration

The Republic of South Africa (RSA) saw a major political regime shift in 1994, with the end of apartheid. Apartheid was a system that legally institutionalized segregation, from 1948 until 1994. South Africans were racially classified as white, black (African), or colored (of mixed descent). Race laws prohibited marriage between

whites and non-whites, and categorized certain employment for whites only. In 1951, Africans were assigned to live in "homelands" established separate from South Africa, but over which the South African Parliament had hegemony.[37]

Homelands, also called townships, were kept semiautonomous and dependent on funds from the South African government for infrastructure development. Many of these homeland designated areas were in regions incapable of sustaining a livelihood based on agriculture, creating a massive pool of unemployment. The apartheid government purposely reduced land supplies for independent cultivation by African farmers, in order to force households to be dependent on migrant wage labor (Posel, 2001). This created a historical trend of migration for unemployed black workers to other areas in South Africa, to work in mines or on white owned agriculture farms, remitting home cash and goods to support their families.

South Africa has a system of circular migration, a consequence of the restrictions placed on temporary migration of Africans during apartheid. Permanent migration was discouraged; migrants maintained membership with origin households, returning back to rural areas after having worked outside their community for a period of time.[38] African migrants recruited from neighboring states to work in South African mines, agriculture, or domestic services, were only allowed to work for specified time periods, forced to return to their countries at the end of their contractual assignment (Adepoju, 2007).[39]

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[37] From 1976 to 1981, four homelands were created, denationalizing nine million South Africans. Africans living in homelands required passports to enter South Africa.

[38] African migrant workers from the townships were prohibited from bringing their wives and families with them to their places of work.

[39] In regions where cultural affinity and homogeneity of people characterize opposite sides of national borders, international migration can involve shorter distances and fewer barriers than internal migration. This is the case in Sub-Saharan Africa, where short-distance international migration between SSA countries

Botswana, Lesotho, Swaziland, and Mozambique were historically suppliers of temporary migrant labor to South Africa.

3.2 Post-apartheid migration patterns

The end of apartheid saw an end of a system designed to control movement and exclude African outsiders, resulting in new opportunities for internal and cross-border mobility, and new incentives for moving. This coupled with a lack of legal mechanisms for entry and work, created a flood of irregular migration into South Africa from Eastern and Southern African countries. This included highly skilled professionals as well as tradesman and local vendors working in informal markets (Adepoju, 2007). The 2001 Census recorded 2.3% of the total population as foreign-born, of which 67% came from neighboring South African countries (Crush and Williams, 2005). These migrants from neighboring countries tend to be largely unskilled (Gupta, Wagh, and Pattillo, 2007). Instead of encouraging permanent migration domestically, temporary migration continued to increase during the 1990s. By 1999, 1.7 million South African households reported migrant workers, an increase from 1.3 million migrants reported in 1993 (Posel and Casale, 2003).

There has been a feminization of migration that was once dominated by men, in Sub-Saharan Africa, and specifically South Africa (Collinson et al., 2003). This has been facilitated by improved access to education and training opportunities, and the expansion of service sectors locally as well as abroad. By 2005, 42.4% of international migrants from Southern Africa were women, an increase from 30.1% in 1960 (UN, 2007). In

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with miniscule geography elsewhere would constitute internal migration (Adepoju, 2007). Some smaller SSA countries with fluid border migration include Lesotho, Swaziland, Gambia, and Guinea Bissau. Frontier workers maintain semi-permanent residences, commuting from home and farm activities.

South Africa, the history of migrant male wage labor left women in positions of decision making and resource management in origin households. This independence has led to empowerment and an increasing number of women willing to leave origin communities in pursuit of better livelihoods. Statistics from the United Kingdom Nursing and Midwifery Council (UKNMC) registered over 2000 nurses and midwives from South Africa in 2001/02, but only 933 in 2004/5 (UKNMC, 2005).[40]

Migration is prevalent in rural South Africa, and remittances are an important supplement to household income. In the Limpopo province of South Africa, remittances contributed 32% of rural household income – a significant proportion, surpassed only by salary and wage earnings which contributed 40% of total household income (Rwelamira and Kirsten, 2003). Migrants were primarily between the ages of 15-30, and moved away in search of employment. Bowles and Posel (2005) find that family ties and relatedness are strong motivators for remittance from South African migrant workers

In South Africa, there is a parallel informal money remittance system to the formal system; most remittances flow through informal, not formal, channels (Bester et al., 2004).[41, 42] Only authorized dealers who have a banking license and invested in expensive exchange control reporting systems can formally remit funds in South Africa (Gupta et al., 2007). Informal money transfer systems are modeled on the Middle Eastern hawala system, which features anonymity, minimal paperwork, and efficiency.

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[40] The caveat to these statistics is that they are not decomposed by race- Of the skilled trained labor emigrating abroad, it is unknown what proportion are made up of Africans, not Whites.

[41] Informal systems encompass the entire gamut of non-market institutions such as credit cooperatives, moneylenders, informal credit and insurance, rotating savings and credit associations, etc. that do not rely on formal contractual obligations enforced through a codified legal system.

[42] Freund and Spatafora (2005) estimate that informal remittances to SSA constitute 45-65 percent of formal flows to the region.

Underdeveloped financial infrastructure lowers competition and raises transaction costs associated with sending remittances through formal channels. A study in South Africa found that the cost of an international transfer of 250 rand was lowest through a friend or taxi driver, and highest through a bank (Genesis Analytics, 2003).

3.3 Post-apartheid economic context and social grants

In its first decade post-apartheid, RSA saw rising unemployment, income poverty, and income inequality. In September 2003, 4.6 million people were unemployed- In the 16-34 age group, 70% of the unemployed had never worked, while 59% of all the unemployed had never worked (Statistics South Africa, 2003).

In an attempt to reverse the economic bias of a system previously built on racially exclusive policies, and to address structural unemployment the government expanded the number and scope of public social grants it offered from 1994-2004. The impetus behind issuing social grants was partly to achieve a more egalitarian society by redistributing wealth.

South Africa is unique amongst other African countries, because it has a well developed welfare system in place for vulnerable populations. The Constitution of South Africa (Act No. 108 of 1996) provides that all citizens unable to support themselves or their dependents have a right to social security, including appropriate social assistance from government (Twine et al., 2007). South Africa's welfare system provides means-tested non-contributory old-age pensions for elderly, disability grants for those too ill or incapacitated to work, and child support grants for caregivers of children.[43] These major

[43] There are also foster-care grants, care-dependency grants for children under 18 with disabilities, and war-veterans grants amongst others.

social security grants are financed through general tax revenues, and administered by the South African Social Security Agency.

Approximately ten million social grants are paid out each month, roughly 3 per cent of the gross domestic product (GDP) (Nattrass, 2006a). The take-up of the disability grant alone rose from 600,000 in 2000 to 1.3 million in 2004 (Nattrass, 2006b). In 2003, state transfers contributed two thirds of income for the poorest quintile; the poorest quintile received the largest portion of grants (Dept of Social Development, 2003). Approximately seven million South Africans (total population 45 million) received a social security grant – total spending in 2004/05 amounted to US$7 billion, representing 10.2% of total government spending (Samson et al., 2006).

The child-support grant was introduced in April 1998, targeted to meet children's basic needs. This grant was paid out to the primary caregiver of children under the age of 7. Research indicates that despite its intention to be pro-poor, the poorest households were less likely to apply for child-support grants than those in higher socioeconomic bands, and face greater barriers to accessing grants (Twine et al., 2007). Only 28% of households with children eligible for the grant were accessing it in 2001, in a sub-district of Agincourt, South Africa. In KwaZulu-Natal, only 36% of caregivers of children under-seven years had applied for the child support grant in 2002 (Case et al., 2005). The authors also note that households with greater numbers of age-eligible children to receive the grant reported receiving a large number of grants.

These grants are important not only for their contribution to household income, but also because of their subsequent impact on household and individual behavior. There is considerable research on the effects of the social pension system on African

households (Case and Deaton, 1998; Jensen, 1998; Duflo, 2003; Edmonds et al., 2004). Research shows that pensions have a negative influence on labor supply in South Africa (Bertrand et al., 2003). However, when Posel et al. (2004) expanded the same dataset to include non-resident household members, they found a positive relationship between social pension receipt and labor force participation. These results suggest that the public grant receipt enabled household members to migrate to other places in search of employment. Despite economic theory which suggests that social grants reduce the opportunity cost of leisure and therefore should undermine labor force participation, households receiving social grants are correlated with higher labor force participation and employment rates (Samson et al., 2004, Posel et al., 2004).

Social grants have also been associated with higher probability of a household having a migrant. South African women were more likely to migrate if there was a pension-receiving resident in the origin household (Posel et al., 2004; Edmonds et al., 2004). The pension-receipt may work through two channels influencing likelihood of migration: the extra income from the grant helps finance migration, and/or the pension enables the elderly to look after themselves, allowing working-age adults the freedom to pursue employment elsewhere.

Section 4: Data – KwaZulu-Natal, South Africa

4.1 Regional Context

Kwazulu-Natal (KZN) is the most populous of South Africa's nine provinces, home to a fifth of South Africa's population (Woolard and Klasen, 2005). It was formed by combining the Natal province with the poor and largely rural former Zulu homeland. Households in rural KZN are supported by a combination of small-scale crop and

livestock agriculture. The largely subsistence agrarian economy coupled with poor local economic conditions contributes to a cycle of temporary migration to larger urban labor markets.[44] From 1994-1999, macroeconomic growth in KZN was limited to just over 1 percent a year, leading to large unemployment rates of over 30 per cent (Sienaert, 2007).

Migration is likely to be an income-diversifying household strategy in an environment characterized by limited local income opportunities plus inherently risky subsistence agriculture. Both result in stochastic income risk; migration and remittances are likely risk-coping mechanisms. Woolard and Klasen (2005) find that changes in remittance income accounted for 10% of household transitions in and out of poverty in KZN between 1993 and 1998.

Household size is another important feature of households in KZN which might drive migration. With larger number of dependents (children, the elderly, disabled), there are economic pressures from within the household that might cause working age adults to seek employment outside KZN. Evidence supports this idea: Posel (2001) finds that migrants' children and parents are the most common recipients of remittances in KZN.[45] Research indicates that public transfer receipt by a household member is another important predictor of migration in KZN. Sienaert (2007) finds that public transfer income crowds in private transfers in KZN, i.e. receipt of public transfer income raises the probability of migration.[46]

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[44] South Africa's second largest city by population, Durban is on the coast of KZN. Johannesburg, the country's capital, lies 500km north.

[45] She finds that relative to earnings, women remit more generously than men.

[46] Information from this section will be exploited when creating an instrumental variable to instrument remittances from migration.

4.2 KwaZulu-Natal Income Dynamics Study

The role of quality and completeness of data has been an important issue given the political impact of analytical work done in South Africa since 1994. Longitudinal data facilitates extracting nuanced information on poverty, inequality, and labor market issues. This is because the dynamics of how these relationships change over time can be better tracked with repeated observations of individuals and households.

The KwaZulu-Natal Income Dynamics Study (KIDS) is a longitudinal survey that follows a random sample of individuals and households who lived in the eastern province of KwaZulu-Natal, South Africa. Three waves of interview were conducted, in 1993, 1998, and 2004.[47, 48] The data was collected with the aim of addressing policy research questions about how political, social, and economic changes were affecting South Africans, African, and Indian persons (Carter and Maluccio, 2002).

The original 1993 survey instrument was a comprehensive household survey collecting information on the socio-economic and demographic conditions of households. Sections of the survey included household environment, education, food and non-food expenditures, remittances, employment and income, agricultural activities, health, and anthropometry. In addition, a community survey was administered in each survey cluster

[47] KIDS is a subset of the first South African national household survey, the Project for Statistics on Living Standards and Development (PLSD) which was undertaken in the last half of 1993. Households in KwaZulu-Natal Province were re-surveyed from March to June 1998 and 2004 for the KIDS study.

[48] KIDS was a collaborative project between researchers at the University of KwaZulu-Natal, the University of Wisconsin, London School of Hygiene and Tropical Medicine, International Food Policy Research Institute (IFPRI), the Norwegian Institute of Urban and Regional Studies and the South African Department of Social Development. In addition to support from these institutions, the following organizations provided financial support: Department for International Development- South Africa (DFID-SA); the United States Agency for International Development (USAID); the Mellon Foundation; and the National research Foundation/Norwegian Research Council grant the University of KwaZulu-Natal.

to collect information common to households in an area, through interviews with key informants.

4.3 Sample Design

The original 1993 sample was selected using a two-stage self weighting design. First, clusters were chosen with probability proportional to size from census enumerator sub-districts, or approximate equivalent if none were available. Second, all households in each cluster were enumerated, from which a random sample was selected. Individuals residing in clusters are in geographic spatial proximity, but do not necessarily constitute a community in the sociologically meaningful sense.

From the 1993 sample, core persons from 1132 households (83.6%) were successfully re-interviewed between March and June 1998. Core persons were identified as main decision makers within a household. This designation was chosen instead of self-declared household head in order to capture the cultural complexity and cultural diversity of South African households. It was decided not to re-survey the small number of white (112) and colored (53) households in 1998, so the 1998 sample only includes African and Indian households.

The 3rd round of the KwaZulu-Natal Income Dynamics Study (KIDS) dataset contains information on the socio-economic circumstances of households. This 3rd round conducted in 2004 re-interviewed households contacted in 1993 and 1998. The third round of the study interviewed 867 households containing core members from 760 of the households contacted in 1993. For 180 of these 760 ‘dynasties’, information was also collected on next generation households that had split off from them.

Analyses by other researchers who have used all three waves of KIDS have found that attrition rates appear to be within acceptable limits between 1993 and 2004. Young adults and smaller, and perhaps poorer, households are underrepresented. The age distribution of the resident members of the core and next generation households matches that of the African and Indian population of KwaZulu-Natal reported by Census 2001. The mortality results suggest that the proportion of people at ages 20-44 dying between the second and third rounds was nearly three times the proportion dying between the first two rounds. This is most probably capturing an important portion of HIV/AIDS-related mortality. The pattern of income distribution is one of increasing poverty and inequality since 1993, although there is indication of a partial reversal of these trends in the post-1998 period.

4.4 Data and Summary Statistics

In constructing the panel used for this research, the 1998 and 2004 waves were used, and efforts were made to ensure that 2004 households that split from their 1998 counterparts were kept in order to maximize information. There was some loss of information as a result of differences in the survey instrument administered across waves.[49] The final sample includes 1374 households for which complete information could be collected across both waves.

Table 1 lists the descriptive statistics which summarize the KZN dataset that the next two papers will draw upon. The variables have been grouped under household

[49] There was some loss of information as a result of difference in the survey instrument administered across waves. For example, remittance-sending migrants are only uniquely identified in the 1998 survey, making it difficult to construct a true individual level remitter panel. This information was not collected in 2004, and it was not possible to track (1) whether the same migrants were remitting across both waves, and (2) migrant location which would indicate whether remittances were international or internal. As a result no remitter specific information was included in this analysis.

characteristics (labor market, human and physical capital), household head characteristics including pension (OAP) and health (ADL) status, and main monthly income sources.

Table 1: Descriptive statistics of select variables by remittance and year

	1998				2004			
	Mean	*Std. Dev.*	*Min*	*Max*	*Mean*	*Std. Dev.*	*Min*	*Max*
Household characteristics								
Household size	7.49	4.41	1	27	6.04	3.58	1	29
Fraction age 0-5	0.11	0.12	0	0.67	0.09	0.12	0	0.60
Fraction age 6-17	0.30	0.20	0	1	0.29	0.21	0	1
Fraction agen18-49	0.42	0.21	0	1	0.43	0.24	0	1
Fraction age 50+	0.17	0.19	0	1	0.16	0.22	0	1
Fraction unemployed	0.18	.19	0	1	0.20	0.22	0	1
Fraction employed	0.17	.20	0	1	0.21	0.24	0	1
Number of deaths	0.33	0.58	0	4	0.38	0.75	0	6
Rural (0/1)	0.67	0.47	0	1	0.67	0.47	0	1
Agriculture (0/1)	0.34	0.47	0	1	0.42	0.49	0	1
Number of durables	5.21	1.90	1	10	5.94	2.22	1	13
Value durable	17782	38347	20	656500	28505	56912	0	576000
Household Head								
Age (years)	56.29	14.39	19	100	46.51	18.38	6	98
Education (years)	3.80	3.53	0	16	7.05	4.70	0	16
Resident (0/1)	0.90	0.29	0	1	0.95	0.22	0	1
Employed (0/1)	0.41	0.49	0	1	0.38	0.48	0	1
Receiving OAP[1] (0/1)	0.34	0.47	0	1	0.20	0.40	0	1
Female (0/1)	0.54	0.50	0	1	0.46	0.50	0	1
ADL[2]	0.49	0.40	0	1	0.45	0.38	0	1
Household income sources (monthly, South African rand)								
Per capita Income	478	1117	2.79	25144	937	2281	0.75	48775
Subsidy	46.93	218.61	0	2524	56.47	569.23	0	15400
Remit (0/1)	0.44	0.50	0	1	0.27	0.45	0	1
Value remittances	146.71	295.92	0	4000	119.15	380.45	0	8000
Percent remittances	0.13	0.26	0	1	.098	.300	0	1
State transfer (0/1)	0.49	0.50	0	1	0.54	0.50	0	1
Value state transfer	304.59	405	0	5000	446.14	685.54	0	13000
Number of CSG[3]	0	0	0	0	0.34	0.51	0	3
Value of CSG	0	0	0	0	95.10	176.53	0	1800

Notes: Tabulated from KIDS panel data. N= 1374.
[1]Old Age Pension: Whether Household head receives a pension from the government.
[2]Activities of Daily Living: Household head's self-reported ability to perform varying labor intensive activities.
[3]Child Support Grant: Whether household receives a child support grant, which was introduced shortly before the 2004 survey.

The mean household size decreased between 1998 and 2004, while the fraction of adults employed as well as unemployed increased by 3% and 2%. The percentage of households involved in agriculture increased from 34% to 42% while household wealth increased by an average of 10,723 Rand over this period.

A closer look at household characteristics between the two periods indicates that the household head in 2004 was on average 10 years younger, had slightly more years of education, was less likely to receive a public pension, and less likely to be a woman. The ADL index captures an individual's self reported health status by asking their ability and comfort in performing a variety of physical activities. The index takes a value of 1 if an individual can perform all ADLs without any physical limitations, and approaches zero the more difficulty an individual has in performing any ADLs. From the mean statistics, it appears that household heads faced less challenge in performing ADLs on average in 1998 than 2004. The number of deaths in a household also increased during this period, and could be reflective of the HIV/AIDS epidemic afflicting this region during that time.

The most interesting dynamics however are the variations in income source between 1998 and 2004. While remittance receiving households decreased from 44 to 27 percent, households receiving state transfers increased from 49 to 54 percent between 1998 and 2004. This indicates that a relationship between remittances and state aide may exist. Remittance income made up roughly 13 percent of household income in 1998, but decreased to 9.8 percent by 2004. What is not clear is whether the increase in public transfers are crowding in migration but crowding out remittances sent back home, or whether public transfers are crowding out both migration and remittance receipt.

Section 5: Conclusion

The debate over economic migration and the impact of remittances on household welfare, poverty, and economic growth has motivated the enormous body of research which has investigated these different streams over the last twenty years. This dissertation will contribute to the evidence base by examining the different ways that health may be a channel through which remittances influence household welfare and vulnerability to poverty. It will specifically investigate these relationships by looking at panel data collected over ten years from the KwaZulu-Natal province, in South Africa.

The KIDS dataset corroborates earlier findings of socio-economic trends occurring in South Africa between 1998 and 2004. The next two papers will use the dataset to explore how remittance receiving households differ from non remittance receiving households in their household consumption and investment in health promoting goods. This data set will also be used to analyze whether remittance receiving households are better able than non remittance receiving households to smooth consumption after suffering from a health shock. In addition it will try to analyze the interaction between public (state grant) and private (remittances) transfers receipt. This is important given the concern regarding the extent to which public insurance programs and state transfers crowd out private savings. The results will inform policy implications regarding whether and how remittance behavior should be encouraged, especially within a context of household dependence on state grant aide to supplement household income.

Paper 1 - References

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Paper 2

Do migrant remittances affect household consumption of health promoting goods and services? Evidence from KwaZulu-Natal, South Africa.

Abstract: This paper uses panel data from the KwaZulu-Natal Income Dynamics Survey to investigate whether migrant remittance receipt influences expenditure patterns of recipient households. Working-Leser Engel curves are estimated for six budget share, in addition to four health budget share equations. The study finds that remittance receiving households spend a larger budget share on food and health, and also concludes that remittances have a differential influence on expenditure patterns dependent on income quintile. Remittances have a larger impact on expenditure patterns for poorer households, and evidence suggests that while wealthier households may pool income, poorer households adjust expenditure patterns based on income source. The results indicate that remittances are enabling poorer households to access better quality medical care suggesting that private transfer receipt is improving household welfare for the poorest households.

Section 1: Introduction

Understanding how remittances influence household health expenditures and consumption of health promoting goods and services will better inform pro-poor health and social protection policies in South Africa. Health, often conditioned on adequate access to health care, is a crucial dimension of well being (Appleton, 1996). Beyond access to medical care, social and economic conditions contribute to health status; lifestyle, living, and working environments influence susceptibility to illness. As a result, there is a role for public policy in improving health outcomes that goes beyond improving access to quality health care, especially for the poor. Public policies that address food

security, housing, employment, poverty, and education create a social environment conducive to better health.[1]

In addition to well-being, improved health outcomes are central to poverty reduction and economic growth (Dodd et al., 2004). The negative consequences of ill-health can entrench households into cycles of disease and intergenerational poverty.[2] South Africa evidence shows that households with a greater number of unhealthy individuals are 60% more likely to be income poor than households with fewer unhealthy individuals (Godlonton and Keswell, 2004). Life expectancy is shorter for people lower down the social ladder; individuals in lower income quintiles face twice the risk of serious illness and premature death than those near the top (WHO, 2003).

The most direct link between morbidity and household poverty is through incurred income loss and medical expenses, which can then result in asset depletion, indebtedness, and cuts to essential income and food consumption (Russell, 2005). Individuals may purposely forego treatment if they lack sufficient resources to access care, pay for medicines, or may be unwilling or unable to reallocate household resources for their treatment.[3] This is a problem in areas where there are insufficient public funds dedicated to finance equitable access to quality and well-resourced public health care. In South Africa, although the public sector provides free primary care, it is generally ill-equipped and understaffed, unable to provide required services or medications for treatment (Dept. of Public Service and Administration, 2006). The better resourced

[1] The unequal distribution of social and economic determinants of health like income, employment, housing, and education produce inequities in health (Graham, 2004).

[2] The consequences of ill-health on poverty are especially relevant in South African, which currently faces one of the highest HIV prevalence rates in the world (Visser and Booysen, 2004).

[3] Reduced food consumption may interfere with a patient's treatment and recovery, and compromise the health of other household members.

private sector caters to middle and upper-income classes, where greater out-of-pocket expenditures are required.[4]

Research has identified two important channels through which migration can directly impact healthcare access (Amuedo-Dorantes et al, 2007; Kanaiaupuni and Donato, 1999). First, remittances can alleviate household income constraints and finance the costs of accessing healthcare, reduce inequities in accessing health care, or help maintain household consumption during an unexpected health shock (Wagstaff, 2005; Gertler and Gruber, 2002). Second, social and migrant networks also provide informational resources, which could motivate households to adopt healthier lifestyles or better health seeking behavior (Hildebrandt and McKenzie, 2005).

Remittances can also have an indirect influence on health status by addressing the social determinants of health. Though remittances may not be explicitly invested in increased health care use, they can be spent on goods and services that result in healthier conditions, like better sanitation, housing, nutrition, or access to clean water. This contributes to better household health, by reducing susceptibility to illness and therefore the need to access care. Public policies addressing social determinants of health require inter-sectoral policy-making and longer time horizons to achieve objectives. Given the shorter timescales that characterize most political initiatives, it is difficult to mobilize support for policies that could otherwise improve inequities in health.[5] Remittances are private transfers that overcome time horizon issues, plus finance what the household deems necessary to achieve a healthier environment and improve household health.

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[4] This inequity in access contributes to the wide geographic and income disparities in health outcomes observed in South Africa, see Table 1.

[5] The tenure of elected or appointed officials is measured in months and years rather than the decades required to witness significant change from policies directed at improving the social determinants of health.

This paper will investigate how remittances influence household expenditure in rural South Africa. Remittances are purported to be treated like additional household income, which may influence household consumption and investment patterns.[6, 7] This paper will examine whether remittance receiving households spend a higher share of their income on health promoting goods than households that do not receive these transfers, including food, health, and education. Further, this paper will analyze whether remittances are influencing health care access and the amount spent on public, private, and traditional health care. Given South Africa's well developed welfare system, the analysis will control for whether the household receives public assistance, since this source of income might also influence outcomes of interest.

This paper is organized as follows. Section 2 of this paper introduces how health fits into a pro-poor policy framework, and how remittances can be leveraged by resource constrained governments to achieve health promoting outcomes. This section also reviews the literature analyzing the impact of migration and remittance receipt on household expenditures, and provides background on the South African health care system. Section 3 details the conceptual framework for the consumer model of demand that is used to derive the econometric specification in the fourth section. Section 4 introduces the methodology used in this paper. Section 5 describes the data. Section 6 presents the results. Section 7 contains a summary of the findings and a discussion of the subsequent policy implications.

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[6] Case and Deaton (1998) find that a Rand of pension income in South Africa is spent the same way as a Rand of any other income, implying pooling of income in South African households.

[7] To the extent that private transfers and public pensions perform similar functions, there is likely to be crowding out of the former by the latter (Maitra and Ray, 2003).

Section 2: Background

There is strong evidence that supports the centrality of health in addressing poverty reduction (CMH, 2001). Health is a key determinant of economic growth and poverty reduction because it impacts income generating capacity. Nutritionists and economists have identified two important ways morbidity reduces productivity: (i) reduced labor supply from sick individuals or those who must care for them; and (ii) reduced efficiency because inadequate energy levels reduce capacity to work or increase time required to complete tasks (Deolalikar, 1987; Thomas and Strauss, 1998; Thomas and Frankenberg, 2002). Infant and child malnutrition have been linked to poor school attendance, scholastic performance, and subsequent labor market opportunities (Haddad et al., 1997; Bhargava, 1997; Akachi and Canning, 2007). Better adult height, body mass index (BMI), and per capita caloric intake are associated with higher wage earnings (Thomas and Strauss, 1997).

People living in extreme poverty tend to enjoy less protection against ill-health and have more frequent and severe disease complications which place greater demands on health care resources.[8] Poverty itself is often an impediment to the poor's capacity to seek adequate health care when sick. Research which has attempted to identify the causal impact of income on health has found evidence of a positive relationship at the micro (Strauss and Thomas, 1998) and at the macro (Bloom and Canning, 2003; Bloom and Canning, 2004) levels. Compounded by insufficient public resources to treat the poor, there are multiple paths through which ill health contributes to further poverty. The direct and indirect expenses incurred during an illness period are often a large share of

[8] Poor and vulnerable populations also face greater instances of premature mortality, maternal mortality, HIV/AIDS infection rates (WHO, 2005).

the household's disposable income and can impoverish households if not drive them into deeper poverty. Health is one of few assets for the poor, significant in its ability to provide their capacity to earn income. Given the reinforcing and intertwined nature of health and poverty, government policies and interventions that improve the health of the poorest, should also help to reduce poverty (Dodd et al., 2004).

2.1 National Health Strategies and Poverty Reduction – Role for Remittances

Governments have employed standard pro-growth macro-economic policies for decades, whose aims include expanding economic output to achieve poverty reduction. Research findings on the impact of growth on absolute income poverty are inconclusive, and the relative roles that governments and markets play in poverty reduction remain under debate (Hunter et al., 2003). This has led to questioning the role for government policy in addressing poverty, including how initial wealth inequality and asymmetric information result in incomplete markets and inefficient economic growth (Bardhan et al., 1998; Alesina and Rodrik, 1994).

In an attempt to promote "pro-poor" government policies, the World Bank requires low-income countries to prepare Poverty Reduction Strategy Papers (PRSP) to qualify them for development assistance.[9] PRSPs are national planning frameworks that focus public sector priorities on reducing poverty by thoroughly profiling the state and extent of poverty unique to the country, and the measures required for its reduction. These multi-sectoral plans recognize poverty as multidimensional, identifying ill-health

[9] PRSP preparations are mandatory for national governments that want to qualify for Highly Indebted Poor Country (HIPC) status, and be considered for debt relief or concessional assistance on loans. Concessional assistance refers to loans through the International Development Association, which provides long-term loans at zero interest to the poorest developing countries.

as a characteristic of poverty.[10] But with so many competing needs from various underfinanced and resource-constrained sectors, most PRSPs fail to properly outline a poverty-focused health strategy.

Pro-poor health strategies include cross-sectoral approaches to address social determinants of health in poverty reduction strategies. This addresses the quality and availability of potable water, sanitation, and nutrition; housing and shelter conditions; and access to health care, including how the health system's organization and financing influences health care utilization. Most PRSPs focus solely on government delivery of health services to reach health goals; there are three notable exceptions where health is addressed in other sectors (Dodd et al, 2004). In Burkina Faso, sanitation facilities will be built in schools; in Ethiopia, rural and telecommunication schemes are being developed to improve rural health services; and in Zambia, the energy sector will fit rural health centers with solar panels as part of its energy strategy (WHO, 2005).

Despite the recognition that improved health outcomes are central to poverty reduction and economic growth in most PRSPs, there are few strategies outlined to address ill health (Dodd et al., 2004). There is little systematic identification of the health issues that are the biggest contributors of poverty, beyond noting that the poor have the worst health and are unable to afford health care fees. In fact, the budgets presented in most PRSPs will not result in large increases in resources available for health. Without a sufficiently funded comprehensive and cross-sectoral strategy to tackle the health situation of the poor, the health-poverty nexus is likely to undermine already over burdened public health resources.

[10] The policies and measures outlined to reduce poverty are intended to be the result of a participatory process involving civil society, various levels of government, and developing partners.

Given that many developing countries are unable to meet their current health commitments and that budgets presented in PRSPs do not reflect the importance of improving health delivery to achieve poverty reduction, governments need to look to new sources of financing and raising capital to meet their health obligations. If remittances are enabling households to consume and invest more in health promoting goods, including improving health services utilization, then there is a role for government involvement to encourage private behavior that has positive social externalities.[11]

For example, the public sector can find ways to reduce the cost of formally transferring money, which might otherwise encourage sending money through informal channels. If the cost to remit is above the marginal cost of sending money, then the amount remitted will be below the socially optimal level (Solimano, 2003).[12] Public policy can be used to create a market for financial institutions that provide access to transfers, and improve efficiency through competition amongst these financial intermediaries.[13, 14] Anecdotal evidence from Somaliland indicates that remittances from the Diaspora in the United States were used to build hospitals (Sorensen, 2004). The World Bank estimates that the Malian Diaspora in France helped build 60 per cent of local infrastructure (World Bank, 2005). There might also be a role for partnerships

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[11] In many parts of Africa, economic migration is still seen as negative by policymakers, attributed to population growth, break-down of traditional family structures, promoting crime, and the spread of diseases. There are some exceptions: In the Niger and Rwandan PRSPs, it is noted that internal migration can boost household incomes for the poor.

[12] The two main cost components in sending remittances are the actual fee and the exchange rate spread.

[13] Higher interest rates on term deposits, foreign currency denominated banking accounts, and tax incentives are examples of mechanisms aimed at mobilizing remittances for investment. Countries with formal remittance policies include El Salvador, Nicaragua, Honduras, and Guatemala.

[14] The public sector can also play a role in incentivizing the increase in number of bank branches to rural populations in order to facilitate remittance receipt in origin communities. Along with access to bank accounts, improved access to credit and savings is also achieved through increased bank branches for otherwise marginalized populations.

between Diaspora emigrants and local and sub-national governments to better identify and finance community health initiatives. The state government of Zacatecas in Mexico began a formal two-for-one "matching fund program" in order to expand and formalize projects financed by migrant communities in the US- including service delivery projects like potable water, health infrastructure, and equipment.[15, 16] This is especially true in areas where current public resources are insufficient- private transfers can be leveraged with public resources to finance and fill in gaps in health infrastructure, human resources, and treatment to improve access to health care for indigent populations.

2.2 Impact of remittances on household expenditures

A number of researchers have analyzed the impact of migrant remittances on household expenditure behavior in different developing countries. While some studies have concluded that remittances are consumed instead of invested (Chami, Fullenkamp and Jahjah, 2003), other researchers have concluded the opposite (Maitra and Ray, 2003; Zarate-Hoyos, 2004; Adams, 2005; Taylor and Mora, 2006; Castaldo and Reilly, 2007). Maitra and Ray (2003) find that private transfers have a significant impact on household expenditures in South Africa. In particular, remittance receiving households have higher budget shares devoted to food and clothing. Unlike Case and Deaton (1998) who find evidence of income pooling in South Africa, the authors find that income from private transfers, pensions, and other resources have different impacts on household

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[15] Along with matching support form municipal governments in Zacatecas, the three-for-one matching program grew from $300,000 in 1997 to $43.5 million by 2002, financing projects in 1,334 municipalities; 25% of which came from Mexican communities in the US (Rempell, 2005). Of these projects, 25% went to community health improving investments.

[16] Cape Verde and Senegal are two countries in Africa who's PRSPs propose strategies to promote remittances and engage emigrants in national development. Mauritania emphasizes creating viable jobs in urban areas rather than trying to prevent rural-urban migration.

expenditures. For poor families, they find evidence that public pensions crowd out private transfers, whereas for non-poor families, public and private transfers are complements.

Zarate-Hoyos (2004) show that remittance receiving households have lower average expenditures per household in most spending categories which include, food, health, and education. Household expenditure patterns in their Mexican dataset indicate that remittance receiving households invest and possibly save more than non-remittance receiving households. Remittance receiving households are found to have lower income elasticities for current consumption and for durable consumer goods expenditures.

Adams (2005) finds that remittance receiving households in Guatemala spend less on the margin on consumption of food, consumer goods, and durables. Instead they spend more on investment goods like education, health, and housing. Taylor and Mora (2006) investigate the impact of international and internal remittances on rural household expenditure using a Mexican data set. They find that households receiving international remittances have a larger marginal budget shares for investments, health, and consumer durables, and small budget shares for food and housing. Households with internal migrants have larger marginal budget shares for health, housing, services and education. Castaldo and Reilly (2007) find that households receiving remittances have a higher marginal propensity to consume food items relative to non-remittance receiving households in Albania. More importantly, the authors suggest that as households become wealthier, they tend to switch from poor quality to better quality food types. In addition, they find evidence that remittances tend to increase a household's propensity to consume

investment-type goods, like durables, which can have important multiplier effects within the local economy.[17]

Amuedo-Dorantes et al. (2007) find that healthcare expenditure rises in response to remittance receipt in Mexico. Hospitalization expenditures are particularly responsive to remittances; however, remittance receiving households spend between 6 and 9 percent of remittance receipts on primary care expenditures. They conclude that to the extent that primary care services are preventative in nature, remittance income can have significant impacts on health outcomes. Their investigation also finds that the effect of increases in non-remittance income on household healthcare expenditures is smaller than the impact of remittance income. The authors conclude that this differential may result from household's greater flexibility to redirect remittance income towards unexpected expenses.

Overall, the empirical evidence regarding where the additional income from remittances is spent at the margin is mixed. With the exception of the evidence presented by Zarate-Hoyos (2004), the other studies conclude that remittance receiving households are either consuming more health promoting goods like housing and food, or investing in health promoting activities like health and education. This study will contribute to the debate by analyzing household expenditure patterns in KwaZulu-Natal, South Africa, and then look more closely at the types of health care resources remittance receiving households are accessing. To better analyze and appreciate the role of remittances on health care use and expenditures in South Africa, it is important to understand the South African health care system and the constraints it faces.

[17] More money in hand for the local community can translate into increased or improved community infrastructure and facilities.

2.3 South African Health Care System

South Africa's health system consists of a large public sector and a smaller, but well funded, private sector which caters to the middle and upper-income classes. In 2004, total expenditures on health were 8.8% of gross domestic product (WHOSIS, 2007). While 40.4% of these health expenditures were financed by the public sector, 59.6% were funded from the private sector. Government expenditure on health was 10.8% of total public spending in 2004; 4.3% of this expenditure came from social security expenditure on health. There is one central ministry and nine provincial departments – the public health system serves just over 80% of the population (Rispel and Setswe, 2007).

Post-apartheid, the African National Congress had a goal to create a National Health Service from the existing inequitable and fragmented health care system. There were disparities in allocation of resources between and within provinces (McIntyre et al, 1998). With insufficient public resources to realize this goal, state funds were targeted to provide basic primary and preventative care, subsidizing care to those demonstrating an inability to pay. Fees are charged on a sliding scale basis – the cost incurred is dependent on the patient's salary and number of dependents. Pregnant and breastfeeding women and children under 6 receive free healthcare. Pensioners and other social grant recipients are also charged less. In 2004, per capita government expenditure on health was US$157.50 (WHOSIS, 2007).

Despite policy and program initiatives aimed at reducing inequities between the public and private sector since 1994, there are still disparities in health spending, health care professionals, and access to care between the two sectors (McIntyre and Gilson,

2000; McIntyre and Gilson, 2002; Sanders and Chopra, 2006; Day and Gray, 2007). The public sector is very under-resourced. In some provinces, vacancies in the health sector are as high as 40% (DPSA, 2006). Public hospitals and clinics are generally overcrowded with patients and treatment usually costs time and money. In contrast, the private health sector is well developed, resource intensive, and highly specialized (Day and Gray, 2007). Expenses beyond basic primary care or for private care must be covered out-of-pocket or through health insurance. In 2004, out-of-pocket expenses and private prepaid plans made up 17.2% and 77.5% respectively of private expenditure on health (WHOSIS, 2007).

Health insurance is provided through medical schemes mainly sponsored by employer and employee contributions. These medical schemes cover about 14% of the South African population; access to medical schemes is strongly influenced by income (McIntyre et al, 2003; McLeod and Ramjee, 2007). There are racial and geographical inequities in medical scheme coverage. In 2006, the White population was nine times more likely to have coverage than the Black African population, and urban provinces had higher coverage rates than rural provinces (StatsSA, 2007).

The result of these medical coverage schemes on the South African health system go beyond inequities in access. There are urban-biases in distribution of facilities and technologies, health professional bias towards the private sector, and bias toward hospital care provision instead of preventive care (Van Rensburg, 2007; Day and Gray, 2007).[18] These are causing rising medical costs which are forcing medical schemes to increase

[18] 62% of medical practitioners and 75% of specialists work in the private sector, while the percentage of medical specialists in the public sector has decreased from 34% to 25%. The public ratio of nurses has also reduced from 12 per 10,000 population to 10.7 per 10,000 population (Van Rensburg, 2007).

premiums, and forcing individuals out of coverage. If spiraling costs in the private sector are not contained, it will also reduce the percentage on health that the public sector can afford (Blecher and Harrison, 2006).

Section 3: Conceptual Framework

Most models of household expenditures assume that households allocate their budgets across expenditure categories so as to maximize utility from current consumption of goods or services, or in the future, from investment expenditures.[19] Consider a household of S members, each of whose utility U^s depends on the commodity consumption of all household members, such that $x = \{x_{is}\}, i = 1,...,I; s = 1,...,S$; i indexes commodity and s indexes the individual.[20] Therefore, $U^s = U^s(x; Z; \varepsilon)$ where Z, ε denote the set of household and individual level characteristics. The household maximizes household welfare:

$$W = W\left[\{U^s(x; Z, \varepsilon)\}_{s=1}^{S}\right] \tag{1}$$

subject to the income constraint:

$$p'X = \sum_{s=1}^{S} I_s \tag{2}$$

Where p is the vector of prices faced by the households (assumed to be fixed exogenously), X is the vector of aggregate demand $\left(X_i = \sum_s x_{is}\right)$, and I_s is household income accruing to individual s. The solution is a set of reduce form demand equations:

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[19] The standard consumer model assumes that the budget is fixed and exogenous, whereas the agricultural household model takes the budget as the endogenous outcome of household labor allocations and/or production choices (Taylor and Mora, 2006).

[20] This section draws from Maitra and Ray, 2003.

$$x_{is} = x_{is}\left(I_1,...,I_s; p, Z, \varepsilon_{is}\right) \tag{3}$$

Aggregated over *S* individuals in the household, the demand functions take the form:

$$x_i = \sum_{s=1}^{S} x_{is} = x_i\left(I_1,...,I_s; p, Z, \varepsilon\right) = x_i\left(\sum_{s=1}^{S} I_s; p, Z, \varepsilon\right) \tag{4}$$

Most consumer models assume that households pool their income $\sum_{s=1}^{S} I_s$, which then ignores income-source effects on expenditure. This assumption is not unreasonable if remittances are fungible like any other source of income. This implies that the marginal change in income from remittances has the same effect on expenditures as a marginal change in any other income source. In this model, remittances are limited to indirect effects operating through total income, therefore an increase in remittances shifts the household budget constraint outwards by the amount of the remittance transfer (Taylor and Mora, 2006). This raises (decreases) the demand for normal (inferior) goods. Recent studies have allowed income sources I_s to vary: In addition to household income *Y*, remittance income *R* and income from public grants *P* have also been included to the demand functions (Maitra and Ray, 2003; Adams, 2005; Zarate-Hoyos, 2004; Taylor and Mora, 2006; Castaldo and Reilly, 2007). Equation (4) can then be re-written:

$$x_i = x_i\left(R, P, Y; p, Z, \varepsilon\right) \tag{5}$$

Indexing households by *h*, this paper will estimate the following budget share equations:

$$w_{ih} = f(E_h, R_h, P_h, Z_h) + \mu_{ih} \tag{6}$$

w_{ih} is the budget share of item *i* in household *h*, such that $w_{ih} = x_{ih}/x_h$, $x_h = \sum_i x_{ih}$.

E_h is total household expenditures, and used instead of household income as is done in most demand studies. Z_h is the vector of household and community characteristics which influence household expenditures, and μ_{ih} is an error term that is assumed to be approximately normally distributed with mean zero and variance σ^2.

Section 4: Econometric Specification and Methodology

The econometric approach models household demand equations as a function of income, prices, socio-demographic variables, and whether the household receives remittances. Demand is proxied by looking at expenditure data, which capture both resource constraints as well as preferences.[21] The amount a household chooses to spend on food, housing, health, or education may reflect beliefs about the relative value or necessity of each good, not just the ability to purchase these items. This approach (1) is consistent with consumer demand models which assume that income from diverse sources is pooled into a common household budget constraint, and (2) allows for the possibility that migrant remittances may have an independent effect on expenditure patterns (Taylor and Mora, 2006).

In choosing the appropriate functional form for the budget shares equations derived in the previous section, the following criteria are considered: (1) the same slope (i.e. marginal budget share) should not be imposed for all levels of expenditure; (2) a good statistical fit for different types of goods should be provided;[22] and (3) the criterion

[21] Expenditure data tend to be more accurately recorded and are generally a better guide to household well-being. This is because households can smooth consumption by using savings and dissavings to deal with unpredictable and erratic incomes (Klasen, 2000; Woolard and Klasen, 2005)

[22] Expenditure on certain goods are "lumpy", i.e. a fixed amount must be paid in order to purchase the good, for example a car.

of additivity should be met in order to be internally consistent, i.e. the marginal propensities for all goods should equal unity (Adams, 2005).

An Engel curve relates the household budget shares allocated to specific categories of expenditures to total household expenditure (Castaldo and Reilly, 2007).[23] Engel curve analysis shows relative changes in expenditure shares for a particular good, not absolute increases or decreases (Leive and Xu, 2007). Engel proposed that as income increases, the budget share devoted to (1) food consumption decreases, (2) fuel, clothing, and lighting consumption remain constant, and (3) luxury good consumption increases (Zarate-Hoyos, 2004).

4.1 Model Specification

This analysis will use the Working-Leser functional form to estimate Engel curves (Working, 1943; Leser, 1963). The Working-Leser specification relates budget shares linearly to the logarithm of total expenditure and meets all three criteria mentioned above.

The underlying assumption of this is model is that household expenditure is a function of household assets (physical and human) and the economic environment in which these assets can be utilized to generate expenditure (May and Woolard, 2007: 17).

Separate budget share equations are run for each expenditure category *i*: food, housing, health, education, consumer durables and 'other'. The Working-Leser budget share demand function can be expressed as:

$$w_{ht} = \alpha + \beta_1 R_{ht} + \beta_2 \ln(E_{ht}) + \beta_3 \ln(E_{ht}) * R_{ht} + \beta_4 Z_{ht} + d_h + d_t + \nu_{th} \quad (7)$$

[23] The Engel function can be defined as a Marshallian demand curve that describes how consumer's expenditures on some goods and services relate to its total resources holding prices of all goods constant..

Where w_{ht} is the per capita budget share for a category of good (separate regressions are run for six different categories: food, consumer durables, housing, health, education, other) for household *h* at time *t* (i.e. the ratio of expenditure on a category of good to total household expenditure), R_{ht} is a dummy variable which captures whether the household received remittances,[24] E_{ht} is total monthly per capita household expenditure, Z_{ht} is a vector of socio-demographic household and household head characteristics, α and $\beta_k, k = 1,...,4$ are unknown parameters, d_h and d_t are vectors of household-level and time-period fixed effects, respectively, and ν_{ht} is an error term that captures the idiosyncratic variation in the budget share for household *h*. The $\ln(E_{ht}) * R_{ht}$ interaction term is included to allow for remittances to shift the intercept of the Engle curve, the marginal propensity to spend income, and the marginal effects of other variables on expenditures on each category of goods.

The model is a fixed effects specification in order to control for unobserved heterogeneity of households as well as time trends. Including the household fixed effects sweeps out correlations from omitted time invariant unobserved household characteristics like preferences, which might influence either the probability of a household receiving remittances or expenditure patterns. Including time fixed effects eliminates unobservable time trends common to all households.

Therefore, the restricted model for remittance receiving households (R_{ht}=1):

$$w_{ht} = (\alpha + \beta_1) + (\beta_2 + \beta_3)\ln(E_{ht}) + \beta_4 Z_{ht} + d_h + d_t + \nu_{ht} \quad (7a)$$

[24] The alternative specification tested will use the monthly amount of remittances received by the household.

Whereas, the unrestricted model for non-remittance receiving households (R_{ht}=0):

$$w_{ht} = \alpha_i + \beta_2 \ln(E_{ht}) + \beta_4 Z_{ht} + d_h + d_t + \nu_{ht} \quad (7b)$$

The slope of the Engel curve without remittances is β_2 which is interpreted as the amount of change in the commodity's budget share given a change in total expenditure. For equation (7a), the slope of the Engle curve is $\beta_2 + \beta_3$. The regression analysis tests the null hypothesis that β_3 is not statistically different from zero for each expenditure category. If the null hypothesis is rejected then remittance income influences expenditure in that particular expenditure category.

Finally, remittance receipt will be allowed to vary by (1) income quintile, and (2) state transfer receipt in order to understand how remittance receipt may influence budget share expenditures for households at different points in the income distribution and/or when households receive public transfers:[25, 26]

$$w_{ht} = \alpha + \beta_1 R_{ht} + \beta_2 \ln(E_{ht}) + \beta_3 \ln(E_{ht}) * R_{ht} + \beta_4 P_{ht} + \beta_5 Z_{ht} + \beta_6 (R_{ht} * P_{ht}) + d_h + d_t + \nu_{th} \quad (8)$$

Where P_{ht} is a dummy variable capturing whether the household receives a public grant and the parameter estimate β_6 indicates whether public transfers crowd-in or crowd-out remittances.[27]

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[25] In the baseline case the restriction that remittances have the same impact across all income levels is imposed. The interaction of remittance receipt with quintiles allows for a non-linear impact of remittance receipt depending on the household's relative position in the income distribution.

[26] Equation (8) only shows interaction between remittance and public transfer receipt. However where previously income quintile was included in Z_{ht} as a household economic characteristic, a separate specification will be run whereby each quintile is interacted with the dummy indicating household remittance receipt.

[27] The alternative specification tested will use the monthly amount of public transfers received by the household.

Health expenditures are further analyzed within this same framework, by separating out categories of annual per capita health expenses and running separate budget share equations for four outcome categories of health care sought: private doctors, public hospital and clinic care, traditional healer, and medical supplies.

$$y_{ht} = \alpha + \beta_1 R_{ht} + \beta_2 \ln(HCE_{ht}) + \beta_3 \ln(HCE_{ht}) * R_{ht} + \beta_4 Z_{ht} + d_h + d_t + \nu_{ht} \quad (9)$$

The annual budget share of health category (outcome categories include private doctor, public hospital, traditional healer, medical supplies) for household *h* at time *t*, y_{ht}, will vary with whether the household receives remittances R_{ht},[28] annual per capita household health expenditures HCE_{ht}, a vector of socio-demographic household and household head characteristics Z_{ht}.[29] The $\ln(HCE_{ht}) * R_{ht}$ interaction term is included to allow for remittances to shift the intercept, the marginal propensity to spend income, and the marginal effects of other variables on expenditures on each category of goods. A vector of household level fixed effects, d_h, and time-period fixed effects, d_t, are included along with an error term, ν_{ht}, which captures the idiosyncratic variation in the health budget share for household *h*. The unknown parameters α and $\beta_k, k = 1,...,4$ will be estimated.

As in Equation 9, the impact of state transfers on how remittance receipt influences health budget share expenditure will also be tested, in order to see whether there is a crowding in or out effect on type health care provision sought.

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[28] The alternative specification tested will use the annual amount of remittances received by the household.

[29] This includes a dummy variable which indicates whether the household is covered by a household member's medical insurance.

$$y_{ht} = \alpha + \beta_1 R_{ht} + \beta_2 \ln(HCE_{ht}) + \beta_3 \ln(HCE_{ht}) * R_{ht} + \beta_4 P_{ht} + \beta_5 Z_{ht} + \beta_6 (R_{ht} * P_{ht}) + \\ + d_h + d_t + \nu_{ht}$$

(10)

4.2 Econometric concerns

There are various econometric challenges in estimating the correct reduced form regression framework. These include controlling for omitted variable bias and dealing with the endogeneity of the migration decision. If migrants are self-selecting for migration based on unobservable characteristics, then the model will suffer omitted variable bias. For example, a crop failure could reduce income and cause migration at the same time. Omitted variable bias will skew parameter estimates since the omitted variable exerts an influence on both migration and the outcome of interest. This would result in unreliable parameter estimate of migration's impact on improving household income. For this paper, a household fixed effects is employed to control for unobserved time-invariant household characteristics, and a time period fixed effects is employed to control for unobserved time trends common to all households.[30] Adding the household and time fixed effects only partially controls for bias resulting from omitted variable bias- the regressions cannot control for unobserved time variant household characteristics, which represent changes within households over time.

Secondly, migration is not randomly assigned to households: characteristics that influence the decision to migrate could also influence the household's ability to invest in human capital or other consumption decisions. For example, preference might influence

[30] Including a cluster fixed effects to the regression equations can help to control for community level variables that may exert pressure on migration and remittance receipt, as well as outcomes of interest. The household effect nullifies the need to include a separate cluster or community fixed effects since the household fixed effect controls for time invariant community characteristics as well.

both migration as well as human capital investment. Since preference is unobservable it ends up in the error term, when regressing migration against a human development outcome. This violates the independence of the explanatory variable with the error term in the equation. Simply comparing outcomes of interest between remittance and non-remittance receiving households is likely to produce upwardly biased estimates if unobservable preferences are not controlled. Hildebrandt and McKenzie (2005) find that failure to control for selectivity of migration understates migration's positive health effects. An instrument that is correlated with migration, but uncorrelated with preference, can "split" the variation in migration and "use" only the part uncorrelated with the error term (McKenzie and Sasin, 2007: p.9).

In our estimation, remittances are endogenous outcomes that might be shaped by the same variables that influence expenditures, including migration itself.[31] Migration is shaped by the variables that also influence the ways in which households spend their income. The expected expenditure on good *i* by a household with remittance sending migrants would be given by:

$$E(w_{ht} / M_{ht} = 1) = Ef(E_{ht}, R_{ht}, P_{ht}, Z_{ht}) + E(\mu_{ht} / M_{ht} = 1) \qquad (11)$$

Expenditures by migrant households are conditioned on the decision to participate in migration in a particular period $(M_{ht} = 1)$. The conditional errors cannot be assumed to be zero, because unobserved variables affecting migration may be correlated with expenditures.[32]

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[31] This section draws from Taylor and Mora (2006).

[32] The inclusion of an instrument that can not be both statistically and theoretically justified can further pollute parameter estimates. For now an adequate instrument that can be theoretically justified to be correlated with remittance receipt and not household expenditure levels has not been found.

Finally, censored data is generally an issue for expenditure analysis using cross sectional data. A household reports zero expenditure when there is (1) purchase infrequency and/or (2) there is no need to consume a particular good. Some expenditure is categorized as "lumpy," i.e. households may have zero expenditure on items like housing or investment in consumer durables. For example, since data in the KwaZulu-Natal is based on expenditure in the last month, it is possible that the reference period is too brief to capture purchases of large items like a household refrigerator or car. Similarly, it is probable that a household with no children under the age of 15 will report zero education expenditure in the last month. Censoring is an issue if there is a reason beyond purchase infrequency or necessity which explains zero expenditure. This is an issue if unobserved household characteristics like preferences are driving households to consume more or less of a particular good: estimates of coefficients would be inconsistent if observed positive expenditure data is used to estimate consumption behavior using OLS.

In the data, the expenditure categories which are most likely to have non-negligible zero values are health, education, consumer durable and other spending. Analysis of the data reveals that 21% of households report zero expenditure for health spending, and 15.9% of households report zero expenditure for education spending.[33] Zero values are negligible for consumer durable or other spending, since only 0.62% and

[33] Out of 2748 household observations, 578 observations recorded zero expenditure in the last month for health (289 households in 1998 and 2004), and 436 observations recorded zero expenditure in the last month for education (193 households in 1998 and 243 households in 2004).

1.27% of households reported zero expenditure in the respective categories in the last month.[34]

Based on the above analysis, the only category for which censoring may be an issue is health expenditure. Zero expenditure in health, however, is not unusual if the household did not have an illness in the previous month, or the severity of illness was such that no medical treatment was sought or required in the last month. Given that (1) the mean household expenditure for households reporting zero health expenditures was 881.92 Rand and (2) analysis by income quintile does not reveal any systematic pattern for a particular income group to report zero expenditure in health,[35] it seems probable that censoring is not an issue in the data. It is therefore assumed that zero expenditure in health spending in the last month represents purchase infrequency.

Section 5: Data

5.1 Sources of data

The data come from two waves (1998 and 2004) of the KwaZulu-Natal Income Dynamics Study (KIDS). KIDS is a longitudinal survey that follows a random sample of individuals and households who lived in the eastern province of KwaZulu-Natal, South Africa.[36, 37, 38]

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[34] Seventeen observations reported zero expenditure for consumer durable spending and 35 observations reported zero expenditure for other spending.

[35] The minimum and maximum total monthly expenditure were 39.77 and 12905.25 Rand, respectively. Decomposing zero health expenditure by income quintile resulted in: 92 households in quintile 1, 74 households in quintile 2, 131 households in quintile 3, 126 households in quintile 4 and 155 household in quintile 5. This indicates that there is no clear pattern based on income or expenditure levels which explains zero expenditure.

[36] Three waves of interviews were conducted in 1993, 1998, and 2004. Data from the 1993 wave were not included because of difficulties in tracking households between 1993 and 1998 due to the fall of Apartheid in 1994. The dataset includes only African and Indian households due to the very small percentage of white and coloured households in the sample.

The survey instrument collected information on the socio-economic condition of households and included sections on household demographics, household environment, education, food and non-food expenditures, remittances, employment and income, agricultural activities, health, and anthropometry. In addition, a community survey was administered in each survey cluster to collect information common to households in an area, through interviews with key informants.[39]

In constructing the panel used for this research, the 1998 and 2004 waves were used, and efforts were made to ensure that 2004 households that split from their 1998 counterparts were kept in order to maximize information. There was some loss of information as a result of differences in the survey instrument administered across waves.[40] The final sample includes 1374 households for which complete information could be collected across both waves.

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[37] KIDS is a subset of the first South African national household survey, the Project for Statistics on Living Standards and Development (PLSD) which was undertaken in the last half of 1993. Households in KwaZulu-Natal Province were re-surveyed from March to June 1998 and 2004 for the KIDS study.

[38] KIDS was a collaborative project between researchers at the University of KwaZulu-Natal, the University of Wisconsin, London School of Hygiene and Tropical Medicine, International Food Policy Research Institute (IFPRI), the Norwegian Institute of Urban and Regional Studies and the South African Department of Social Development. In addition to support from these institutions, the following organizations provided financial support: Department for International Development- South Africa (DFID-SA); the United States Agency for International Development (USAID); the Mellon Foundation; and the National research Foundation/Norwegian Research Council grant the University of KwaZulu-Natal.

[39] Analyses by other researchers who have used different waves of KIDS have found that attrition rates appear to be within acceptable limits between 1993 and 2004.

[40] There was some loss of information as a result of difference in the survey instrument administered across waves. For example, remittance-sending migrants are only uniquely identified in the 1998 survey, making it difficult to construct a true individual level remitter panel. This information was not collected in 2004, and it was not possible to track (1) whether the same migrants were remitting across both waves, and (2) migrant location which would indicate whether remittances were international or internal. As a result, no remitter specific information was included in this analysis.

5.2 Data and summary statistics

This analysis uses self-reported information about household expenditure on food, consumer durables, housing, health, education, and other expenditures bought within the last month. Expenditure data were aggregated into two consumption categories and three investment categories, and one "other" expenditure category. The consumption categories include food and consumer goods/durables expenditure; investment categories include housing, health, and education; and "other" expenditure. The food category includes the total monthly expenditure on food, while consumer goods/durables spending include monthly expenditure on household items, clothes, personal items and other regular non-food items. The housing category includes monthly expenditure on utilities, energy, and imputed house/rent value. Health expenditures include monthly expenses on fees for doctors, hospitals, traditional healers, medical supplies and medical aid fees. The education category includes monthly fees for school, college and university fees, books and uniforms, and other school related expenditures. Finally, the category "other" constitutes monthly spending on transportation, child care, insurance and other regular non-food expenditure.

Table 1 includes a detailed description of what goods and services are included in each category. Table 2 presents the differences in average monthly budget shares and expenditure levels between remittance and non-remittance receiving household. For most items, the household was asked about their expenses over the last 30 days. For certain items like health and education, households were asked about their expenditures in the past – monthly expenditures were calculated as the average over the last 12 months.

Not surprisingly, food constitutes the largest budget share for both remittance receiving households (RRH) and non-remittance receiving households (NRH). Following Engle's prediction, NRH devote a slightly smaller fraction of their budget on food and a larger percentage of their budget on discretionary goods ("other") than RRH. Across the board however, RRH spend significantly less Rand per capita for each expenditure category than their NRH counterparts. This preliminary finding is the first indication that RRH are much poorer than NRH, and that therefore poorer households are engaging in migration as an income diversifying strategy. This is further explored in Table 5 which is discussed later.

Table 5 presents the summary statistics for the independent regressors that will be included in the analysis. Income has been decomposed into important public and private transfers received by the household, including state transfer and remittance receipt. There are various types of social transfers targeted to the needs of poorer households by the South African government (see Table 4), all of which are considered in the public transfer receipt covariate used in the analysis. The state old age pension (OAP) is one of South Africa's largest public cash transfer programs and source of direct government support for poor households. It is a means tested program which covered approximately 2 million recipients at approximately 740 Rand per month in 2004 (Sienaert, 2007). Men and women qualify for their pension at 65 and 60 years respectively. A new Child Support Grant (CSG) was introduced after 1998, targeted to all poor children under the age of seven. Though the CSG is a type of public transfer, in table 6 it is kept separate from other public transfers received by household members so as to distinguish its contribution to household income. Remittances are money and in-kind private transfers

received by the household from migrants. Subsidies include monthly allowances for transport, food, and housing.

Household income was calculated as sum of labor earnings, income from self employment, non-labor income, and income from net sale or lease of household, business, and/or farm assets. From here, households were ranked and split into quintiles to capture how remittance receipt varies across households at different points of the income distribution.

The data indicate that RRH heads are more likely to be older, less educated, less likely to be employed, and more likely to be pension recipients than heads of NRH. The more interesting finding is that NRH are more likely to be headed by a female than RRH. Taking a look at socio-demographic characteristics, RRH have a greater dependency burden than NRH: RRH have a statistically significant larger share of children under 18, and a larger share of elderly over 50 years old. Meanwhile, NRH have a greater share of 18-49 year olds, the economically productive age range. This might explain why RRH receive more public transfers and also suggests that remittances are altruistic. RRH also have a statistically significant larger share of unemployed members and a smaller share of employed members than NRH, even though the mean age of members not in school is roughly the same for both NRH and RRH. Finally, RRH have a slightly larger household size than NRH, on average about one person more.

As reported above, when income is decomposed into different sources, RRH receive more social assistance through public transfers than NRH, but interestingly less from the CSG and subsidies. This might reflect less take up of CSG by poorer, less educated households; more educated households are better positioned to understand and

take advantage of new public programs. Through diffusion and spread of information with time, poorer households then learn that they qualify and how to apply for programs. This is further considered in the analysis of the Table 5. Not surprisingly, and in support of the earlier conclusion that poorer households are more likely to receive remittances, RRH fall in a lower quintile than NRH.

A closer look at physical capital variables reveals that RRH report greater number of shocks[41] incurred which might indicate that remittances are being received to cope with shocks. The reason RRH might be more vulnerable to shocks could be linked with other information: RRH are more likely to reside in rural areas and engage in agriculture activity. Agricultural activity is particularly vulnerable to weather shocks, which might suggest that migration is being pursued as a household income diversifying strategy.

Table 6 presents three sources of transfer income in 1998 and four sources of transfer income with the introduction of the Child Support Grant (CSG) in 2004. This analysis includes how the introduction of CSG influenced household income in 2004.[42]

Table 6 presents these sources of monthly transfer income by income quintiles; the results indicate that the poor are very dependent on both private and public transfers in both 1998 and 2004. While almost 64% of income came from remittances and public transfers for the lowest quintile in 1998, it jumped to 75% of income (including CSG) by 2004. Remittances decreased nominally and as a percentage of total income for all

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[41] The number of shocks covariate captures the number of negative economic shocks that have hurt the household financially since 1998. These include serious injury or illness, loss of employment, destruction of household property.

[42] CSG is not included as an independent covariate in the regression analysis because it is captured in public transfers. It is kept separate in for this portion of the analysis to see its contribution to household income since it was introduced after 1998.

quintile groups in 2004, but still made up a relatively larger percentage of total income for lower quintiles. Public transfers increased both nominally and as a percentage of total income for all quintile groups from 1998 to 2004. The same pattern holds for the CSG in 2004. Although there is variation in the nominal amounts received by quintile, the CSG contributes a greater percentage of income for the lowest quintiles. The share of transfer income form remittances, public transfers, and CSG falls monotonically with income class. This indicates that they represent an inequality-decreasing source of transfer income.

Finally, taking information from both Tables 5 and 6, it is interesting to note that though the share of individuals engaged in schooling dropped between 1998 and 2004 for both NRH and RRH, the share of unemployed increased for both types of households. Several studies have found evidence that between 1998 and 2004, there was significant return migration to KwaZulu-Natal of unemployed migrant workers (May and Woolard, 2007; Case et al, 2005). This might also explain the decrease in remittance receipt observed in households from 1998 to 2004. Meanwhile, other South African studies suggest that poverty and inequality increased between 1995 and 2000 (May and Woolard, 2007; Hoogeveen and Ozler, 2005). Since prime age adults are one group excluded from South Africa's extensive system of social assistance grants, the return migration of unemployed individuals would likely present a financial burden to the household. If this return migration of unemployed tipped households into poverty, it might explain why the contribution of social assistance (generally means tested) as a percentage of income increased across all quintile groups in 2004 from 1998.

5.3 Health Expenditures

For the second part of the analysis, health expenditures were decomposed into separate health categories in order to create health budget shares. Table 7 details each category of health expenditures. Table 8 details the household health budget shares and level of out-of-pocket health expenditures that are not covered under medical insurance. Doctor fees constitute the largest health budget share for both RRH and NRH. Actual levels of expenditure do not vary drastically between NRH and RRH, though the difference in amount spent for doctors, hospitals and medical supplies is statistically significant. There is a much larger difference in amount spent for total health expenditures between NRH and RRH. These two findings may be reconciled by the fact that if NRH are wealthier, and as a result are more likely to have medical insurance coverage, consequently paying less out-of-pocket expenses.

Section 6: Results

6.1 Budget share equations

Table 9 reports the full regression specification for the fixed effects estimates of the six budget share equations based on Equation 7 from Section 4.1. The results presented include the full set of covariates that were run for each of the six budget share equations (Food, Housing, Health, Education, Consumer Durables, Other) and a dummy variable capturing household remittance receipt.[43] Household composition variables

[43] Tables 1 and 2 in the Appendix run regressions on food budget share, using remittance receipt, and monthly amount or remittances received, respectively. Both specifications yield similar signs and relative magnitude, though remittance receipt has more robust coefficient estimates. Using monthly levels of remittances will pose even more of a problem when investigating their impact on health and education budget shares, whose monthly expenditures are quite small. Therefore the remittance receipt specification is used instead of levels for the rest of this paper's analyses, since using either specification does not alter

capturing the share of household members under the age of five, between the ages of six and 17, between the ages of 18 and 49, and over the age of 50 were not individually reported in the tables due to their insignificant impact on any of the budget share equations.

As household expenditure levels increase, the per capita budget share devoted to food and housing decreases. Since expenditures are constrained by disposable income available for purchases, expenditure levels also capture income poverty. Though wealthier households may spend more on the amount of food consumed, the share spent on food as a fraction of total expenditure decreases, consistent with Engel's law. This is supported by looking closer at the income quintiles – households in the bottom three income quintiles spend a greater share of their budget on food consumption. The bottom two quintiles also spend a smaller share of their budget on housing.[44]

RRH seem to spend a greater share of their expenditure budget on food. As household expenditures (proxy for income) increase, however, the impact of remittance receipt on food expenditures decreases, implying that remittance receipt is going towards other types of consumption. The opposite is true for housing – RRH devote a significantly smaller share towards housing, however as household expenditures increase, the impact of remittance receipt on housing expenditure increases. Specifically, the estimated coefficient on remittance receipt suggests a reduction in budget share allocation to food by 13.3 percentage points on average.

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relative magnitude or significance of parameter estimates. Table 1 in the Appendix also presents five different specifications investigating the impact of remittance receipt on food budget share, incrementally adding different covariates, time fixed effects, and household fixed effects to test the stability of remittance receipt. The results indicate robust parameter estimates.

[44] Quintile 1 is the lowest income quintile.

Similarly, home ownership and number of durables, the other measures of household wealth, corroborate this inverse relationship between wealth and budget share devoted to food – households that own their home and more durables spend a smaller share of their budget on food. As expected, those who own their homes devote a greater share of their budget towards housing, though there does seem to be an inverse relationship between the number of durables a household owns and the share of their budget devoted to housing. This might indicate that there is a tradeoff between home ownership and consuming durables, or it might indicate that wealthier households (captured by number of durables) have greater expenditure levels so that the amount of money spent on housing still constitutes a smaller budget share compared to those households with less number of durables.

As level of expenditures rise, a greater budget share is devoted to health – this could indicate a preference for health as a normal good. RRH devote a larger budget share towards health expenditure. As expenditure levels increase, however, the impact of remittance receipt on heath expenditure decreases, implying that wealthier households are not using remittances for health consumption. The quintile analysis indicates that irrespective of income, the bottom three quintiles devote roughly the same budget share to health expenditures. This is evidence that households will find a way to consume the minimum amount of requisite health services, irrespective of income source. All of these pieces together suggest that remittances are enabling poorer household to consume a share of health services comparable to middle income quintile households. Remittances may be influencing types of service provisions sought rather than the probability that

health services are sought in the case of an illness or health shock. This will be further explored in the next sub-section.

RRH devote a greater budget share to education than NRH. This relationship is truer for poorer households – as income rises (as well as levels of expenditures), the impact of remittance receipt on education expenditure decreases. This is consistent with the other results cited so far. A preference for education seems apparent, given that those in the bottom quintiles devote a larger budget share towards educational activities.

Finally, as level of expenditures rise, the budget share devoted to consumer durables and other discretionary items also increases. Remittance receipt increases the share allocated to other discretionary items by 10.3 percentage points on average. RRH devote a smaller budget share towards consumer durables; as expenditures rise, remittances have less of an effect on these budget shares. From income quintile analysis, poorer households spend a significantly larger share on consumer durables, and a smaller share on discretionary items. Larger households devote a greater budget share to both consumer durables and other discretionary items. Households that own their dwelling devote a smaller share towards consumer durables as compared to households that do not own their dwellings. This suggests a trade-off in household investment between home ownership and consumer durables. Households with greater number of consumer durables (proxy for wealth) are also more likely to devote a greater budget share towards other discretionary spending.[45]

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[45] A closer look at household head characteristics indicates that household heads receiving old age pensions are likely to devote a greater budget share towards consumer durable consumption and a smaller share towards housing. This might reflect that older household heads are less likely to own their home, and instead have chosen to invest more in consumer durables. This same tradeoff can be found with female

Therefore, for the housing and "other" budget share equations, the null hypothesis is rejected, indicating that remittance income does influence expenditures for these particular categories. For the food, health, education, and consumer durable categories, we cannot reject the null hypothesis since the coefficient on the interaction of remittances with log expenditures is not statistically significant. For these categories, however, there seems to be an income effect which suggests that remittance influence on expenditure budget shares may vary by income quintile. This motivates the analysis presented in Tables 10a-c based on Equation 8 in Section 4.1, which allows the impact of remittance receipt to vary by (1) income quintile, and (2) with public transfer receipt.

Tables 10a-10c presents the covariates of interest for each budget share equation for four specifications: (1) the baseline scenario that assumes the impact of remittance receipt is the same across all households, (2) allowing the influence of remittance receipt to vary by income quintile, (3) allowing the influence of remittance receipt to vary with state transfer receipt, and (4) allowing state transfer and remittance receipt to vary by income quintile.

Allowing remittance receipt to vary by income quintile indicates that there is a differential impact of remittance receipt on budget shares devoted to certain categories. Specifically, the null hypothesis that remittance income does not influence food, health, and other discretionary expenditures is rejected when the interaction between remittance receipt and income quintile is included. The null hypothesis, however, is not rejected in the case of housing and consumer durable expenditures.

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headed households – a larger budget share is devoted towards consumption of consumer durables, and a smaller share is devoted to housing.

Under the interaction specification, the effect of remittance receipt on food budget share is now significantly negative. On average, RRH spend 22.2 percentage points less of their budget share on food than NRH. The parameter estimate for the interaction between remittance receipt and log of expenditures is positive, implying that the impact of remittance receipt on food budget share increases for households with larger levels of expenditures. The coefficient estimates for the interaction of remittance receipt by income quintile are significantly positive, indicating that poorer RRH spend a larger budget share on food expenditure than those households than RRH in higher quintiles.

These results are consistent when the analysis allows for state transfer interaction, though it is interesting to note that households receiving state transfers spend a smaller budget share on food expenditure than households that do not receive state transfers – the same result found with remittance receipt. Specifically, state transfer receiving households devote 4.3 percentage points fewer to food budget shares than households not receiving state help. This is reflected in the parameter estimates for the remittance receipt interaction with income quintile: though the bottom most quintile receiving remittances devotes a larger budget share to food, it is smaller than in case when state transfer receipt interaction is not considered. This indicates that there may be some crowding out of public and private transfers for the lowest income quintile, whereas for the third income quintile there seems to be a crowding in effect for state transfer receipt.

Under the interaction specification, the effect of remittance receipt on health budget share is now significantly positive – RRH spend a larger budget share on health expenditure. RRH spend 2.45 percentage points more on health budget shares than NRH.

The impact of remittance receipt on health budget share decreases as expenditure levels rises. For this budget share an additional covariate capturing whether the household is covered by medical insurance is also included. The parameter estimate is negative indicating that households covered by medical insurance spend less out of pocket for medical expenditures, and therefore devote a smaller budget share to medical expenses. This might be reflected in the negative parameter estimate for the interaction between remittance receipt and log of expenditures. Wealthier households are more likely to be covered by medical insurance, as discussed in Section 2.3, and are therefore more likely to spend less out of pocket on health expenses. Therefore, as levels of expenditure rise, the impact of remittance receipt on health expenditure decreases. Additional income through remittances can then be devoted to other types of expenditure. The parameter estimates are consistent when the analysis includes state transfer interaction effects. The interaction between state transfer and remittance receipt indicates a crowd-in effect which is supported but the income quintile analysis since households receiving both remittances and state transfers spend a greater share on health expenditure.

Taking these results under consideration, remittances seem to be targeting the poorest households and improving their ability to consume health promoting goods, like food, health, and education. The results do seem to indicate that remittances are enabling poorer households to consume more essential goods, at the margin. This is not surprising given the preliminary analysis in Section 5, which indicated that remittances constituted a great share of household income for households in lower quintiles of the income distribution. Wealthier households are able to use remittances for consumer durable and

housing expenditure. Housing expenditure can be considered a health promoting good since here housing includes expenses paid for improving household environment.

State transfers, however, are supplementing household income in a way which is allowing households to devote a smaller budget share to food and health, and a larger budget share to housing and consumer durables. Based on the income quintile analysis, it seems that state transfers are not reaching the poorest individuals and may be supplementing income for middle quintile households, in a way that allows those households to consume more consumer durables and discretionary items. The interaction between remittance and state transfer seem to indicate a crowding out effect, at least in the case of housing and spending on other discretionary goods. Given the importance of remittance income in supplementing household income for bottom quintiles of the income distribution, it is quite possible that state transfers are crowding out remittance receipt for middle quintile households.

6.2 Health Budget Share Equations

Table 11 reports the full regression specification for the fixed effects estimates of the four health budget share equations based on Equation 9 from Section 4.1. The results presented include the full set of covariates that were run for each of the four budget share equations (Private Doctor, Public Hospital, Traditional Healer, Medical Supplies) and a dummy variable capturing household remittance receipt. A dummy variable capturing whether a household had medical insurance coverage is also reported, since it is expected that those households should have less out-of-pocket expenses. Household composition variables capturing the share of household members under the age of five, between the ages of six and 17, between the ages of 18 and 49, and over the age of 50 were not

individually reported in the tables due to their insignificant impact on any of the budget share equations.

The null hypothesis that remittance receipt does not influence health expenditure for any of the categories can not be rejected. RRH spend a smaller health budget share at hospitals and for private doctors than NRH, and a greater budget share on traditional healers and medical supplies. As health expenditure levels rise, however, the impact of remittance receipt on health budget shares devoted to both private doctors and public hospitals increases, and decreases for budget share devoted to treatment sought with traditional healers. This indicates a preference for private medicine especially, over traditional healers, but that income may be a constraint in accessing private medicine, and to a lesser extent, care from public hospitals. This is explored in Tables 12a-b.

Households which have higher annual health expenditure levels spend a larger health budget share on private doctors and traditional healers, and a smaller budget share on hospital services and medical supplies. Households in the top end of the income distribution also spend a greater budget share on private medicine than lower quintiles. Wealthier households as proxied by number of durables owned are associated with lower health budget shares devoted to seeking care form traditional healers. Similarly, households involved in agricultural activities, which in the previous analysis were associated with poorer households, tend to devote a larger health budget share towards seeking care from traditional and not private doctors.

Households covered by medical insurance devote a larger budget share towards hospital services and a smaller portion of their budget share with private doctors. This supports the hypothesis that households covered by medical insurance pay less to access

this type of otherwise expensive private health care- households consequently pay less out-of-pocket and therefore pay a smaller health budget share towards doctors' fees. This is contrasted with the higher budget shares devoted to traditional healers for households covered by medical insurance- since traditional healers are not likely to be covered by insurance, households pay more out of pocket, and therefore devote a larger budget share towards this type of service provision.

Tables 12a-b present the covariates of interest for each health budget share equation, based on Equation 10 in Section 4.1. The four specifications reported in Table 12a-b include: (1) the baseline scenario that assumes the impact of remittance receipt is the same across all households, (2) allowing the influence of remittance receipt to vary by income quintile, (3) allowing the influence of remittance receipt to vary with state transfer receipt, and (4) allowing state transfer and remittance receipt to vary by income quintile.

Irrespective of the specification tested, the null hypothesis that remittance receipt does not influence specific categories of health expenditure can not be rejected. RRH in the poorest income are able to spend a greater budget share on private doctors and less on public hospitals and traditional healers. The interaction between remittances and quintile indicate that remittances are helping individuals to spend a slightly greater health budget share for private medicine and public hospitals, and less on traditional healers. This implies that remittances may be allowing households, especially poorer ones, to consume better quality health care. Though not statistically significant, there seems to be a crowding out effect of state transfer receipt on the influence of remittances on health

share expenditure by income quintile. The parameter estimate on the interaction between state transfer and remittance receipt is negative.

Given the context of the South African health care system discussed in Section 2.3, these results seem consistent with wealthier households and households with access to medical insurance consuming more private medical care than seeking public hospital care or care from traditional healers. Taking the results presented in Tables 8-11, while remittances may not be influencing the budget share devoted towards health consumption (which is probably conditioned on severity of illness or health shock), remittances do seem to influence the type of health care sought, i.e. better quality of health care treatment.

6.3 Sensitivity of parameter estimates

As described in Section 4.2, there are various econometric concerns which may bias the presented results, which generally arise from correlation between explanatory variables and the regression's error term. The main source of bias confounding parameter estimates from this analysis is omitted variable bias. The influence from omitted variables is lumped into the error term – this is an issue when regressors are stochastic because the omitted regressor increases the variance in the error term, which increases the variance of coefficient estimates of the remaining variables. The following will discuss possible sources of omitted variable bias and consequences for parameter analysis, since omitted variable bias can lead to (1) over-estimation or under-estimation of the influence of remittance receipt on household budget shares, and (2) insignificant parameter estimates.

Certain unobservable household characteristics may affect a household's propensity to spend in certain categories as well as the likelihood of receiving remittances.[46] This may be in part due to sample selection bias or it may also be due to unobservable household heterogeneity.[47] While fixed-effect estimation controls for time-invariant household characteristics which may influence expenditure patterns, it is not able to control for time-variant unobservable household heterogeneity.[48] If the collective influence of the unmeasured omitted variables is uncorrelated with the included explanatory variables and hence error term, then omitting them will not cause bias. But if unobserved heterogeneity is correlated with included explanatory variables and hence bundled into error term, there will be bias. The estimated effect will be the true effect plus the bias term which is bundled into the error term. If the bias term is negative, the effect of remittances will be underestimated; if it is positive, the parameter estimate will overestimate the true impact of remittances on household expenditure patterns.

To examine whether unobserved heterogeneity is influencing parameter estimates, estimates from the fixed effects (FE) model are compared to parameter estimates from the corresponding random effects (RE) model. These models effectively test the independence between the error term and explanatory variables. When testing the independence between the error term and explanatory variables, the FE estimator is

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[46] For example, if households who receive remittances are also less likely to consume private medical services for any reasons not captured in the model (ex/poorer households with less health knowledge may be less likely to access private medicine and also more likely to receive remittances) the impact of remittances on health budget share devoted to private medical care consumption will be under-estimated. This underestimation could result in attributing negative effects of remittance receipt on consumption patterns. Similarly, if households receiving remittance are more likely to consume private medical care (ex/better health knowledge leads to (1) greater propensity to seek private doctors and (2) healthier household members who can migrate and remit money) remittance receipt impact will be over-estimated.

[47] Selection bias is a form of omitted variable bias that leads to unobserved heterogeneity.

[48] Specifically household FE estimation absorbs the influence of endogenous household and community characteristics that are fixed over time.

always unbiased because it includes dummy variables to capture different intercepts. The RE estimator is only unbiased if the null hypothesis is true, i.e. that the error term is independent from explanatory variables, but biased if the null hypothesis is false.

The Hausman specification tests the null of whether the two estimators are significantly different from each-other. Specifically, the Hausman specification test is used to test the null hypothesis that the coefficients estimated by the efficient RE estimator are the same as the ones estimated by the consistent FE estimator, based on a χ^2 distribution. If this null is rejecting, then the RE estimator is more efficient, implying that omitted variable bias (unobserved heterogeneity) is not correlated with explanatory variables, and therefore not influencing parameter estimates. It is the more efficient estimator because it does not wipe out explanatory variables or observations that are time-invariant the way the FE estimator does. If the null can not be rejected, then the FE estimator is appropriate, implying that unobserved heterogeneity is possibly influencing parameter estimates.[49]

The Hausman test is used to compare corresponding coefficients from the FE and RE models for (1) food budget share, reported in Table 3 in the Appendix, and (2) health budget, reported in Table 4 in the Appendix. In the case of food budget shares, the null is rejected since the Hausman test yields a χ^2 of 82.15 with a highly significant p-value.[50] In the case of health budget shares, the null is not rejected, with a χ^2 of 25.06 and p-value of 0.8379 reported. This provides evidence the consistency of remittance receipt effect

[49] FE estimators are more robust than RE estimators against selection bias problems if selection characteristics remain constant over time – time invariant heterogeneity will be captured in the constant.

[50] The Hausman test does confirm that the consistent FE estimation is the appropriate model.

across the two models depends on the budget share equation being analyzed.[51] The effect of remittances cited in the analysis could be contaminated by unobserved heterogeneity, likely the result of sample selection bias discussed earlier.

This is a concern, because the inability to control for unobserved heterogeneity arising from omitted variable bias, could be contributing to insignificant parameter estimates. As discussed above, omitted variable bias increases the variance on estimates of other parameter estimates due to the effect it exerts on regression error term. This can in turn increase lead to inflated standard errors, which increases the probability of accepting a false null.

For example, households with migrants probably have a higher ability to absorb the cost of sending migrants and, therefore, a greater ability to send them, while simultaneously having a preference for certain expenditure items. Since the ability to send a migrant or receive remittances is not controlled for in this analysis, it could be leading to a positive error term, which in turn is inflating standard errors. Aside from introducing bias into the regression by over-estimating the impact of remittance receipt on a particular expenditure category, it may also be leading to higher standard errors which would cause the parameter estimate to seem insignificant- increasing the probability of a type II error (accepting a false null).

Sample size may be another factor resulting in insignificant parameter estimates. When sample size is too low, the regression lacks the precision to provide reliable estimates, increasing the probability pf committing a type II error – in this case, accepting

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[51] The null of consistent estimators across FE and RE models are rejected in the case of housing (χ^2 of 129.16 with a highly significant p-value) and consumer durables (χ^2 of 75.76 with a highly significant p-value); but not rejected in the case of food (χ^2 of 6.77 with a p-value of 1) and 'other' (χ^2 of 33.65 with a p-value of 0.3874).

that there in no significant difference in the mean effect of remittance receipt on budget share when there is an effect. As explained in Section 4.2, health and education expenditures are subject to purchase infrequency, which may result in sample sizes too small to yield significant parameter estimates.

Finally correlation between independent variables can lead to insignificant parameter estimates. This is because highly correlated independent variables are explaining the same part of the variation in the dependent variable, so their explanatory power and the significance of their coefficients are divided between them. Statistically, this will lead to inflated standard errors, which increases the probability of accepting a false null. In the analysis, covariates like household ownership and number of durables owned are included to capture household illiquid and liquid assets, respectively. These are likely to be correlated, however, since wealthier households should be able to afford both home ownership and a greater number of durables. Given the above discussion, these variables are likely to be correlated with the omitted variables which capture ability and motivation to migrate and/or receive remittances.

Section 7: Conclusion and Policy Implications

7.1 Analysis

The results indicate that remittance income does influence household expenditure behavior, but more importantly that there is a differential impact on expenditure patterns based on household income and aggregate levels of expenditure. The evidence presented supports the theory that remittances are used to supplement household income for bottom income quintiles, enabling them to purchase more necessary goods like food and health. In contrast, wealthier RRH spend more on consumer durables, housing, and discretionary

than bottom quintiles RRH. RRH in the bottom two quintiles spend 12-14 percentage points more on food budget shares and 5-7 percentage points less on consumer durables and discretionary goods than remittance receiving households in the highest income quintile.

With regards to the budget share devoted to health expenditures, while RRH spend 2.4 percentage points more than NRH, RRH in the bottom most quintile spend 0.96 of a percentage point less than RRH in the highest income quintile. This indicates that while remittance receipt is enabling households to increase their health expenditures, it is insufficient in helping poorer households to "catch-up" to wealthier households in the budget share they devote to health.

Further analysis is required to explore in more detail the effect of remittance on expenditure items with the aggregated "other" category, given its high statistical significance and magnitude of influence across all specifications. This category includes a range of goods, such as insurance purchase, day care and transport fees, and other non-food occasional spending items which if considered individually could indicate which household members benefit most from remittances. The conflated category may be disguising important variation in effects within more precisely defined categories.

A closer look at how remittance receipt influences type of health care sought suggests that RRH are more likely to seek care with traditional healers than private doctors or public hospitals, but that as expenditures rise (and hence income) remittance receipt is associated with seeking treatment with private doctors and public hospitals, and less with traditional healers. This combined evidence seems to suggest a preference for care from private doctors, and that while remittances are helping households spend more

on health expenditures than NRH, it is still insufficient to enable poorer households to access better quality care. This suggests that the out-of-pocket expense of accessing care from private medicine or public hospitals is a barrier for the bottom most income quintiles, and an issue for policy makers to address.

Analysis of the influence of remittance receipt on patterns of expenditure within the context of state transfer receipt suggests that public transfers may be crowding out private transfers, at least for middle quintile households, and are used towards greater consumption of consumer durables and discretionary goods. This calls into question the effectiveness of the targeting by public programs that were designed to target improving the welfare of the poorest households. Public transfer receipt tempers the influence of remittance receipt on budget shares allocated to food and seeking care from private doctors for bottom income quintiles.

The estimation results indicate that income, state transfers, and private transfers have different impacts on budget shares and in some cases, income and private transfers act in reverse ways. For example, while private transfers are associated with larger food budget shares, increased income levels and state transfer receipt are associated with lower food budget shares. The same inverse relationship can be seen with the share of income devoted to other discretionary items. Increased income (proxied by expenditure levels) leads to greater consumption and accordingly greater budget share devoted to discretionary consumption, yet, remittance receipt is associated with less consumption of discretionary goods. This inverse relationship is more apparent for low income households, while wealthier RRH devote greater budget shares to consumer durables, housing and other discretionary investment. This suggests that while wealthier

households may pool income, poorer households do not and adjust expenditure patterns based on income source.

An important element which is not being captured in the analysis is the source of remittances – whether they are coming from international migrants or internal migrants. Based on the literature, international migrants are more likely to be sent from households at the upper end of the income distribution who can afford to send a migrant abroad (education and relocation expenses). Internal migrants on the other hand generally come from the lower end of the income distribution and migrate in search of employment to supplement household income. The magnitude, frequency, and motivations for sending remittances between these two types of migrants will have different impacts on their use and impact on household income. Given the unavailability of remitter specific characteristics which would enable this identification, stratification by household income is used instead since household income is believed to influence the probability of an international versus internal migrant.[52] While this non-linearity has been partly captured by interacting remittance receipt with income quintiles, important information is likely being lost.[53] It also explains why there is variation between the overall impact of remittance reported for a particular budget share and the impact when looking at the interaction of remittance receipt and income quintile.

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[52] This has been done in the health literature, where subjects are grouped into sub-classes based on observed characteristics, and then comparing treated and untreated subjects within subclasses.

[53] The other methodology investigated for this paper included quantile regression, which allows different slopes for each budget share for different regression quantiles. Conditional-quantile models offer the ability to disaggregate the sample populations into income groups to better understand how the dependent variable distribution is affected by predictors. The functional form imposed may fail to capture more important differences between quantiles. However, when this functional form was run for health and education budget shares, and individual health expenditure budget shares, the model failed to converge, suggesting there is insufficient data to characterize the tail (lower end quantiles).

7.2 Policy considerations

Public transfers are often laid on top of pre-existing informal systems of private transfers and support among individuals in the same family or community; therefore, public and private transfers perform similar functions (Maitra and Ray, 2003). From the data presented, it appears that public transfers may be crowding out private transfer receipt, even though it appears that these two transfers are targeting different segments of the income distribution. While remittances are targeting the poorest households and enabling them to consume more health promoting goods like food and health, public transfers appear to be targeting middle income quintiles, and facilitating greater consumption of consumer durable and other discretionary goods. It is possible that the remittance income effect on household expenditure patterns is diluted for middle income quintiles because of the public transfer receipt, but this is difficult to determine from the analysis.

From a policy perspective, if the purpose of state transfers is to supplement the household income and therefore consumption of the poorest households, the results in this paper do not support this. The evidence suggests that state transfers may have an income inequality increasing effect if they are targeting the middle of the income distribution, and not the poorest households. Instead policies which explore how to better encourage or facilitate remittance receipt should be explored, since they seem to better target improving the consumption set for the poorest households. Without more information about the characteristics of the remitter or nature of relationship with the household or individual receiving the remittance, it is difficult to understand why remittance income is being used for necessary before discretionary consumption.

From a welfare perspective, the effectiveness of state transfers targeted at improving household consumption of health promoting goods also needs to be further explored. There is greater room for fungibility of income sources for state transfers. State transfers are seen as improving consumption of discretionary goods and consumer durables; whereas, remittance income seems targeted at improving health and food consumption.

It is not clear from the analysis, however, whether the increased capacity of households to finance these types of consumption is also welfare enhancing if the counterfactual would mean a constrained consumption set. For example, a refrigerator, classified as a consumer durable, can also increase household welfare by indirectly impacting health and food consumption.[54] If in the absence of state transfers the budget constraint to make this consumer durable purchase was prohibitive, then this could be seen as a reduction in household welfare. When setting policy regarding remittance flows and state transfers, policy makers face a decision. On one hand, policy makers can focus efforts on influencing particular consumption categories such as health or food consumption. On the other hand, policy makers can encourage greater choice of consumption which may also impact overall household welfare even if that consumption occurs in various consumption categories.[55]

Further, the analysis finds that remittances enable households to consume more goods like food and health services, including improved access to public and private health service providers. Thus, there is an opportunity for RSA to encourage private

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[54] A refrigerator is necessary to preserve food and can also be considered a health promoting expenditure.

[55] This latter point is linked to the utility functions attached to households, since for certain specifications, the ability to consume more of anything is welfare increasing.

transfers which influence health promoting consumption and therefore has positive social externalities. If origination of the remittance receipt could be better isolated, there could be room to follow the examples of Somaliland, Mali, and Mexico in engaging the Diaspora to help direct and monitor the provision of better targeted health services and infrastructure to vulnerable populations.

If most remittances are the result of internal migration, it is probable that remittances are flowing through informal channels given the high cost of formally sending remittances within South Africa. Remittances can still be encouraged to enable households to access better quality care by reducing transaction costs for private transfers. RSA should focus on how better to create the market and promote competition between financial institutions and remittance service providers (such as credit unions and microfinance institutions) who provide access to private transfers.

This will require both adequate legislation and an existing banking network to encourage competition in facilitating remittance transfers. Some countries like India, the Philippines, and Ghana have commercial banks that play a significant role in remittances, this is because remittances represent a major source of foreign exchange. The challenge for RSA will be to encourage internal transfers within such institutions, even though these private transfers are much smaller in magnitude and are not be as profitable as larger loans and investments. However, formalizing remittance receipt may be a way to engage more low-income individuals into the formal banking system and hence be a way to deepen financial markets.

Improving remittance channels themselves can help promote remittance transfer. Ensuring that there are branch locations in rural areas and villages in both sending and

receiving locations to reduce indirect costs (time and travel) of transfer transmission should also encourage private transfers as a household income source. Post offices, for example, could be a channel through which remittances are transmitted since they have extensive networks, even in remote areas. As the ability to transfer money through cell phones and other innovative instruments improve, this might also facilitate and reduce cost of remittance transmission from migrants to recipient households, regardless of location. The Philippines has a text-based remittance system which simply requires cell phones and the recipient to have a bank account and card with a participating bank. When the migrant sends money, the recipient receives a text message that their account has been updated, the recipient can then use their card to withdraw money from any ATM.

With regard to health expenditure and choice of health care treatment sought, both state and private transfers seem to enable poorer households to consume more of private medicine and public hospital care and fewer services from traditional healers. Assuming preferences are built into to expenditure patterns, this implies a preference for private medicine and public hospital care over treatment from traditional medicine. More importantly, remittances are enabling poorer households to consume better quality care at the margin. The results indicate that poorer households are being priced out from accessing health services from private doctors, and to a lesser extent public hospitals. Though not significant, household heads receiving pensions and households headed by women are more likely to seek care from public hospitals, which could be a result of subsidized prices for public care utilization for these targeted groups as discussed in Section 2.3

The deepening of its AIDS crisis and a heavy chronic disease burden are placing strains on the current RSA medical system (Case, Menendez and Ardington, 2005). Understanding how individuals seek care and how ill people interact with both formal and informal health care providers within this context is important in order to assess the efficiency and effectiveness of the current health system organization. Similarly, understanding the constraints that may preclude individuals from accessing health services from formal channels has important welfare and equity implications. This is especially relevant given RSA's commitment and efforts to addressing the inequitable and fragmented health care system inherited post-Apartheid.

The results imply that RSA needs to improve its health services organization and health insurance, both in access and quality, to reduce inequities in utilization that are not being addressed by subsidizing services for targeted vulnerable populations. The results support evidence from other studies that socioeconomic status, proxied by liquid (durables) and illiquid (home) asset ownership, is a significant correlated of health seeking behavior. Wealthier households, who are also more likely to be covered by medical schemes and private health insurance, pay less out of pocket for and therefore access private medicine. In contrast, households at the bottom end of the income distribution rely on both public and private transfer receipt to finance access to better quality care from private doctors and public hospitals. Policy makers in RSA should consider how to leverage private transfers with public resources if poorer households with limited access to formal medical insurance are instead relying on both public and private transfers to overcome financial barriers to access better quality care.

Paper 2 - Tables

Table 1: Expenditure Categories

Category	Description	Examples
Food	Purchased and Non-purchased food	Purchased food, food from own-production, gifts, donations, in-kind payment
Consumer goods, durables	Consumer goods	Clothing, fabric, personal items, regular non-food items
	Household durables	Household items like furniture, kitchen items
Housing	Housing value	Monthly use value of housing (calculated from rental pmts or imputed values)
	Household services	Water, gas, electricity
Health	Health expenses	Doctor and traditional healer fees, hospitalization, medical supplies and medical aide fees
Education	Educational expenses	Books and school supplies, uniforms, registration fees
Other	Transportation	Gas, public transport fees
	Insurance	Monthly life and short term insurance fees
	Occasional non-food	Day care fees and other occasional non-food items

Table 2: Monthly Budget Shares, Levels, By Remittance Receiving Status

Expend Category	1998			2004		
	RRH[Ψ]	NRH[Ψ]	t-test	RRH	NRH	t-test
Panel A: Expenditure Shares						
Food	0.426	0.385	-4.80***	0.401	0.372	-2.70***
Consumer durables	0.201	0.194	-0.89	0.199	0.200	0.23
Health	0.014	0.011	-2.31***	0.0098	0.0104	0.48
Education	0.037	0.030	-2.73***	0.052	0.041	-2.88***
Housing	0.232	0.256	2.97***	0.227	0.224	-0.32
Other	0.091	0.124	7.37***	0.111	0.151	5.76***
Panel B: Average Monthly Expenditure Levels and Total Expenditures (per capita, rand)						
Food	114.14	125.40	1.69**	204.63	242.26	2.52***
Consumer durables	76.74	96.06	1.90**	126.95	205.80	3.89***
Health	3.72	4.47	1.32*	3.94	4.21	0.42
Education	10.49	13.70	1.69**	34.361	34.53	0.03
Housing	79.77	137.68	5.38***	164.45	226.30	2.45***
Other	31.24	65.516	5.90***	75.554	198.26	4.40***
Total Expenditure	316.09	442.82	4.61***	612.94	918.45	4.20***

Source: KIDS

[Ψ]NRH: Non-remittance receiving households, RRH: Remittance-receiving households

***1% level of significance, **5% level of significance, *10%level of significance

Table 3: Average Monthly Budget Share Across Both Waves

Expenditure Share	Mean	Standard deviation
Food	0.391791	0.1677514
Consumer Durables	0.1984223	0.1361043
Health	0.0113766	0.0209422
Education	0.0388618	0.0564634
Housing	0.2351809	0.1476406
Other	0.1243674	0.1023542

Source: KIDS

Table 4: State Transfers Offered In Republic Of South Africa

State Transfers
State Old Age Pension (OAP)
Disability grant (18 and over)
Workmen's compensation
Unemployment Insurance fund
Government supplementary food scheme
Care dependency grant (under 18)
Foster care grant
War veterans aid
Child Support Grant (introduced after 1998)

Table 5: Descriptive Statistics Of Covariates, By Remittance Receiving Status

Variable	1998		2004		Pooled		t-test
	NRH*	RRH	NRH	RRH	NRH	RRH	NRH vs RRH
Household Head							
Age (years)	54.0 (13.9)	59.1 (14.5)	46.1 (17.9)	47.6 (19.5)	49.5 (16.8)	54.8 (17.4)	-7.77***
Yrs education	4.40 (3.67)	3.05 (3.19)	7.27 (4.78)	6.45 (4.43)	6.01 (4.56)	4.31 (4.05)	9.66***
Female (0/1)	0.60 (0.49)	0.47 (0.49)	0.47 (0.50)	0.41 (0.49)	0.527 (0.50)	0.447 (0.50)	4.04***
Employed (0/1)	0.50 (0.50)	0.09 (0.16)	0.41 (0.49)	0.28 (0.45)	0.45 (0.50)	0.29 (0.46)	8.17***
OAP (0/1)	0.27 (0.02)	0.43 (0.02)	0.19 (0.01)	0.22 (0.02)	0.23 (0.01)	0.35 (0.02)	-7.02***
Income Sources (Monthly, Rand)							
Public transfer	0.44 (0.50)	0.56 (0.50)	0.51 (0.50)	0.60 (0.49)	0.48 (0.50)	0.58 (0.49)	-4.88***
Remittances	0 -	330.40 (369.6)	0 -	437.12 (626.88)	0 -	371.15 (486.17)	-32.06***
Per capita income	606.42 (1456)	318.82 (341.6)	1054.6 (2478)	624.42 (1601)	860.62 (2109.25)	434.85 (1032.54)	5.95***
Quintile	3.02 (1.45)	2.62 (1.23)	3.13 (1.42)	2.664 (1.33)	3.09 (1.44)	2.63 (1.26)	8.36***
Human capital and labor market characteristics							
Fraction 0-5 years	0.098 (0.12)	0.118 (0.13)	0.094 (0.12)	0.093 (0.12)	0.096 (0.12)	0.108 (0.13)	-2.61***
Fraction 6-17 years	0.281 (0.19)	0.327 (0.2)	0.27 (0.20)	0.333 (0.21)	0.275 (0.20)	0.329 (0.20)	-6.84***
Fraction 18-49 years	0.461 (0.21)	0.375 (0.21)	0.453 (0.24)	0.384 (0.25)	0.456 (0.22)	0.378 (0.22)	8.80***
Fraction 50+ years	0.157 (0.19)	0.176 (0.18)	0.158 (0.23)	0.171 (0.22)	0.158 (0.21)	0.174 (0.19)	-1.97**
Fraction in school	0.343 (0.21)	0.407 (0.22)	0.316 (0.22)	0.394 (0.24)	0.328 (0.22)	0.402 (0.22)	-8.43***
Fraction employed	0.229 (0.21)	0.094 (0.16)	0.248 (0.26)	0.117 (0.17)	0.240 (0.24)	0.103 (0.16)	16.16***
Fraction unemployed	0.164 (0.18)	0.189 (0.20)	0.189 (0.21)	0.232 (0.23)	0.178 (0.20)	0.205 (0.21)	-3.35***
Mean age (not in school)	40.2 (9.86)	43.3 (11.4)	34.8 (12.5)	35.7 (14.3)	37.2 (11.7)	40.5 (13.0)	-6.79***
Household size	7.46 (4.57)	7.54 (4.22)	5.95 (3.51)	6.26 (3.74)	6.60 (4.07)	7.05 (4.09)	-2.78***
Physical capital variables							
Own home (0/1)	0.883 (0.012)	0.926 (0.011)	0.867 (0.011)	0.955 (0.011)	0.874 (0.008)	0.937 (0.008)	-5.22***
Number shocks	1.21 (1.14)	1.31 (1.09)	0.77 (1.06)	0.95 (1.21)	0.96 (1.11)	1.18 (1.15)	-4.73***
Agriculture (0/1)	0.27 (0.444)	0.43 (0.496)	0.38 (0.486)	0.53 (0.50)	0.33 (0.47)	0.47 (0.50	-7.19***
Rural (0/1)	0.577 (0.49)	0.789 (0.41)	0.644 (0.48)	0.743 (0.44)	0.615 (0.49)	0.772 (0.42)	-8.49***

Notes: Tabulated from KIDS panel data. Standard deviations are in parentheses. N= 2748. *NRH – non-remittance receiving household, RRH – remittance receiving household. ***1% level of significance, **5% level of significance

Table 6: Sources Of Transfer Income, By Income Distribution And Year (Monthly, Rand)

Income quintile	1998					
	Income per cap	Remit	Public transfers	% remit	% public transfer	% subsidy
Lowest20	65.23	130.26	219.64	26.38	31.81	0.75
Second20	158.68	182.83	323.81	16.46	25.55	0.26
Third20	288.26	168.68	393.00	11.12	25.64	0.87
Fourth20	553.51	112.19	370.22	4.79	16.31	1.90
Highest20	1726.46	135.61	187.99	2.67	3.82	2.17

Notes: Tabulated from KIDS panel data.

Income quintile	2004						
	Income per cap	Remit	Public transfers	CSG	% remit	% public transfer	%CSG
Lowest20	80.83	88.96	275.11	115.36	25.10	38.37	11.44
Second20	196.76	165.71	556.88	150.07	11.59	36.61	4.92
Third20	384.11	130.57	618.15	117.09	6.46	30.12	2.33
Fourth20	770.71	105.89	458.43	75.49	4.38	17.67	0.89
Highest20	3263.46	104.54	321.69	17.19	1.54	4.63	0.11

Notes: Tabulated from KIDS panel data.

Table 7: Health Expenditures

Category	Description
Doctor	Private doctors, dentists and nurses
Hospital	Public hospital and clinic fees
Traditional Healer	Faith healer/herbalist
Medical supplies	Medicines, bandages, pharmacy, chemist

Table 8: Annual Health Expenditure Shares, Levels, by Remittance Receiving Status

Expend Category	1998		2004		Pooled
	RRH	NRH	RRH	NRH	t-test
Panel A. Expenditure Shares					
Doctor	0.393	0.316	0.236	0.238	-3.92***
Hospital	0.165	0.214	0.119	0.101	0.19
Traditional Healer	0.147	0.123	0.108	0.089	-2.68***
Medical supplies	0.100	0.058	0.096	0.054	-5.24***
Panel B. Annual Expenditure Levels and Total Health Expenditures (Rand)					
Doctor	21.79	19.96	41.28	68.47	2.18***
Hospital	6.41	17.58	13.38	28.31	2.07**
Traditional Healer	13.79	12.46	15.26	22.39	0.65
Medical supplies	2.67	3.64	14.05	16.32	1.53**
Total Health Expenditure	57.62	120.83	177.62	422.90	2.78***

Source: KIDS
***1% level of significance, **5% level of significance, *10% level of significance

Table 9: Effect of Remittance Receipt on Budget Shares

	COEFFICIENTS					
VARIABLES	Food	Housing	Health	Education	Consumer	Other
Log(Exp)	-0.06519***	-0.04323***	0.00440***	-0.00364	0.07706***	0.03060***
	(0.009)	(0.008)	(0.001)	(0.003)	(0.009)	(0.007)
Remit (0/1)	0.05085	-0.13310**	0.00993	0.01426	-0.04529	0.10335**
	(0.049)	(0.049)	(0.008)	(0.019)	(0.048)	(0.032)
Remit*Log(Exp)	-0.00643	0.02212**	-0.00184	-0.00061	0.00908	-0.02232***
	(0.008)	(0.008)	(0.001)	(0.003)	(0.009)	(0.006)
Quintile1	0.05263**	-0.10661***	0.00563*	0.01233	0.05256**	-0.01655
	(0.018)	(0.017)	(0.003)	(0.007)	(0.018)	(0.013)
Quintile2	0.02773	-0.06801***	0.00232	0.00933	0.04645**	-0.01783
	(0.016)	(0.016)	(0.002)	(0.006)	(0.017)	(0.012)
Quintile3	0.01943	-0.03709**	0.00294	0.00288	0.02894*	-0.01709
	(0.014)	(0.014)	(0.002)	(0.006)	(0.015)	(0.011)
Quintile4	0.00117	-0.01357	0.00161	0.00401	0.01168	-0.00492
	(0.011)	(0.013)	(0.002)	(0.005)	(0.013)	(0.010)
OAP head (0/1)	0.01617	-0.02986*	0.00250	-0.00652	0.03072*	-0.01301
	(0.015)	(0.014)	(0.002)	(0.005)	(0.015)	(0.010)
Employed head (0/1)	0.01146	-0.03051**	-0.00362	0.00116	0.01493	0.00657
	(0.012)	(0.011)	(0.002)	(0.005)	(0.011)	(0.008)
Unemp head (0/1)	0.00138	0.00831	-0.00483*	-0.00082	-0.00196	-0.00208
	(0.015)	(0.013)	(0.002)	(0.005)	(0.014)	(0.009)
Female head (0/1)	-0.00649	-0.01097	0.00004	-0.00216	0.02519**	-0.00562
	(0.009)	(0.009)	(0.001)	(0.004)	(0.009)	(0.006)
Age head	-0.00069	0.00045	-0.00003	0.00002	-0.00014	0.00040
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Yrs ed head	0.00048	0.00183	-0.00009	-0.00114	-0.00155	0.00048
	(0.002)	(0.002)	(0.000)	(0.001)	(0.002)	(0.001)
HHsize	-0.00448**	-0.00432**	-0.00021	0.00096	0.00385**	0.00419***
	(0.002)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Share unemployed	0.01846	0.06565*	-0.00079	-0.02222*	-0.00932	-0.05178**
	(0.025)	(0.026)	(0.004)	(0.009)	(0.026)	(0.016)
Mean Age	0.00185***	-0.00033	0.00006	0.00041	-0.00120*	-0.00079*
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)
Mean yrs education	-0.00221	0.00071	-0.00006	0.00117	-0.00091	0.00130
	(0.002)	(0.002)	(0.000)	(0.001)	(0.002)	(0.001)
Own House (0/1)	-0.05833***	0.08468***	-0.00128	0.01175	-0.02954*	-0.00729
	(0.013)	(0.013)	(0.002)	(0.006)	(0.013)	(0.009)
Number of shocks	-0.00090	-0.00725*	0.00118*	0.00025	0.00594	0.00078
	(0.004)	(0.003)	(0.001)	(0.002)	(0.004)	(0.003)
Number of durables	-0.00497	-0.00844***	-0.00005	0.00029	0.00597*	0.00720***
	(0.003)	(0.003)	(0.000)	(0.001)	(0.002)	(0.002)
Agriculture (0/1)	0.02557**	-0.01672*	-0.00004	-0.00526	-0.00265	-0.00091
	(0.009)	(0.008)	(0.001)	(0.003)	(0.009)	(0.006)
HH Comp Variables	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
HH Fixed Effects	Y	Y	Y	Y	Y	Y
F test	10.68	8.57	2.08	3.89	6.90	11.66
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Tabulated from KIDS panel data, N=1374.
HH Composition variables include share of household members <5, between 6-17, 18-49, >50.
Robust standard errors in parentheses
***p<0.001, **p<0.01, *p<0.05

Table 10: Effect of Remittance Receipt on Budget Shares (with and without public transfers and income quintile interactions)

Table 10a: Food and Housing

	Without Transfers		With Transfers	
Variables	Baseline	With Quintiles	Baseline	With Quintiles[1]
FOOD				
Remit (0/1)	0.05085	-0.22278**	0.02963	-0.23607**
	(0.049)	(0.081)	(0.052)	(0.085)
Remit*Log(Exp)	-0.00643	0.02659*	-0.00404	0.02817*
	(0.008)	(0.012)	(0.009)	(0.012)
State Transfer (0/1)			-0.02302*	-0.04298*
			(0.012)	(0.019)
Remit*State Transfer			0.01400	0.02504
			(0.016)	(0.033)
Remit*Q1		0.14213***		0.11509**
		(0.035)		(0.042)
Remit*Q2		0.12806***		0.12624**
		(0.030)		(0.040)
Remit*Q3		0.06706**		0.08533*
		(0.026)		(0.038)
Remit*Q4		0.04162		0.03695
		(0.025)		(0.042)
HOUSING				
Remit (0/1)	-0.13310**	-0.08481	-0.11321*	-0.06425
	(0.049)	(0.075)	(0.051)	(0.079)
Remit*Log(Exp)	0.02212**	0.01410	0.02070*	0.01273
	(0.008)	(0.011)	(0.009)	(0.011)
State Transfer (0/1)			0.00965	0.01346
			(0.011)	(0.026)
Remit*State Transfer			-0.02135	-0.03258
			(0.016)	(0.050)
Remit*Q1		-0.01311		-0.00869
		(0.033)		(0.040)
Remit*Q2		-0.01890		-0.03958
		(0.032)		(0.039)
Remit*Q3		-0.00300		0.00362
		(0.029)		(0.042)
Remit*Q4		0.02628		0.02831
		(0.029)		(0.042)

Notes: Tabulated from KIDS panel data.

[1]This specification includes the following quintile interactions which were not reported: state-transfer*quintile and state-transfer*quintile*remit.

All specifications include the full set of covariates and fixed effects shown in Table 7.

Robust standard errors in parentheses

***p<0.001, **p<0.01, *p<0.05

Table 10b: Health and Education

	Without Transfers		With Transfers	
Variables	Baseline	With Quintiles	Baseline	With Quintiles[1]
HEALTH				
Remit (0/1)	0.01063	0.02456*	0.00969	0.02320
	(0.008)	(0.011)	(0.008)	(0.012)
Remit*Log(Exp)	-0.00198	-0.00337*	-0.00193	-0.00363*
	(0.001)	(0.002)	(0.001)	(0.002)
State Transfer (0/1)			-0.00020	-0.00184
			(0.002)	(0.003)
Remit*State Transfer			0.00117	0.00768
			(0.002)	(0.006)
Remit*Q1		-0.00957*		-0.00464
		(0.005)		(0.006)
Remit*Q2		-0.00684		0.00024
		(0.005)		(0.006)
Remit*Q3		-0.00316		-0.00692
		(0.004)		(0.006)
Remit*Q4		-0.00748*		-0.00276
		(0.004)		(0.005)
Medical Insurance (0/1)	-0.00394*	-0.00411*	-0.00393*	-0.00398*
	(0.002)	(0.002)	(0.002)	(0.002)
EDUCATION				
Remit (0/1)	0.01426	0.02333	0.00991	0.02124
	(0.019)	(0.030)	(0.019)	(0.029)
Remit*Log(Exp)	-0.00061	-0.00278	-0.00052	-0.00268
	(0.003)	(0.004)	(0.003)	(0.004)
State Transfer (0/1)			0.00122	0.00176
			(0.005)	(0.005)
Remit*State Transfer			0.00697	0.00363
			(0.006)	(0.006)
Remit*Q1		-0.00874		-0.00800
		(0.013)		(0.013)
Remit*Q2		0.01000		0.00903
		(0.012)		(0.012)
Remit*Q3		0.00147		0.00046
		(0.011)		(0.011)
Remit*Q4		0.01367		0.01273
		(0.012)		(0.012)

Notes: Tabulated from KIDS panel data.

[1]This specification includes the following quintile interactions which were not reported: state-transfer*quintile and state-transfer*quintile*remit.

All specifications include the full set of covariates and fixed effects shown in Table 7.

Robust standard errors in parentheses

***p<0.001, **p<0.01, *p<0.05

Table 10c: Consumer Durables and Other

	Without Transfers		With Transfers	
Variables	Baseline	With Quintiles	Baseline	With Quintiles[1]
CONSUMER DURABLES				
Remit (0/1)	-0.04529	0.04616	-0.03526	0.03828
	(0.048)	(0.082)	(0.051)	(0.087)
Remit*Log(Exp)	0.00908	0.00222	0.00747	0.00221
	(0.009)	(0.012)	(0.009)	(0.012)
State Transfer (0/1)			0.01783	0.04241*
			(0.012)	(0.021)
Remit*State Transfer			-0.00182	0.00026
			(0.016)	(0.043)
Remit*Q1		-0.05618		-0.05244
		(0.036)		(0.041)
Remit*Q2		-0.07088*		-0.04700
		(0.033)		(0.042)
Remit*Q3		-0.03224		-0.04679
		(0.030)		(0.042)
Remit*Q4		-0.07911**		-0.07441
		(0.028)		(0.042)
OTHER				
Remit (0/1)	0.10335**	0.21462***	0.09993**	0.21726***
	(0.032)	(0.057)	(0.034)	(0.062)
Remit*Log(Exp)	-0.02232***	-0.03694***	-0.02182***	-0.03686***
	(0.006)	(0.008)	(0.006)	(0.008)
State Transfer (0/1)			-0.00549	-0.00929
			(0.009)	(0.018)
Remit*State Transfer			0.00102	-0.00412
			(0.011)	(0.032)
Remit*Q1		-0.05476*		-0.04348
		(0.026)		(0.032)
Remit*Q2		-0.04171		-0.04164
		(0.023)		(0.032)
Remit*Q3		-0.03026		-0.04036
		(0.021)		(0.030)
Remit*Q4		0.00471		0.00076
		(0.021)		(0.032)

Notes: Tabulated from KIDS panel data.

[1]This specification includes the following quintile interactions which were not reported: state-transfer*quintile and state-transfer*quintile*remit.

All specifications include the full set of covariates and fixed effects shown in Table 7.

Robust standard errors in parentheses

***p<0.001, **p<0.01, *p<0.05

Table 11: Effect of Remittance Receipt on Health Budget Shares

	COEFFICIENTS			
VARIABLES	Doctor	Hospital	Traditional	Medical Supplies
Log(Health Exp)	0.03164*	-0.06625***	0.06596***	-0.03136**
	(0.015)	(0.014)	(0.012)	(0.010)
Remit (0/1)	-0.13197	-0.04949	0.04678	0.13468*
	(0.086)	(0.085)	(0.068)	(0.064)
Remit*Log(Health Exp)	0.03395	0.00727	-0.02464	-0.01659
	(0.022)	(0.021)	(0.017)	(0.016)
Quintile1	0.05565	-0.01081	-0.03843	-0.00641
	(0.085)	(0.084)	(0.062)	(0.056)
Quintile2	0.14744	-0.05484	-0.07852	-0.01408
	(0.080)	(0.075)	(0.057)	(0.056)
Quintile3	0.08944	-0.03555	-0.02231	-0.03158
	(0.071)	(0.071)	(0.054)	(0.051)
Quintile4	0.10158	-0.03291	-0.05688	-0.01179
	(0.065)	(0.059)	(0.047)	(0.047)
Medical Insurance (0/1)	-0.06546	0.03787	0.08186	-0.05427
	(0.067)	(0.056)	(0.046)	(0.038)
OAP head (0/1)	-0.07570	0.06640	0.02878	-0.01948
	(0.064)	(0.058)	(0.051)	(0.042)
Employed head (0/1)	0.00760	-0.03026	-0.00017	0.02284
	(0.049)	(0.046)	(0.038)	(0.033)
Unemployed head (0/1)	0.01165	-0.08191	0.03203	0.03823
	(0.063)	(0.061)	(0.046)	(0.039)
Female head (0/1)	-0.04499	0.03072	-0.00081	0.01508
	(0.041)	(0.037)	(0.034)	(0.028)
Age head	0.00117	-0.00115	-0.00064	0.00063
	(0.002)	(0.001)	(0.001)	(0.001)
Yrs ed head	0.01072	-0.00056	-0.00593	-0.00423
	(0.008)	(0.007)	(0.006)	(0.005)
HHsize	0.00512	-0.00283	0.00297	-0.00526
	(0.006)	(0.006)	(0.005)	(0.004)
Share unemployed	-0.11784	0.17081	0.02867	-0.08165
	(0.119)	(0.116)	(0.081)	(0.066)
Mean Age	0.00233	-0.00297	0.00014	0.00050
	(0.003)	(0.002)	(0.002)	(0.002)
Mean yrs education	-0.00408	-0.00144	-0.00498	0.01050
	(0.011)	(0.009)	(0.008)	(0.006)
Own House (0/1)	-0.01365	-0.00669	-0.04180	0.06214*
	(0.063)	(0.055)	(0.046)	(0.032)
Number of shocks	-0.01020	0.02142	0.00256	-0.01377
	(0.014)	(0.012)	(0.011)	(0.007)
Number of durables	0.00470	0.00567	-0.02452**	0.01415*
	(0.012)	(0.011)	(0.009)	(0.007)
Agriculture (0/1)	-0.02981	-0.02459	0.04643	0.00797
	(0.041)	(0.035)	(0.033)	(0.024)
HH Comp Variables	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
HH Fixed Effects	Y	Y	Y	Y
F test	1.31	2.34	2.69	2.10

Notes: Tabulated from KIDS panel data, N=1234. Robust standard errors in parentheses.
HH Composition variables include share of household members <5, between 6-17, 18-49, >50.
***p<0.001, **p<0.01, *p<0.05

Table 12: Effect of Remittance Receipt on Health Budget Shares (with and without public transfers and income quintile interactions)

Table 12a: Doctor and Hospital

	Without Transfers		With Transfers	
Variables	Baseline	With Quintiles	Baseline	With Quintiles[1]
DOCTOR				
Remit (0/1)	-0.13197	-0.24260	-0.18537	-0.07145
	(0.086)	(0.152)	(0.095)	(0.051)
Remit*Log(Exp)	0.03395	0.03632	0.03403	0.00709
	(0.022)	(0.023)	(0.022)	(0.008)
State Transfer (0/1)			0.02487	-0.01985
			(0.054)	(0.029)
Remit*State Transfer			0.09073	-0.00276
			(0.075)	(0.052)
Remit*Q1		0.17509		0.04571
		(0.136)		(0.057)
Remit*Q2		-0.01998		0.11255
		(0.135)		(0.059)
Remit*Q3		0.23820		0.10551
		(0.135)		(0.058)
Remit*Q4		0.07569		0.02609
		(0.141)		(0.066)
Medical Insurance (0/1)	-0.06546	-0.06648	-0.06174	-0.05328**
	(0.067)	(0.068)	(0.067)	(0.018)
HOSPITAL				
Remit (0/1)	-0.04949	-0.04166	-0.07599	-0.02597
	(0.085)	(0.127)	(0.095)	(0.151)
Remit*Log(Exp)	0.00727	0.00762	0.00843	0.00910
	(0.021)	(0.022)	(0.021)	(0.022)
State Transfer (0/1)			-0.10676*	-0.08720
			(0.049)	(0.106)
Remit*State Transfer			0.04146	-0.03420
			(0.065)	(0.157)
Remit*Q1		-0.01340		-0.14615
		(0.105)		(0.153)
Remit*Q2		0.00979		-0.05248
		(0.112)		(0.184)
Remit*Q3		-0.05511		-0.14544
		(0.098)		(0.166)
Remit*Q4		0.01366		0.09045
		(0.101)		(0.160)
Medical Insurance (0/1)	0.03787	0.03850	0.03413	0.03289
	(0.056)	(0.056)	(0.056)	(0.057)

Notes: Tabulated from KIDS panel data.

[1]This specification includes the following quintile interactions which were not reported: state-transfer*quintile and state-transfer*quintile*remit.

All specifications include the full set of covariates and fixed effects shown in Table 9.

Robust standard errors in parentheses

***p<0.001, **p<0.01, *p<0.05

Table 12b: Traditional Healer and Medical Supplies

	Without Transfers		With Transfers	
Variables	Baseline	With Quintiles	Baseline	With Quintiles[1]
TRADITIONAL HEALER				
Remit (0/1)	0.04678	0.10808	0.08011	0.11165
	(0.068)	(0.120)	(0.074)	(0.114)
Remit*Log(Exp)	-0.02464	-0.02470	-0.02501	-0.02316
	(0.017)	(0.018)	(0.017)	(0.018)
State Transfer (0/1)			0.01899	0.00914
			(0.038)	(0.065)
Remit*State Transfer			-0.05560	-0.05737
			(0.054)	(0.141)
Remit*Q1		-0.07197		-0.11922
		(0.105)		(0.117)
Remit*Q2		-0.01016		-0.00870
		(0.105)		(0.128)
Remit*Q3		-0.12506		-0.15528
		(0.097)		(0.129)
Remit*Q4		-0.07097		0.10220
		(0.092)		(0.138)
Medical Insurance (0/1)	0.08186	0.08132	0.08115	0.07783
	(0.046)	(0.046)	(0.046)	(0.047)
MEDICAL SUPPLIES				
Remit (0/1)	0.13468*	0.17617	0.18125*	0.24025
	(0.064)	(0.119)	(0.071)	(0.162)
Remit*Log(Exp)	-0.01659	-0.01925	-0.01745	-0.02256
	(0.016)	(0.016)	(0.016)	(0.016)
State Transfer (0/1)			0.06291	0.15323
			(0.035)	(0.088)
Remit*State Transfer			-0.07659	-0.18587
			(0.045)	(0.189)
Remit*Q1		-0.08971		-0.03755
		(0.105)		(0.156)
Remit*Q2		0.02035		0.00518
		(0.106)		(0.175)
Remit*Q3		-0.05803		-0.08390
		(0.105)		(0.163)
Remit*Q4		-0.01838		-0.05902
		(0.108)		(0.179)
Medical Insurance (0/1)	-0.05427	-0.05333	-0.05355	-0.04742
	(0.038)	(0.039)	(0.038)	(0.039)

Notes: Tabulated from KIDS panel data.

[1]This specification includes the following quintile interactions which were not reported: state-transfer*quintile and state-transfer*quintile*remit.

All specifications include the full set of covariates and fixed effects shown in Table 9.

Robust standard errors in parentheses

***p<0.001, **p<0.01, *p<0.05

Paper 2 - Appendix

APPENDIX TABLE 1: EFFECT OF REMITTANCE RECEIPT ON FOOD BUDGET SHARE

	COEFFICIENTS				
VARIABLES	(1)	(2)	(3)	RE	HH FE
Log(Exp)	-0.08508***	-0.06768***	-0.06910***	-0.07217***	-0.06519***
	(0.003)	(0.004)	(0.005)	(0.006)	(0.009)
Remit (0/1)	0.02469	0.03408	0.07850*	0.10341**	0.05085
	(0.040)	(0.039)	(0.039)	(0.038)	(0.049)
Remit*Log(Exp)	-0.00219	-0.00431	-0.01175	-0.01608*	-0.00643
	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
Quintile1		0.07945***	0.07590***	0.04477***	0.05263**
		(0.012)	(0.013)	(0.013)	(0.018)
Quintile2		0.04762***	0.04625***	0.01428	0.02773
		(0.011)	(0.012)	(0.012)	(0.016)
Quintile3		0.03659***	0.03170**	-0.00030	0.01943
		(0.010)	(0.010)	(0.010)	(0.014)
Quintile4		0.02302**	0.01655	-0.00072	0.00117
		(0.009)	(0.009)	(0.009)	(0.011)
OAP head (0/1)			0.01541	0.00348	0.01617
			(0.010)	(0.010)	(0.015)
Employed head (0/1)			0.00317	-0.00491	0.01146
			(0.008)	(0.008)	(0.012)
Unemployed head (0/1)			-0.00002	-0.01938	0.00138
			(0.010)	(0.010)	(0.015)
Female head (0/1)			-0.00576	0.00801	-0.00649
			(0.006)	(0.006)	(0.009)
Age head (years)			-0.00176***	-0.00098***	-0.00069
			(0.000)	(0.000)	(0.000)
Yrs ed head			-0.00364***	0.00010	0.00048
			(0.001)	(0.001)	(0.002)
HHsize				-0.00597***	-0.00448**
				(0.001)	(0.002)
Share unemployed				0.01871	0.01846
				(0.019)	(0.025)
Mean Age				0.00091*	0.00185***
				(0.000)	(0.001)
Yrs education				-0.00785***	-0.00221
				(0.002)	(0.002)
Own House (0/1)				-0.04604***	-0.05833***
				(0.009)	(0.013)
Number of shocks				0.00193	-0.00090
				(0.002)	(0.004)
Number of durables				-0.00737***	-0.00497
				(0.002)	(0.003)
Agriculture (0/1)				0.02842***	0.02557**
				(0.006)	(0.009)
HH Comp Variables	N	N	Y	Y	Y
Year Fixed Effects	N	N	N	Y	Y
HH Fixed Effects	N	N	N	N	Y
Wald chi2	19650.19	20599.66	1554.96	2147.28	
F test					10.68

Notes: Tabulated from KIDS panel data, N= 1374.
HH Composition variables include share of household members <5, between 6-17, 18-49, >50.
Robust standard errors in parentheses.
***p<0.001, **p<0.01, *p<0.05

APPENDIX TABLE 2: EFFECT OF REMITTANCES ON FOOD BUDGET SHARE

	COEFFICIENTS				
VARIABLES	(1)	(2)	(3)	RE	HH FE
Log(Exp)	-0.08470***	-0.06743***	-0.07055***	-0.07490***	-0.06506***
	(0.003)	(0.004)	(0.005)	(0.006)	(0.009)
Remittances	0.00012*	0.00012*	0.00017***	0.00022***	0.00023**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Remittances*Log(Exp)	-0.00002	-0.00002*	-0.00002**	-0.00003***	-0.00003**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Quintile1		0.08068***	0.07697***	0.04651***	0.05547**
		(0.013)	(0.013)	(0.013)	(0.018)
Quintile2		0.04700***	0.04458***	0.01249	0.02717
		(0.011)	(0.012)	(0.012)	(0.016)
Quintile3		0.03727***	0.03117**	-0.00104	0.02034
		(0.010)	(0.010)	(0.010)	(0.014)
Quintile4		0.02359**	0.01588	-0.00172	0.00137
		(0.009)	(0.009)	(0.009)	(0.011)
OAP head (0/1)			0.01586	0.00354	0.01476
			(0.010)	(0.010)	(0.015)
Employed head (0/1)			0.00389	-0.00421	0.01285
			(0.008)	(0.008)	(0.012)
Unemployed head (0/1)			0.00015	-0.01883	0.00119
			(0.010)	(0.010)	(0.015)
Female head (0/1)			-0.00661	0.00699	-0.00617
			(0.006)	(0.006)	(0.009)
Age head			-0.00176***	-0.00097***	-0.00065
			(0.000)	(0.000)	(0.000)
Yrs ed head			-0.00369***	0.00012	0.00049
			(0.001)	(0.001)	(0.002)
HHsize				-0.00615***	-0.00484**
				(0.001)	(0.002)
Share unemployed				0.01571	0.01877
				(0.019)	(0.025)
Mean Age				0.00099**	0.00187***
				(0.000)	(0.001)
Yrs education				-0.00793***	-0.00269
				(0.002)	(0.002)
Own House (0/1)				-0.04746***	-0.05997***
				(0.009)	(0.013)
Number of shocks				0.00196	-0.00015
				(0.002)	(0.004)
Number of durables				-0.00718***	-0.00506
				(0.002)	(0.003)
Agriculture (0/1)				0.02675***	0.02503**
				(0.006)	(0.009)
HH Comp Variables	N	N	Y	Y	Y
Year Fixed Effects	N	N	N	Y	Y
HH Fixed Effects	N	N	N	N	Y
Wald chi2	19843.79	20794.42	1587.09	2226.24	
F test					11.41

Notes: Tabulated from KIDS panel data, N=1374.
HH Composition variables include share of household members <5, between 6-17, 18-49, >50.
Robust standard errors in parentheses.
***p<0.001, **p<0.01, *p<0.05

APPENDIX TABLE 3: HAUSMAN SPECIFICATION TEST – FOOD

Variables	Coefficients (b) Fixed	(B) Random	(b-B) Difference
Remit	-0.2485455	-0.0448604	-0.2036851
Log(exp)	-0.0790368	-0.7904750	0.0000108
Remit*Log(exp)	0.0295895	0.0010461	0.0285433
State Transfer	-0.0245983	-0.0168084	-0.0077899
Remit*State Transfer	0.2178320	0.0042682	0.0174700
Q1	0.0078217	0.0187242	-0.0109026
Q2	-0.0092345	-0.006664	-0.0025705
Q3	0.0048732	-0.0049121	0.0097853
Q4	-0.0081588	-0.0112801	0.0031213
Remit*Q1	0.1419812	0.0772809	0.0647003
Remit*Q2	0.1243376	0.0678250	0.0561260
Remit*Q3	0.0610375	0.0290335	0.0320041
Remit*Q4	0.0365600	0.0404716	-0.0039116

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(32) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 82.51
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)

APPENDIX TABLE 4: HAUSMAN SPECIFICATION TEST – HEALTH

Variables	Coefficients (b) Fixed	(B) Random	(b-B) Difference
Remit	0.0238519	0.1335850	0.0104934
Log(exp)	0.0052715	0.0036852	0.0015863
Remit*Log(exp)	-0.0033094	-0.0020592	-0.0012502
State Transfer	-0.0001790	-0.0003005	0.0001215
Remit*State Transfer	0.0008430	0.0035383	-0.0026953
Q1	0.0082566	0.0070822	0.0011744
Q2	0.0036756	0.0054397	-0.0017641
Q3	0.0028604	0.0022619	0.0005984
Q4	0.0034099	0.0019414	0.0014685
Remit*Q1	-0.0094778	-0.0042116	-0.0052662
Remit*Q2	-0.0070355	-0.0039275	-0.0031079
Remit*Q3	-0.0033941	0.0006668	-0.0040609
Remit*Q4	-0.0076887	-0.0054183	-0.0022704
Medical Insurance	-0.0041087	-0.0040242	-0.0000844

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(33) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 25.06
Prob>chi2 = 0.8379
(V_b-V_B is not positive definite)

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PAPER 3

Do migrant remittances help insure consumption against adverse health shocks? Evidence from KwaZulu-Natal, South Africa

Abstract: This paper investigate the impact of illness on consumption of households in KwaZulu-Natal, Africa, and whether remittance receipt is a household coping mechanism used to insure consumption against illness. Using data on self-reported health and activity levels, the study concludes that illness of the household head has significant negative impact on the growth rate of per capita food consumption. The results indicate that the movement of household head status from healthy to unhealthy lowers the monthly purchased per capita food consumption by roughly 6.5 percent. Secondly, while evidence suggests that remittances enable households to better insure their food consumption, the evidence is not statistically significant. This indicates that informal household private coping mechanisms are insufficient in helping poorer households insure food consumption against adverse health shocks. The results indicate that though there is evidence of crowd-out between public and private transfers, households that receive both transfers are better able to insure consumption against illness. These results suggest that there is room for significant welfare gain if existing risk sharing arrangements can be improved to help poorer households without access to medical insurance insure consumption from the economic costs of illness.

Section 1: Introduction

In the absence of formal health insurance, the strategies households adopt to finance health care have important implications for the measurement and interpretation of how health payments impact consumption and poverty (Flores et al., 2008). The economic costs associated with illness include the cost of accessing medical care and treatment, and lost income due to reduced labor supply and productivity (Gertler and Gruber, 2002). For poorer families without access to health insurance or formal risk-pooling mechanisms to cover these costs, the illness shock to household resources can translate into an inability to maintain food and other types of consumption. This so called uninsured income shock, and the household's inability to cope with income risk, results in vulnerability to transient, if not chronic, poverty (Dercon, 2005; Lokshin and

Ravallion, 2005). An innovative anti-poverty intervention should take into account the events that cause a household to fall into poverty, and go beyond cataloging the depth and severity of households that are currently poor (Chaudhuri, 2003).

Traditional coping mechanisms, such as social insurance and safety-net policies, are likely to be further strained with economic mobility, wealth differentiation, changing age profiles, and the AIDS epidemic afflicting many parts of the developing world. In the absence of complete insurance or credit markets, the household's capacity to borrow against future earning or to smooth consumption in the wake of economic loss is questionable. It is in this context that the role of non-market and self-insurance mechanisms that enable households to smooth consumption during periods of idiosyncratic and covariate shocks need to be better understood.[1]

Access to social capital and informal or migration networks can help households lower the cost of borrowing and improve a poor household's ex-post risk management capacity.[2] Perfect risk sharing within a group or network of households would result in household consumption being insured against idiosyncratic risk. Access to remittances can help households protect consumption; they supplement income loss during income shock periods, or help household cover unexpected costs that might otherwise force resources to be diverted from consumption. Migration can also be an ex-ante risk management strategy, when households seek income diversification (Dercon, 2004; Morduch, 1995). The economic impact of health shocks will depend on the extent to which households have access to either formal insurance institutions or private risk-

[1] Idiosyncratic risk refers to household or individual specific risk, like an illness, whereas covariate risk refers to group or community level risk, like a drought.

[2] Migration is a different form of social capital, known as bridging social capital, which cuts across geographic and socioeconomic distance (Carter and Maluccio, 2002).

sharing networks between family members or for households within a village (Linnemayr, 2007).

This paper tests whether and how much remittances help households in Kwazulu-Natal, South Africa, insure consumption against a health shock. The paper will test whether households receiving greater remittances are better able to insure consumption against a health shock. A household health shock will be quantified by two different indices capturing the household head's health: Activities of daily living (ADL) and self-reported health status (SRH). Changes in both food and non-food consumption outcomes will be analyzed, to see whether certain types of consumption are more sensitive to health shocks. The research will also examine how the effect of remittances as informal insurance changes in the presence of a strong social assistances system. This is relevant since public transfers are targeted as income support for poorer households and may also constitute a household coping and risk management mechanism. This second part will examine whether remittance receiving households that also receive public transfers are better able to smooth consumption during a health shock than similar households not receiving public transfers.

The paper is organized as follows – Section 2 of this paper introduces the risk-chain framework that decomposes vulnerability into risk of an uninsured shock, options for risk management, and consumption changes. This section also briefly reviews the literature on coping strategies for household that experience health shocks. Section 3 introduces the conceptual framework for the model of consumption smoothing this paper will test. Section 4 introduces the empirical specification and methodology. Section 5

describes the data. Section 6 presents results. Section 7 is a summary of the findings and a discussion of the policy implications.

Section 2: Background

The World Bank defines poverty as the inability to attain a minimal standard of living, measured in terms of basic consumption needs (World Bank, 1990). Chambers (1988) distinguishes five dimensions of poverty, including: poverty proper, physical weakness, physical or social isolation, vulnerability to crisis, and powerlessness within existing socio-economic and political structures. Poverty proper refers to insufficient income or inadequate assets to generate income. Physical weakness identifies those individuals or households that are more susceptible to under-nourishment, sickness, or disability. Physical and social isolation can refer to households or individuals that are peripherally located, have lack of access to goods or services, are ignorant, or illiterate. Vulnerability to crisis identifies those individuals or households that are at risk of destitution or further poverty due to external shocks.

Vulnerability to poverty is an important dimension of poverty and deprivation (Dercon, 2001). Standard poverty analysis makes statements about deprivation and welfare once poverty has occurred. Consumption levels are outcomes often analyzed when establishing level and depth of poverty. While current consumption is intrinsic to the definition of well-being, so is the vulnerability to episodes that can result in reduced future consumption. Risk relates to events or shocks occurring beyond a household's control; the downside of risk is vulnerability to poverty or consumption that falls below

some benchmark via the loss of physical, human, financial, or social capital.[3,4] Households can smooth consumption with ex-ante risk management strategies, by taking actions to reduce the impact before a shock occurs, or ex-post risk management strategies, to mitigate the consequences subsequent to a shock.

2.1 Risk-chain Framework

This section provides a risk-chain framework that decomposes vulnerability into risk of an uninsured shock, options for risk management, and consumption changes. Vulnerability is defined as uninsured exposure to risk – this paper will make an ex-post statement about the extent to which a negative health shock causes a welfare loss in Kwazulu-Natal, South Africa.[5] It borrows from the policy analysis framework developed by Stefan Dercon for the UK Department for International Development (Dercon, 2001). The analysis is based on the benchmark theory of full insurance, which states that changes in consumption should be independent of changes in income for fully insured households.

Households and individuals have assets and endowments, in the form of labor and capital (human, physical, financial, and social capital). Human capital encompasses knowledge, health, and skills. Financial capital includes cash-in-hand, bank accounts, and net loans outstanding (Hoddinott and Quisumbing, 2003). These assets and endowments are allocated to activities that generate income in various forms, including

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[3] This is distinct from the concept of uncertainty which generally includes unforeseen states of the world that are therefore not considered in an individual's mitigation strategy.

[4] Social capital is broadly defined as networks, norms, and trust that enhance the incentive compatibility of non-contractual or legally unenforceable exchange (Carter and Maluccio, 2002). Social capital can be a source of informal insurance, and is generally within a community that is tightly circumscribed geographically.

[5] A household is vulnerable if it is unable to smooth consumption in the face of a health shock.

earnings and returns to assets, sale of assets, transfers, and remittances (Dercon, 2001). Income can be used to achieve well-being through consumption, nutrition, health, etc. Households can also invest income to build human, social, and physical capital as an alternative to current consumption. Poor households are seen within this framework: weighing current consumption and well-being with decisions affecting future possibilities.

Risk can affect an individual or household's assets, the transformation of assets into income, and how income is used to achieve various dimensions of well-being.[6] The likelihood of a shock affects the relationship between household and/or individual endowments, income-generating activity choice, and income. Environment or conflict can destroy physical assets; ill health or unemployment can lead to an erosion of human capital; social capital is threatened when problems of property rights and their enforcement arise. Epidemiological, environmental, economic, or political events represent covariate and idiosyncratic shocks that can affect whether assets are transformed into income or well-being. Death and loss of human capital due to illness impact assets that the household may have relied on to generate future income.

The adverse event/shock can reduce a household's stock of endowments and/or the returns to these endowments. Either of these consequences can reduce a household's income- the resulting adjustment of current and future consumption will depend on the household's capacity to engage in ex-post risk management strategies including drawing down savings from physical or financial capital, accessing credit markets, and ability to

[6] Current choice decisions, like employment or investment in health or education, reflect adjustments to past shocks and events.

access state or private network resources.[7] Therefore a household's ability to smooth consumption is a function of the nature of the shock, the available options for managing risk, and the outcome in terms of welfare loss. Ex-ante and ex-post risk management strategies include the availability of additional sources of income, asset accumulation and diversification, the functioning of labor, credit, and insurance markets, the extent of public assistance, and presence of networks and social relations (Hoddinott and Quisumbing, 2003).

Most households and individuals are aware of different sources of income risk that undermine their ability to maintain consistent consumption levels, and therefore rely on well-documented coping strategies (Thomas et al., 2004; Morduch, 1995; Townsend, 1994; Rosenzweig and Wolpin, 1993). There is evidence that risk-averse households seek to smooth their consumption during periods of uncertain or fluctuating incomes that result from unanticipated shocks (Hoddinott et al., 2005).[8]

2.2 Consumption smoothing and health shock coping strategies

Illness shocks are one of the least predictable shocks to economic opportunities in developing countries (Wagstaff, 2005). For poorer families without access to health insurance or social safety nets to cover these costs, the illness shock to household resources can translate into an inability to insure consumption. Dercon, Hoddinott, and Woldehanna (2005) find that illness shocks significantly reduce per capita consumption in 15 Ethiopian villages. Wagstaff (2005) finds that households in Vietnam are unable to

[7] Private network resources include receipt of gifts, transfers, or remittances from migration or social networks, in response to the shock.

[8] Risk-averse relates to a preference trait, whereby individuals are willing to pay to avoid facing a risky situation.

smooth non-medical consumption in the face of illness shocks. Dercon and Krishnan (2000) investigate the ability of individual members within a household to consumption smooth in Ethiopia. They find that poorer households do not engage in complete risk sharing – women bear the brunt of adverse health shocks and are unable to smooth their consumption.

Gertler and Gruber (2002) find that Indonesian families with more assets are better able to smooth consumption following changes in health status of the household head. The household's ability to cope with illness shocks is a function of the magnitude of the shock. Townsend (1994) finds that the percentage of the year that a rural Thai adult male is sick has no impact on consumption, but that the wealthier are better insured in their consumption. Linnemayr (2007) investigates the consumption smoothing ability of households experiencing an HIV-related illness or death in two South African communities. He finds that households do adjust their food expenditure in response to an income shock, rejecting the hypothesis that consumption is fully insured.

Dercon and De Weerdt (2006) test the extent of risk-sharing between insurance networks within a Tanzanian village. They do not find that consumption is fully insured within households in the village.[9] Asfaw and von Braun (2004) investigate the impact of illness on consumption and the capacity of risk-sharing arrangements in insuring consumption against illness, in rural Ethiopia. They find that an illness shock reduces household purchased food consumption by 24 percent and non-food consumption by 28 percent. They reject the hypothesis of full consumption insurance against illness,

[9] The analysis does not reveal that consumption is impacted by health shocks.

concluding that existing household risk sharing mechanisms are inadequate to insure consumption against illness.

The existing literature indicates that consumption insurance tends to be more complete for households with more physical and health assets, and who have better access to private informal coping mechanisms (Gertler and Gruber, 2002; Jalan and Ravallion, 2000; Townsend, 1994). These include drawing on savings, selling assets, social support networks and borrowing from local credit markets (Hoddinott et al., 2005). Sauerborn et al. (1996) find that medical care is paid from savings, selling livestock, borrowing and labor substitution in rural Burkina Faso.[10] Peters et al. (2001) show that poorer households in India are more likely to finance inpatient care by borrowing or through the sale of assets.

While financial coping mechanisms may insure consumption from health shocks, self-insurance can be very costly and recovering assets lost to cope with a crisis may not result in the same level of efficiency (Dercon, 2005). Empirical evidence suggests that families relying solely on informal mechanisms are not able to insure consumption well (Dercon and Krishnan, 2000; Gertler and Gruber, 2002; De Weerdt and Dercon, 2006). Linnemayr (2007) finds that HIV-affected households that sacrifice regular consumption in order to smooth food consumption undermine their future capacity to cope with shocks. Depleting productive assets can have a dramatic impact on future earnings; indebtedness due to health expenditures has been shown to be a major pathway into poverty (Krishna, 2004; van Damme, 2004; Flores et al, 2008).

[10] Labor substitution is one of the main strategies to reduce the burden of income loss (Flores et al., 2008).

The literature has not explicitly looked at the role of migration as a private informal coping mechanism, namely whether remittance receiving households are better able to insure consumption against an illness shock. This paper will look at whether remittance receiving households in KwaZulu-Natal, South Africa are able to better insure consumption, and whether remittance receiving households are less likely to draw on savings, borrow, or sell of assets in order to finance care.

Section 3: Conceptual Framework

The model for consumption smoothing is based on the theory of full insurance, first initiated by Arrow (1964). Assuming complete markets and risk-averse households, the main proposition that arises from this model is that household consumption should not respond to idiosyncratic shocks, or variation in income. Even in the absence of competitive markets, this result should hold true if there are formal and informal institutions such as remittances or loans from friends and relatives that pool risks (Townsend, 1994; Cochrane, 1991; Linnemayr, 2007). This implies that risk-sharing institutions should mitigate idiosyncratic shocks, which is why the full insurance hypothesis has been used to evaluate the level of risk sharing within households and communities (Gertler and Gruber, 1997; Morduch, 2002; Asfaw and Braun, 2004). Migration and remittances are assumed to improve the allocation of resources across states of nature in a risky environment (Azam and Gubert, 2006).

Consider a social planner of a village with N number of households, whose aim is to maximize the sum of individual households' utilities subject to the village-level

resource constraints, uncertainty, and predetermined social weight.[11] The uncertainty element s_π takes finite value (S) at time t; the sum of the probabilities of all states π is one at any time t, such that $\sum_{\tau=1}^{S}\pi(S_\pi)=1$ for $\pi(S_\pi)=1,...,S$. Assume that the planner maximizes consumption of household h at time t and state $\tau\left(C_t^h(s_\pi)\right)$ and leisure $\left(l_t^h(s_\pi)\right)$ and that consumption and leisure are separable.[12] The planner faces maximization problem:

$$\max\sum_{j=1}^{N}\omega^h\sum_{t=1}^{\infty}\left(r^h\right)^t\sum_{\tau=1}^{S}\pi(S_\pi)\left[U^h\left(C_t^h(S_\pi),\delta_t^h(S_\pi)\right)+V^h\left(l_t^h(S_\pi)\right)\right] \tag{1}$$

subject to the consumption and leisure constraints:

$$\sum_{h=1}^{N}C_t^h(S_\pi)\le\overline{C}_t(S_\pi),\ C_t^h(S_\pi)\ge 0 \tag{2}$$

and

$$\sum_{h=1}^{N}l_t^h(S_\pi)\le\bar{l}_t(S_\pi),\quad 0\le l(S_\pi)\le T_t^h(S_\pi) \tag{3}$$

ω^h is the *j*th household's Pareto weight, which is assumed to be time invariant and satisfies $0\le\omega^h\le 1$ and $\sum_{h=1}^{N}\omega^h=1$; $\left(r^h\right)^t$ is the *h*th household's time preference; $\pi(s_\pi)$ is the probability that state τ occurs at time t; $U^h(.)$ and $V^h(.)$ are utility functions of the *h*th household for consumption and leisure, respectively, and are assumed to be additive and differentiable over time and across states; and δ_t^h signifies preference shifters at time *t*. The resulting first order condition for maximization of consumption:

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[11] This section draws from Asfaw and von Braun (2004).

[12] The separability assumption does not affect the generalization- if consumption and leisure are not separable then the Lagrange multiplier associated with the leisure constraint will appear in the aggregate consumption multiplier (Asfaw and von Braun, 2004).

$$\omega^h \left(r^h\right)^t U_c \left[C_t^h(S_\pi), \delta_t^h(S_\pi)\right] = \lambda_c * (S_\pi) \tag{4}$$

$\lambda_c * (S_\pi)$ is the resource constraint associated with the consumption divided by $\pi(S_\pi)$.

This analysis will use a power utility function to specify the functional form of the utility function.[13] The utility function in Equation 1 takes the form:

$$U^h \left[C_t^h(S_\pi), \delta_t^h(S_\pi)\right] = -\frac{1}{\rho} \exp\left[-\rho\left(C_t^h(S_\pi) - \delta_t^h(S_\pi)\right)\right] \tag{5}$$

ρ is the measure of absolute risk aversion, assumed to be time invariant across households; ρ<1 for the utility function to be strictly concave (Townsend, 1994).

Substituting Equation 5 into Equation 1 for U^h and maximizing the corresponding Lagrange equation with respect to consumption, yields the first order condition:

$$\omega^h \left(C_t^h\right)^{\rho-1} \exp\left(\rho \delta_t^h\right) = \hat{\lambda}_t \tag{6}$$

$\hat{\lambda}_t$ is the Lagrange multiplier associated with consumption λ_t divided by both states $\pi(S_\pi)$ and the rate of time preference $\left(r^h\right)^t$.

Taking the log of Equation 6, aggregating over *N* individuals, and taking the difference at two different points in time yields the estimable equation:[14]

$$\log\left(\frac{C_{t+1}^h}{C_t^h}\right) = \log\left(\frac{\hat{C}_{t+1}}{\hat{C}_t}\right) + \frac{\rho}{1-\rho}\left(\left(\delta_{t+1}^h - \delta_t^h\right) - \left(\hat{\delta}_{t+1} - \hat{\delta}_t\right)\right) \tag{7}$$

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[13] Though the functional form of the utility function can be exponential, logarithmic, Cobb-Douglas or power, the most widely used specifications in the literature are exponential and power utility functions. They are all able to test the hypothesis that once aggregate consumption is controlled for, idiosyncratic shocks do not affect the change in growth rate of individual consumption.

[14] The Pareto weights are assumed to be time invariant, therefore they are differences out when the first order equation is taken at two different points in time (*t+1* and *t*).

where $\hat{C}_t = \exp\left(\frac{1}{N}\sum_{j=1}^{N}\log\left(C_t^h\right)\right)$ and $\hat{\delta}_t^h = \frac{1}{N}\sum_{j=1}^{N}\delta_t^h$

In Equation 7 the Pareto weight does not determine the change in household *h*'s consumption between period *t+1* and *t*. This equation expresses the growth rate in household consumption as a linear function of the growth rate of average aggregate consumption and taste shifters δ, but individual endowments or idiosyncratic shocks do not enter the equation. This implies that the coefficient of a variable entered on the right hand side of the equation will be insignificant in explaining a change in individual consumption, so long as the variable is uncorrelated with social weights and the preferences shifters.

Section 4: Empirical Specification and Methodology

Households that are unable to smooth or completely insure against income shocks (either through savings or borrowings) are expected to pass through income changes resulting from health shocks into consumption changes (Wagstaff, 2005). The first empirical specification will explore whether households can insure consumption against health shocks. The second specification will test whether remittance receipt is a household coping mechanism that enables them to smooth consumption against a health shock.

4.1 Model Specification

Given that some types of consumption may be more sensitive to income shocks, the empirical specification will look at the impact of a health shock on food and non-food consumption specifically. The following equation is used to test whether families are able to insure food and non-food consumption against illness:

$$\ln c_{ht} = \alpha_h + \beta_1 H_{ht} + \beta_2 Z_{ht} + d_c + d_t + \varepsilon_{ht} \quad (8)$$

Where $\ln c_{ht}$ is the annual log per capita consumption (run separately for food and non-food expenditure) for household *h* at time *t*; H_{ht} captures household health in time *t* (using two different measures of self-reported health status described in detail in Section 4); Z_{ht} is a vector of socio-demographic household and household head characteristics that affect the preference and health status of household *h*; α , β_1, and β_2 are unknown parameters to be estimated; d_c and d_t are vectors of community-level and time-period fixed effects, respectively; and ε_{ht} is an idiosyncratic error term.

The model is a fixed effects specification in order to control for unobserved heterogeneity across households. Tracking the same households over both periods should sweep out correlations from omitted time invariant unobserved household characteristics like preferences or initial health endowments. This will help isolate the effect of illness on consumption which might otherwise lead to biased estimates (Gertler and Gruber, 2002). The community fixed effects sweeps out correlations from community specific shocks which could affect both changes in permanent income and changes in health[15] - including time fixed effects eliminates unobservable time trends common to all households.

Equation 8 regresses the log of annual household consumption against an indicator for household head's health status. If consumption of household *h* is insured against illness, whether through own savings or any other intra- and inter-risk sharing mechanisms, β is predicted to be zero. This likely indicates that households are fully

[15] A community instead of household fixed effects specification is used because it is less restrictive. The household fixed effects specification will remove from the analysis households whose head report no change in health status. Performing the analysis on the reduced sample size reduces the power of the test, i.e. the probability of correctly rejecting the null hypothesis when it is false.

insured against the medical costs associated with a health shock, and can smooth consumption in the face of a health shock.

In this analysis, health and consumption are assumed to be separable. Otherwise, the health status variable will enter in the determination of the marginal utility of consumption. This implies that health and the error terms could be correlated through omitted preference shifters, which would lead to biased coefficient estimates (Gertler and Gruber, 2002).

4.2 Remittances as a household coping strategy

Equation 8 assumes that all households respond to health shocks in the same way. Several studies on consumption smoothing have relaxed this restriction using household specific observable characteristics to differentiate household consumption responses to shocks (Skoufias, 2004; Gertler and Gruber, 2002; Morduch, 2002; Gertler, Levine and Moretti, 2001). The next question examined is whether remittance receiving households are better able to insure consumption against illness shocks. While households may be able to smooth consumption, coping-strategies that include depletion of assets, selling of livestock, or using assets as buffers for consumption have long term poverty consequences. Remittances may allow households to smooth consumption without having to resort to the aforementioned coping-strategies and their implications for household poverty. Adding remittances to the model yields:

$$\ln c_{ht} = \alpha_h + \beta_1 H_{ht} + \beta_2 R_{ht} + \beta_3 (R_{ht} * H_{ht}) + \beta_4 Z_{ht} + d_c + d_t + \varepsilon_{ht} \quad (9)$$

R_{ht} is a binary variable which captures whether the household receives remittances. The sample can then be split between remittance receiving and non-remittance receiving households; the parameter estimate β_3 tests whether there are differences in the two

groups' abilities to insure consumption against a health shock. The parameter estimate for the interaction between change in health status and the dummy for whether a household receives remittances will indicate whether remittance receiving households face a change in consumption due to a health shock. This will indicate whether remittance receiving households are better protected from health shocks. If both groups adjust their food expenditure in reaction to income changes, then the benchmark hypothesis of full insurance will be rejected. If remittances help in self-insurance, β_3 should be positive and significant; if remittances have any impact on household consumption then β_2 and β_3 should be jointly significant.

4.3 Public versus private transfers

Finally, the research will investigate how the effects of remittances as informal insurance change if households also receive state transfers.

$$\ln c_{ht} = \alpha_h + \beta_1 H_{ht} + \beta_2 R_{ht} + \beta_3 P_{ht} + \beta_4 (R_{ht} * H_{ht}) + \beta_5 (R_{ht} * P_{ht}) + \beta_6 (R_{ht} * H_{ht} * P_{ht}) + \\ + \beta_7 Z_{ht} + d_c + d_t + \varepsilon_{ht} \tag{10}$$

The interaction term $R_{ht} * H_{ht}$ in Equation 9 is interacted with the annual amount of public transfers received by the household $R_{ht} * H_{ht} * P_{ht}$. If the effect of remittance receipt as a form of informal insurance decreases as public transfer receipt increases, the coefficient β_6 should be significantly negative. This might indicate that if both public transfers and remittance receipt are used as forms of informal insurance, public transfers may be crowding out private transfers. A dummy variable which captures whether the household receives medical aid will also be included in the household level characteristics estimation. This should indicate whether medical aid coverage is

sufficient in helping households cover the direct costs of accessing health care and therefore reduce the need to rely on coping mechanisms in order to smooth consumption against a health shock.

Section 5: Data

5.1 Sources of data

The data comes from two waves (1998 and 2004) of the KwaZulu-Natal Income Dynamics Study (KIDS). KIDS is a longitudinal survey that follows a random sample of individuals and households who lived in the eastern province of KwaZulu-Natal, South Africa.[16, 17, 18]

The survey instrument collected information on the socio-economic condition of households and included sections on household demographics, household environment, education, food and non-food expenditures, remittances, employment and income, agricultural activities, health, and anthropometry. In addition, a community survey was administered in each survey cluster to collect information common to households in an area, through interviews with key informants.

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[16] Three waves of interviews were conducted in 1993, 1998, and 2004. Data from the 1993 wave were not used due to the difficulty of tracking households between 1993 and 1998 brought by changes from the 1994 fall of Apartheid. The dataset includes only African and Indian households due to the very small percentage of white and coloured households in the sample.

[17] KIDS is a subset of the first South African national household survey, the Project for Statistics on Living Standards and Development (PLSD) which was undertaken in the last half of 1993. Households in KwaZulu-Natal Province were re-surveyed from March to June 1998 and 2004 for the KIDS study.

[18] KIDS was a collaborative project between researchers at the University of KwaZulu-Natal, the University of Wisconsin, London School of Hygiene and Tropical Medicine, International Food Policy Research Institute (IFPRI), the Norwegian Institute of Urban and Regional Studies and the South African Department of Social Development. In addition to support from these institutions, the following organizations provided financial support: Department for International Development- South Africa (DFID-SA); the United States Agency for International Development (USAID); the Mellon Foundation; and the National research Foundation/Norwegian Research Council grant the University of KwaZulu-Natal.

Analyses by other researchers who have used different waves of KIDS have found that attrition rates appear to be within acceptable limits between 1993 and 2004. Young adults and smaller, and perhaps poorer, households are underrepresented. The age distribution of the resident members of the core and next generation households matches that of the African and Indian population of KwaZulu-Natal reported by Census 2001. The mortality results suggest that the proportion of people at ages 20-44 dying between the second and third rounds was nearly three times the proportion dying between the first two rounds. This is most probably capturing an important portion of HIV/AIDS-related mortality. The pattern of income distribution is one of increasing poverty and inequality since 1993, although there is indication of a partial reversal of these trends in the post-1998 period.

In constructing the panel used for this research, the 1998 and 2004 waves were used, and efforts were made to ensure that 2004 households that split from their 1998 counterparts were kept in order to maximize information. There was some loss of information as a result of differences in the survey instrument administered across waves.[19] The final sample includes 1374 households for which complete information could be collected across both waves.

5.2 Data

This paper tests the null hypothesis that an observed health shock has no effect on consumption, where failure to reject the null implies that the household is unable to

[19] There was some loss of information as a result of difference in the survey instrument administered across waves. For example, remittance-sending migrants are only uniquely identified in the 1998 survey, making it difficult to construct a true individual level remitter panel. This information was not collected in 2004, and it was not possible to track (1) whether the same migrants were remitting across both waves, and (2) migrant location which would indicate whether remittances were international or internal. As a result no remitter specific information was included in this analysis.

insure consumption. This analysis uses self-reported information about household expenditure on food, consumer durables, housing, health, education, and other expenditures bought within the last month. Expenditure data are aggregated into two food and non-food consumption categories, to examine the effect of illness on different consumption items. Households are more likely to protect food consumption in order to avoid potentially serious long-term consequences like loss of productivity or deterioration in health. Malnutrition can make individuals more susceptible to morbidity, and in extreme cases, can lead to mortality. It is hypothesized that food consumption should be less sensitive to health shocks than non-food (without medical) consumption. Medical consumption is deducted from non-food consumption to make the health variable exogenous (Asfaw and von Braun, 2004). All expenditure and income data, including remittance and public transfer receipt, are annualized.

5.2.1 Measuring Health Status

The key independent variable in this analysis is the change in health status between 1998 and 2004. The main proxy for changes in health status will be captured by using the self reported health status of the household head in 1998 and 2004. Two different health measures will be separately used to test the sensitivity of the health specification. The first health measure is an index of the household head's self-reported ability to physically perform activities of daily living (ADLs). These physical functioning measures are based on individuals' self ratings of ability to engage in specific activities.[20] Examples of these activities include ability to carry a heavy load for 20

[20] These self-reported physical functioning measures have been tested extensively for reliability (consistency between tests and interviewers) and validity (consistency between individual assessments of different skills) (Gertler, Levine and Moretti, 2003: p. 7)

meters, ability to sweep floor/yard, walk 5 km without stopping, bend, kneel, etc. The information about ADL capabilities comes from a module in the KIDS surveys asking core household member about their perceived health status and physical abilities. The KIDS ADL questions consisted of ability to carry heavy objects like a bucket of water for 20 meters without stopping, ability to walk 5 km without stopping, and ability to partake in heavy or vigorous activities like planting, harvesting or construction work. Each activity is given a sore of 1 if it can be performed easily, 2 if the activity is performed with some difficulty and 3 if the respondent is unable to perform the activity. The ADL index takes a value of zero if the individual cannot perform any activity and a 1 if the individual can easily perform all activities. The responses are then combined following an algorithm developed for RAND Medical Outcome Study (Gertler and Gruber, 2002; Stewart et al. 1990):

$$ADLindex_i = \frac{Score_i - Minimumscore}{Maximumscore - Minimumscore}$$

$Score_i$ is the aggregate of the three coded responses, *Minimumscore* is the worst score an individual can receive (a score of 9 representing an inability to perform any ADL), and *Maximumscore* is the best score an individual can receive (a score of 3 representing ability to easily perform all ADLs). The index is bound by 0 (household head is unable to perform and ADLS) and 1 (household head can easily perform all ADLs).

The second health measure uses self reported health status (SRH) to construct a similar index. The survey instrument asks household core members to report on their perception of current health status, ranging from 1 (Very good), 2 (Good), 3 (Fair) to 4 (Poor) and 5 (Very Poor).

$$SRH_i = \frac{Score_i - Minimumscore}{Maximumscore - Minimumscore}$$

$Score_i$ is the self reported coded response, *Minimumscore* is the worst health status an individual can report (5), and *Maximumscore* is the best health status an individual can report (1). The index is bound by 0 (household head is in very poor health) and 1 (household head is in very good health).

5.2.2 Summary statistics

Table 1 presents the summary statistics of the independent variables included in the analysis. These include household economic and demographic information collected from the survey, included household composition and income sources.

As expected, the mean log of both food and non-food (minus medical expenditure) consumption increased from 1998 and 2004. Similarly, the amount and value of household durables increased over this period. While average household size decreased slightly between 1998 and 2004, overall household composition by age structure remained roughly the same. The fraction of household members who were both employed as well as unemployed also increased over the four year period, as did the number of households involved in agrarian activity.

During the four year period, the average age of the household head decreased by 10 years, while the average years of education rose by 4 years. Following this trend the number of household heads receiving old age pension (OAP) decreased while the average health of the household head improved along both health measures, the ADL and SRH indices. The improvement in health was much higher along the SRH index than the ADL index which may reflect greater subjectivity in reporting on perception of general health. The average number of households headed by women also decreased over this period.

Regarding household income, though per capita income rose from 1998 to 2004, the amount of households receiving remittances declined while the number and amount of public transfers increased. All of this information combined seems to indicate that there may have been return migration over this period, which is consistent with evidence found by other researchers (Posel et al., 2004).

Table 2 presents a decomposition of consumption and household health status by remittance and non-remittance receiving households. The results suggest that there is a statistically significant difference in consumption and household head health status patterns between remittance and non-remittance receiving households.

Remittance receiving households have on average worse health outcomes as well as lower food and non-food consumption across both periods. This motivates further study of the interaction between household health and consumption, including how remittances influence this relationship. How all of these relationships are influenced by the context of increased social grant receipt between 1998 and 2004 presented in Table 1, is also of policy interest.

Section 6: Results

6.1 Insurance against a health shock

Table 3 reports the full regression specification for the impact of a change in health on food and non-food (minus health expenditures) consumption, based on Equation 8 from Section 4.1. The results presented include the full set of covariates that were run for the two specifications tested for each of type of consumption. The first specification uses the ADL index to measure change in health while the second specification uses the SRH index to capture change in health. Household composition

variables capturing the share of household members under the age of five, between the ages of six and 17, between the ages of 18 and 49, and over the age of 50 were not individually reported in the tables due to their insignificant impact on any of the budget share equations.

The null hypothesis of full insurance is rejected for food consumption when using the ADL index to measure change in health. For both ADL and SRH indexes, illness is represented by a reduction in both indices such that a positive coefficient on both measures indicates a reduction in consumption. Changes in the ADL index have a significant effect on food consumption, where moving from performing all ADLs (index = 1) to being able to perform none (index = 0) would lower consumption by 6.5%. This result for change in health on food consumption is consistent using the SRH index, though not significant. Moving from being in very good health (index = 1) to very poor health (index = 0) reduces consumption by 6.2%.

For non-food consumption there is an opposite movement, though the coefficient on health change for both ADL and SRH specifications is not significant. The results indicate that a reduction in ADL from being able to perform all ADLs to being able to perform none, increases non-food consumption by 1.8%; moving from being in very good health to very poor health using the SRH measure increases non-food consumption by almost 4%.

Overall, the results are surprising given the expectation that food consumption would be less sensitive to health shocks. The results indicate that for short term changes in health as nuanced by ADL and SRH indices, food consumption is more sensitive than non-food consumption. This might be reflected in the fact that non-food consumption

includes consumer durables and housing investment which are longer term commitments in nature and therefore possibly less sensitive to short term fluctuations in household income resulting from temporary shocks to household head health.

Using either ADL or SRH specification yields similar magnitude and expected direction for the impact of control variables on both food and non food consumption. Per capita food consumption growth rates are lower for households covered by medical insurance. This is probably capturing the fact that wealthier households, which are more likely to be covered by medical insurance, already have unconstrained food consumption. Similarly, households who own their home, another proxy for household wealth, have lower per capita food consumption growth rates than households that do not own their home. Food consumption growth rates are higher for households employed in agricultural activities and households with more adults. Per capita log of food consumption changes fall with changes in family size, which indicates economies of scale in consumption.

Per capita non-food consumption growth rates are higher for households covered by medical insurance – this is in line with expectations since medical insurance is probably picking up on wealthier households and their ability to consume more discretionary goods. This is also captured in the significantly positive parameter estimate for the impact of home ownership on increased growth rate of per capita non-food consumption.

6.2 Remittance receipt as a household coping strategy

Table 4 presents the covariates of interest when investigating whether remittances help households insure food consumption against a health shock, based on Equation 9 in

Section 4.2. Table 4 presents three different specifications for both food and non-food consumption: (1) the baseline scenario that reports the impact of a change in ADL on consumption, (2) investigating whether remittance receiving households are better insured against a health shock (assuming that the impact of remittance receipt is the same across all households, (3) allowing the influence of remittance receipt to vary by income quintile when investigating remittance receipt as a household coping strategy to insure consumption. This analysis will focus on the results for the food consumption specifications since the null hypothesis for full insurance was rejected only for food and not non-food consumption.

In the case of food consumption, the parameter estimate on the interaction between ADL and remittance receipt in the second specification has the expected sign, but is not statistically significant. Therefore, we can not conclude that remittance receiving households are better insured against health shocks. The insignificant parameter estimate indicates that there is no difference in the two groups' abilities to insure consumption against a health shock. However, based on the negative sign on the parameter estimate, it does seem to indicate that remittance receiving households facing a health shock spend roughly 4% more on food consumption than households facing health shocks that do not receive remittances.

Because the second specification assumes that remittance receipt will have the same impact on households' ability to self-insure, the third specification which includes income quintile interactions with remittance receipt is also analyzed. Once again, the parameter estimate on the interaction between ADL and remittance receipt is insignificant, but has an effect in the expected direction: households with negative

increments in health but receive remittances consume roughly 3% more on food consumption compared to households with negative increments in health that do not receive remittances. Just as important, food consumption growth rates are significantly and sizably higher for households that receive remittances in the bottom two income quintiles than for households receiving remittances in the highest income quintile.

6.3 Public and private transfer receipt as household coping mechanism

Given the interest in remittance receipt as a coping mechanism and as a possible informal household safety net, Table 5 reports the covariates of interest based on Equation 10 in Section 4.3. Given the extent of welfare assistance provided to South African households intended to act as an informal safety net, the analysis is looking at this influence on the role of remittance receipt in insuring consumption against a health shock. Table 5 presents three different specifications for both food and non-food consumption: (1) the baseline scenario that reports the impact of a change in ADL on consumption, (2) allowing the influence of remittance receipt to vary by income quintile when investigating remittance receipt as a household coping strategy to insure consumption, and (3) allowing the influence of remittance receipt to vary with state transfer receipt.

Looking at the third specification for food consumption, the parameter estimate for ADL is no longer significant. More importantly, the null hypothesis of full insurance for food consumption can no longer be rejected.[21] Households receiving state transfers spend roughly 15% less on consumption than households not receiving state transfers,

[21] The sign on the parameter estimate for ADL for this third specification indicates that when considering the context of public and private transfers, households increase food consumption and decrease non-food consumption in the face of a health shock.

which is as expected given that state transfers are targeted to households at the lower end of the income distribution and not the upper end. State transfer receiving households with negative increments to health have significantly lower food consumption than households that do not receive state transfers. Specifically households facing health shocks which receive state transfers spend 16% less on food consumption than households facing health shocks not receiving state transfers. This is capturing that households at the upper end of the income distribution who do not receive state transfers, are better able to insure their consumption against an illness shock than poorer household receiving state transfers.

It can not be concluded that remittance receipt as a form of informal insurance decreases as state transfer increases since the coefficient on the interaction term between remittance receipt, public transfer receipt, and ADL is insignificant. The direction of the sign for the parameter estimate is negative, however, as is the interaction of remittance receipt with public transfer receipt, indicating that there maybe some level of public transfers crowding out private transfers. More important is the evidence that households rely on both public and private transfers as informal safety nets to insure consumption against a health shock. Households facing health shocks receiving both state transfers and remittance receipt are able to spend 5% more on food consumption than households facing health shocks which receive either state or private transfers alone.

The tables in the appendix report the same results for Tables 4 and 5, using SRH instead of ADL. For the most part, the results are consistent, except when looking at the influence of state transfer receipt on impact of remittance receipt as a household strategy to insure consumption in Table 2. Though the null hypothesis of full insurance for food

consumption is still not rejected, the direction of the signs on change in health (SRH) and the interaction between remittance receipt and SRH are different. Where the signs on ADL and the interaction between ADL and remittance receipt are negative, the signs on SRH and the interaction between SRH and remittance receipt are positive; all are insignificant. The sign on the covariate of interest (the interaction of state transfer, remittance receipt and SRH) is negative- the same as when ADL is interacted with state transfer and remittance receipt.

6.4 Sensitivity of parameter estimates

There are various econometric concerns in estimating the correct reduced form regression framework which may bias the results found. These include controlling for omitted variable bias and dealing with the endogeneity of the migration decision. If migrants are self-selecting for migration based on unobservable characteristics, then the model will suffer omitted variable bias. For example, a crop failure could reduce income and cause migration at the same time. In this analysis, migration is not likely to be randomly assigned to households: characteristics that influence the decision to migrate could also influence the household's ability to invest in human capital or other consumption decisions. For example, preference might influence both migration as well as human capital investment. Since preference is unobservable it ends up in the error term, when regressing migration against a human development outcome. This violates the independence of the explanatory variable with the error term in the equation. Simply comparing outcomes of interest between remittance and non-remittance receiving households is likely to produce upwardly biased estimates if unobservable preferences are not controlled.

An important element which is not being captured in the analysis is the source of remittances – whether they are coming from international migrants or internal migrants. Based on the literature, international migrants are more likely to be sent from households at the upper end of the income distribution who can afford to send a migrant abroad (education and relocation expenses). Internal migrants on the other hand generally come from the lower end of the income distribution and migrate in search of employment to supplement household income. The magnitude, frequency, and motivations for sending remittances between these two types of migrants will have different impacts on their use and impact on household income – especially if households (1) are using migration as a household strategy to diversify income, or (2) using remittances as an informal coping mechanism. Given the unavailability of remitter specific characteristics which would enable this identification, stratification by household income is used instead since household income is believed to influence the probability of an international versus internal migrant.[22]

The resulting omitted variable bias from insufficient remitter specific characteristics or timing and motives for sending remittances, could be biasing parameter estimates. If households at the lower end of the distribution are less able to migrate for financial reasons, this may lead to an attenuation bias on the parameter estimate for impact of remittance receipt in insuring consumption against a health shock. Aside from introducing bias into the regression by under-estimating the impact of remittance, omitted variable bias may also be leading to higher standard errors which would cause the parameter estimate to seem insignificant – increasing the probability of a type II error

[22] This has been done in the health literature, where subjects are grouped into sub-classes based on observed characteristics, and then comparing treated and untreated subjects within subclasses.

(accepting a false null). The variance on estimates of other parameter estimates increased due to the effect omitted variable bias exerts on regression error term, leading to inflated standard errors.

Correlation between independent variables can lead to insignificant parameter estimates. This is because highly correlated independent variables are explaining the same part of the variation in the dependent variable, so their explanatory power and the significance of their coefficients are divided between them. Statistically, this will lead to inflated standard errors, which increases the probability of accepting a false null. In the analysis, covariates like household ownership and number of durables owned are included to capture household illiquid and liquid assets, respectively. These are likely to be correlated, however, since wealthier households should be able to afford both home ownership and a greater number of durables. Given the above discussion, these variables are likely to be correlated with the omitted variables which capture ability and motivation to migrate and/or receive remittances.

Finally, the covariates of interest, ADL and SRH, are likely to be contaminated with measurement error, since both are self-reported. Measurement error leads to an attenuation bias on parameter estimates because of a negative relationship between the error term and the incorrectly measured covariate. Measurement error can also lead to insignificant parameter estimates if standard errors are high due to noise from measurement error. This could be resulting in the type II error which is causing the analysis to conclude that non-food consumption is protected against health shocks, or that remittances only partially insure food consumption against health shocks.

Section 7: Conclusion and Policy Implications

7.1 Analysis

Empirical evidence from developing countries has shown that households with sick members without access to formal insurance markets rely on private informal coping mechanisms to finance the economic costs of illness (Townsend, 1995; Gertler and Gruber, 2003; Wagstaff, 2005). Households unable to cope with the financial costs associated with illness have been found to compensate by reducing consumption over periods of major illness. This research focuses on whether remittance receipt is a private informal coping mechanism that poorer households rely on to insure consumption (food and non-food) against a health shock.

The overall results from the analysis provide convincing evidence that in the absence of informal household safety nets from public or private transfers, adverse health shocks reduce food consumption because households are unable to insure the economic cost of illness. Remittance receipt is associated with improved ability to insure food consumption against health shocks, but this finding is not statistically significant, therefore, remittance receipt alone is insufficient to not reject the hypothesis of full insurance for food consumption. When state transfer and remittance receipt are allowed to interact, the hypothesis of full insurance for food consumption is not rejected – this implies that households rely on both public and private transfers as informal safety nets. There is, however, indication that public transfers crowd out private transfers.

The reported 6.5% reduction in food consumption for households incurring adverse health shocks understates the total welfare cost of illness. There are additional welfare costs from the uninsured variability in consumption that go beyond reduced

consumption. Uncertainty and vulnerability to future poverty that arise from depletion of assets or dependence on private or public transfers are not captured in the simple outcome of reduced consumption. In addition, the impact of reduced food consumption itself can have longer term impacts, especially on growth and development for younger family members.

The analysis reflects how households respond to short term fluctuations in household health by using the ADL index as a health measure, since short term changes are less likely to influence long term adjustments in household consumption patterns (minimize reverse feedback). The SRH index is a longer term measure compared to the ADL index, which might explain the few discrepancies observed when running the specification that investigates how remittance and state transfer receipt influence the household's ability to insure consumption. Where the ADL index is meant to capture shocks that may affect a household head's short term ability to perform certain activities, the SRH index captures deterioration in health from 1998 and 2004.

Though results are not significant, the direction of the sign on parameter estimates for SRH and remittance receipt effect interacted with SRH are both positive. This indicates that (1) despite public transfer and remittance receipt, household head health deterioration reduces food consumption, and (2) households receiving remittances which report a deterioration in household head health spend 3.6 percent less on food consumption than non remittance receiving households. In contrast, the ADL measure suggests that households receiving remittances that report a short term health shock spend 0.9% more on food consumption than non-remittance receiving households. This indicates that while remittances may be a coping strategy to help insure food

consumption in response to a health shock in the short run, remittances are not a long term strategy to help finance economic costs or insure consumption for long run deterioration in health or morbidity.

In contrast, running this specification with both health measures indicates that households receiving state transfers and reporting a health shock spend less on food consumption than households not receiving state transfers. Whereas, households receiving state transfers and experiencing ADL deterioration respond by decreasing food consumption by 16%, household receiving state transfers and experiencing SRH deterioration reduce consumption by 4.6%. This might be picking up on the household head receiving more state assistance with deterioration of health (like disability or some other form of supplemental transfer), which might be helped to partially insure consumption. It might also be picking up on the channels through which health shock leads households to re-allocate resources. While short term health shocks may be resulting in temporary short-falls in expenditure budgets due to increased direct medical costs, longer term deterioration in health may be influencing labor supply and hence amount of household income earned. While remittances from migrants may be able to address the temporary short fall in household budget, public transfers are needed to provide long term supplemental income and partial consumption insurance. Although it can not be concluded which of these phenomena are occurring, it is an interesting question for future research.

Finally, as reported, food consumption is more sensitive to changes in income than non-food consumption. This is surprising and warrants further exploration given the expectation that households would sooner insure food consumption than non-food

consumption. This is probably picking up on the conflated nature of both food and non-food consumption, and may be disguising important variation in effects within more precisely defined categories. For example, food consumption could be disaggregated into individual components like purchased food versus food from own production or gifts. Similarly the results indicating that households are purchasing more non-food consumption when experiencing a health shock (whether short term or longer term) is not picking up on what types of non-food consumption.

7.2 Policy Implications

While the economic significance of migration is still contested in the literature, there is increasing evidence that the social significance of remittances plays an important role as an informal household safety net. The results from this analysis indicate that households forced to compromise food consumption in response to an illness shock may face potentially large welfare loss from its impact on household resources. The larger implications arising from the research result from evidence that households are relying on remittances as informal coping mechanism to weather health shocks. The two immediate considerations include (1) how can the Republic of South Africa (RSA) make these private transfers more readily accessible, and (2) the current system of state transfers is inadequate in weaving a strong enough household safety net weather health shocks. By extension, this implies that current social safety nets are insufficient in helping households insure the economic costs of illness.

This differential impact of remittance and public transfer receipt's ability to insure or partially insure consumption based on length of health shock has important implications for the design of social safety nets as well as improved risk sharing

arrangements. Given the context of high HIV/AIDS prevalence in KwaZulu-Natal and the associated economic costs of morbidity, this is especially relevant due to the absence of formal health insurance for the poorest households. While households can rely on remittance transfers for temporary short changes in income, it is still insufficient to completely insure consumption. When remittance receipt is combined with state transfer receipt, consumption is better insured; however, the crowd out effect implies that these two effects (full insurance versus crowd-out) need to be carefully weighed in order to maximize efficiency in targeting transfers.

Traditionally, governments interested in helping families prepare for adverse shocks have used subsidies, mandates, or direct government provision of health insurance and disability insurance. Until now, RSA has relied on a heavy welfare state to address post-Apartheid inequities in income and standard of living amongst its population. The results from this analysis indicate that government promotion of private remittances can be an additional tool encouraged to improve household safety nets, especially to target the financial needs of poorer households. Finding a way to leverage both public and private transfers may be a longer term solution to providing health insurance to low-income households.

In the short-medium run, this can be done by encouraging greater household reliance on private transfers as informal insurance. Reducing cost and improving remittance channels are two ways RSA can experiment with to encourage greater private transfer transmission. In additions, most remittances in our dataset are likely the result of internal migration, and it is probable that remittances are flowing through informal channels given the high cost of formally sending remittances within RSA. Remittances

can still be encouraged to enable households to access better quality care by reducing transaction costs for private transfers. RSA should focus on how better to create the market and promote competition between financial institutions and remittance service providers (such as credit unions and microfinance institutions) who provide access to private transfers.

This will require both adequate legislation and an existing banking network to encourage competition in facilitating remittance transfers. Some countries like India, the Philippines, and Ghana have commercial banks that play a significant role in remittances, this is because remittances represent a major source of foreign exchange. The challenge for RSA will be to encourage internal transfers within such institutions, even though these private transfers are much smaller in magnitude and are not be as profitable as larger loans and investments. However, formalizing remittance receipt may be a way to engage more low-income individuals into the formal banking system and hence be a way to deepen financial markets.

Improving remittance channels themselves can help promote remittance transfer. Ensuring that there are branch locations in rural areas and villages in both sending and receiving locations to reduce indirect costs (time and travel) of transfer transmission should also encourage private transfers as a household income source. Post offices, for example, could be a channel through which remittances are transmitted since they have extensive networks, even in remote areas. As the ability to transfer money through cell phones and other innovative instruments improve, this might also facilitate and reduce cost of remittance transmission from migrants to recipient households, regardless of location. The Philippines has a text-based remittance system which simply requires cell

phones and the recipient to have a bank account and card with a participating bank. When the migrant sends money, the recipient receives a text message that their account has been updated, the recipient can then use their card to withdraw money from any ATM.

Finally, the Diaspora that is sending remittances home (whether international or concentrated internally), may also be engaged to remit transfers that are matched with public funds for specific community initiatives. These community initiatives may include providing lower cost health care access which enables households to bear less direct costs of health care utilization. Given the increased frequency and intensity of economic and financial crises over the past two decades, it is important to consider remittances as a buttress for social safety nets when re-designing and re-distributing the risks and burdens of the current state transfer system.

The evidence supports (at least partially) that remittances provide social protection to poor households and reduces vulnerability to shocks. Remittances help diversify a household's sources of external finance and therefore can be viewed as a self-insurance mechanism.

Paper 3 - Tables

Table 1: Descriptive summary statistics of independent variables

Variable	1998		2004	
	Mean	*Std. Dev.*	*Mean*	*Std. Dev.*
Household characteristics and consumption				
Log food consumption	4.53	0.68	5.07	0.87
Log nonfood consumption	4.94	1.07	5.59	1.27
Household size	7.49	4.41	6.04	3.58
Fraction 0-5	0.11	0.12	0.09	0.12
Fraction 6-17	0.30	0.20	0.29	0.21
Fraction 18-49	0.42	0.21	0.43	0.24
Fraction 50+	0.17	0.19	0.16	0.22
Fraction unemployed	0.18	0.19	0.20	0.22
Fraction employed	0.17	0.20	0.21	0.24
Agriculture (0/1)	0.34	0.47	0.42	0.49
Number of durables	5.21	1.90	5.94	2.22
Value durable	17782	38347	28505	56912
Household head characteristics				
Age (years)	56.29	14.39	46.51	18.38
Education (years)	3.80	3.53	7.05	4.70
Employed (0/1)	0.41	0.49	0.38	0.48
Receiving OAP[1] (0/1)	0.34	0.47	0.20	0.40
Female (0/ 1)	0.54	0.50	0.46	0.50
ADL[2]	0.51	0.40	0.55	0.38
SRH[3]	0.40	0.31	0.51	0.30
Household income sources (monthly, Rand)				
Per capita Income	478.53	1117	937.48	2281
Remit (0/1)	0.44	0.50	0.27	0.45
Value remittances	146.92	296.08	119.15	380.45
State transfer (0/1)	0.49	0.50	0.54	0.50
Value of state transfer	304.77	404.51	446.14	685.54

Source: KIDS
[1]Old Age Pension, [2]Adjusted Daily Living, [3]Self Reported Health Status

Table 2: Consumption and household health status, by remittance receiving status

Variable	1998			2004		
	RRH[ψ]	NRH[ψ]	t-test	RRH	NRH	t-test
Panel A. Consumption (log, per capita, Rand)						
Food	4.486	4.572	2.34***	5.014	5.087	1.39*
Nonfood	4.783	5.071	4.99***	5.435	5.652	2.83***
Panel B. Household health status						
ADL	0.428	0.565	6.33***	0.460	0.580	4.54***
SRH	0.357	0.431	4.39***	0.448	0.531	4.09***

Source: KIDS
[ψ]NRH: Non-remittance receiving households, RRH: Remittance-receiving households
***1% level of significance, **5% level of significance, *10%level of significance

Table 3: Impact of Change in Health on Food and Non-Food Consumption

	Food Consumption		Non Food Consumption	
Variables	ADL	SRH	ADL	SRH
Log(Exp)	0.75157***	0.75109***	1.10804***	1.10848***
	(0.025)	(0.025)	(0.022)	(0.022)
ADL	0.06525*		-0.01811	
	(0.030)		(0.029)	
SRH		0.06208		-0.04103
		(0.033)		(0.031)
Q1	0.05132	0.05095	-0.10841**	-0.10964**
	(0.044)	(0.044)	(0.039)	(0.039)
Q2	0.03797	0.03748	-0.02749	-0.02890
	(0.036)	(0.036)	(0.031)	(0.032)
Q3	0.01032	0.00906	-0.00925	-0.00921
	(0.039)	(0.039)	(0.030)	(0.029)
Q4	-0.00032	-0.00071	0.00803	0.00827
	(0.035)	(0.035)	(0.026)	(0.025)
Medical Insurance (0/1)	-0.16881***	-0.16887***	0.04148*	0.04059*
	(0.034)	(0.034)	(0.018)	(0.018)
OAP head	0.03581	0.03428	-0.02108	-0.01916
	(0.037)	(0.037)	(0.035)	(0.035)
Employed head	0.00363	0.00616	-0.01553	-0.01395
	(0.028)	(0.027)	(0.024)	(0.024)
Unemployed head	-0.00621	-0.00419	0.00776	0.00859
	(0.039)	(0.039)	(0.034)	(0.034)
Female head	-0.01889	-0.01496	0.00176	0.00250
	(0.023)	(0.022)	(0.017)	(0.016)
Age head	-0.00180	-0.00198	0.00150	0.00137
	(0.001)	(0.001)	(0.001)	(0.001)
Yrs ed head	-0.00210	-0.00182	0.00199	0.00208
	(0.005)	(0.005)	(0.003)	(0.003)
HHsize	-0.01599***	-0.01616***	0.00875*	0.00886*
	(0.004)	(0.004)	(0.004)	(0.004)
Share unemployed	0.02229	0.02369	-0.05937	-0.06004
	(0.057)	(0.056)	(0.051)	(0.050)
Mean Age	0.00365**	0.00358**	-0.00337**	-0.00338**
	(0.001)	(0.001)	(0.001)	(0.001)
Yrs education	-0.00630	-0.00638	0.00718	0.00718
	(0.006)	(0.006)	(0.004)	(0.004)
Own House	-0.15391***	-0.15172***	0.08965**	0.08849**
	(0.034)	(0.034)	(0.027)	(0.026)
Number of shocks	0.00276	0.00239	-0.00232	-0.00264
	(0.009)	(0.009)	(0.007)	(0.007)
Number of durables	0.00358	0.00318	0.00462	0.00510
	(0.006)	(0.006)	(0.005)	(0.005)
Agriculture	0.04511*	0.04515*	-0.03072	-0.03073
	(0.021)	(0.020)	(0.018)	(0.018)

	Food Consumption		Non Food Consumption	
Variables	ADL	SRH	ADL	SRH
HH comp var	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Community FE	Y	Y	Y	Y
Observations	2386	2388	2387	2389
F test	294.74	279.04	988.63	970.71
Prob>F	0.00000	0.00000	0.00000	0.00000

Notes: Tabulated from KIDS panel data.
HH Composition variables include share of household members <5, between 6-17, 18-49, >50.
Robust standard errors in parentheses
***p<0.001, **p<0.01, *p<0.05

Table 4: Remittance Receipt as a Coping Strategy to Insure Consumption Against Change in Health Status (ADL)

	FOOD CONSUMPTION			NON FOOD CONSUMPTION		
VARIABLES	Baseline	Remittance Receipt	Quintile interaction	Baseline	Remittance Receipt	Quintile interaction
Log(Exp)	0.75157***	0.75926***	0.74195***	1.10804***	1.10025***	1.11457***
	(0.025)	(0.028)	(0.028)	(0.022)	(0.021)	(0.020)
ADL	0.06525*	0.08061*	0.07961*	-0.01811	-0.02483	-0.02709
	(0.030)	(0.033)	(0.033)	(0.029)	(0.029)	(0.028)
Remit (0/1)		0.20684	-0.22747		-0.18406	0.17827
		(0.168)	(0.230)		(0.175)	(0.270)
Remit*Log(Exp)		-0.03042	0.01707		0.02889	-0.01463
		(0.029)	(0.034)		(0.029)	(0.039)
ADL*Remit		-0.04010	-0.03222		0.01774	0.01687
		(0.049)	(0.049)		(0.051)	(0.052)
Remit*Q1			0.22534*			-0.20487*
			(0.086)			(0.088)
Remit*Q2			0.22162**			-0.16010*
			(0.077)			(0.072)
Remit*Q3			0.13981			-0.06206
			(0.077)			(0.056)
Remit*Q4			0.14847			-0.09866
			(0.088)			(0.061)
Medical	-0.16881***	-0.17010***	-0.17145***	0.04148*	0.04262*	0.04313*
Insurance (0/1)	(0.034)	(0.033)	(0.034)	(0.018)	(0.017)	(0.017)
HH comp var	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Community FE	Y	Y	Y	Y	Y	Y
Observations	2386	2386	2386	2387	2387	2387
F test	294.74	299.88	344.90	988.63	1034.12	1101.36
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Tabulated from KIDS panel data.
All specifications include the full set of covariates and fixed effects shown in Table 7.
HH Composition variables include share of household members <5, between 6-17, 18-49, >50.
Robust standard errors in parentheses
***p<0.001, **p<0.01, *p<0.05

Table 5: Impact of State transfer and Remittance Receipt on Ability to Insure Consumption Against Change in Health Status (ADL)

	FOOD CONSUMPTION			NON FOOD CONSUMPTION		
VARIABLES	Baseline	Remittance Receipt[1]	With Transfers[2]	Baseline	Remittance Receipt[1]	With Transfers[2]
Log(Exp)	0.75157***	0.74195***	0.74508***	1.10804***	1.11457***	1.11206***
	(0.025)	(0.028)	(0.028)	(0.022)	(0.020)	(0.021)
ADL	0.06525*	0.07961*	-0.00525	-0.01811	-0.02709	0.01191
	(0.030)	(0.033)	(0.043)	(0.029)	(0.028)	(0.029)
Remit (0/1)		-0.22747	-0.16043		0.17827	0.10634
		(0.230)	(0.257)		(0.270)	(0.285)
Remit*Log(Exp)		0.01707	0.01272		-0.01463	-0.01145
		(0.034)	(0.033)		(0.039)	(0.038)
ADL*Remit		-0.03222	-0.00988		0.01687	0.03463
		(0.049)	(0.089)		(0.052)	(0.103)
State Transfer			-0.14903*			0.10403*
			(0.070)			(0.041)
State*Remit			-0.05112			0.04861
			(0.135)			(0.093)
State*ADL			0.15970*			-0.07634
			(0.068)			(0.044)
State*ADL*Remit			-0.05895			-0.00526
			(0.104)			(0.107)
Remit*Q1		0.22534*	0.13372		-0.20487*	-0.17103
		(0.086)	(0.112)		(0.088)	(0.105)
Remit*Q2		0.22162**	0.15150		-0.16010*	-0.08279
		(0.077)	(0.106)		(0.072)	(0.083)
Remit*Q3		0.13981	0.12170		-0.06206	-0.05416
		(0.077)	(0.130)		(0.056)	(0.078)
Remit*Q4		0.14847	0.05676		-0.09866	-0.04867
		(0.088)	(0.127)		(0.061)	(0.102)
Medical Insurance (0/1)	-0.16881***	-0.17145***	-0.17238***	0.04148*	0.04313*	0.04513*
	(0.034)	(0.034)	(0.034)	(0.018)	(0.017)	(0.018)
HH comp var	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Community FE	Y	Y	Y	Y	Y	Y
Observations	2386	2386	2386	2387	2387	2387
F test	294.74	344.90	342.02	988.63	1101.36	1121.62
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Tabulated from KIDS panel data.

[1] This specification is the same as the third specification in Table 2- Remittances interacted with quintiles. It is included again in Table 3 to facilitate comparison of results.

[2] This specification includes the following quintile interactions which were not reported: state-transfer*quintile and state-transfer*quintile*remit.

All specifications include the full set of covariates and fixed effects shown in Table 7.

HH Composition variables include share of household members <5, between 6-17, 18-49, >50.

Robust standard errors in parentheses

***p<0.001, **p<0.01, *p<0.05

Paper 3 - Appendix

APPENDIX TABLE 1: REMITTANCE RECEIPT AS A COPING STRATEGY TO INSURE CONSUMPTION AGAINST CHANGE IN HEALTH STATUS (SRH)

	FOOD CONSUMPTION			NON FOOD CONSUMPTION		
VARIABLES	Baseline	Remittance Receipt	Quintile interaction	Baseline	Remittance Receipt	Quintile interaction
Log(Exp)	0.75109***	0.75996***	0.74259***	1.10848***	1.09983***	1.11424***
	(0.025)	(0.028)	(0.028)	(0.022)	(0.021)	(0.020)
SRH	0.06208	0.06239	0.06093	-0.04103	-0.03641	-0.03686
	(0.033)	(0.032)	(0.032)	(0.031)	(0.026)	(0.025)
Remit (0/1)		0.19687	-0.23990		-0.17694	0.18939
		(0.166)	(0.228)		(0.173)	(0.265)
Remit*Log(Exp)		-0.03190	0.01548		0.02992	-0.01373
		(0.029)	(0.033)		(0.028)	(0.038)
SRH*Remit		-0.00525	0.00430		-0.01033	-0.01284
		(0.064)	(0.062)		(0.061)	(0.060)
Remit*Q1			0.22521*			-0.20570*
			(0.086)			(0.088)
Remit*Q2			0.22535**			-0.16430*
			(0.078)			(0.072)
Remit*Q3			0.14617			-0.06559
			(0.077)			(0.055)
Remit*Q4			0.15126			-0.10159
			(0.088)			(0.060)
Medical	-0.16887***	-0.17005***	-0.17146***	0.04059*	0.04161*	0.04218*
Insurance (0/1)	(0.034)	(0.034)	(0.035)	(0.018)	(0.017)	(0.018)
HH comp var	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Community FE	Y	Y	Y	Y	Y	Y
Observations	2388	2388	2388	2389	2389	2389
F test	279.04	282.49	347.77	970.71	1036.24	1159.10
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Tabulated from KIDS panel data.
All specifications include the full set of covariates and fixed effects shown in Table 7.
HH Composition variables include share of household members <5, between 6-17, 18-49, >50.
Robust standard errors in parentheses
***p<0.001, **p<0.01, *p<0.05

APPENDIX TABLE 2: IMPACT OF STATE TRANSFER AND REMITTANCE RECEIPT ON ABILITY TO INSURE CONSUMPTION AGAINST CHANGE IN HEALTH STATUS (SRH)

VARIABLES	FOOD			NON FOOD		
	Baseline	Remittance Receipt[1]	With Transfers[2]	Baseline	Remittance Receipt[1]	With Transfers[2]
Log(Exp)	0.75109***	0.74259***	0.74420***	1.10848***	1.11424***	1.11238***
	(0.025)	(0.028)	(0.028)	(0.022)	(0.020)	(0.020)
SRH	0.06208	0.06093	0.03456	-0.04103	-0.03686	-0.02886
	(0.033)	(0.032)	(0.045)	(0.031)	(0.025)	(0.029)
Remit (0/1)		-0.23990	-0.20081		0.18939	0.18472
		(0.228)	(0.255)		(0.265)	(0.288)
Remit*Log(Exp)		0.01548	0.01348		-0.01373	-0.01279
		(0.033)	(0.033)		(0.038)	(0.037)
SRH*Remit		0.00430	0.03597		-0.01284	-0.05945
		(0.062)	(0.104)		(0.060)	(0.104)
State Transfer			-0.07688			0.06037
			(0.068)			(0.039)
State*Remit			-0.04258			-0.01317
			(0.143)			(0.083)
State*SRH			0.04622			-0.01348
			(0.084)			(0.053)
State*SRH*Remit			-0.05794			0.08817
			(0.143)			(0.121)
Remit*Q1		0.22521*	0.14767		-0.20570*	-0.19538
		(0.086)	(0.113)		(0.088)	(0.109)
Remit*Q2		0.22535**	0.17748		-0.16430*	-0.11956
		(0.078)	(0.105)		(0.072)	(0.084)
Remit*Q3		0.14617	0.13601		-0.06559	-0.07417
		(0.077)	(0.130)		(0.055)	(0.077)
Remit*Q4		0.15126	0.07182		-0.10159	-0.06777
		(0.088)	(0.127)		(0.060)	(0.099)
Medical Insurance (0/1)	-0.16887***	-0.17146***	-0.17457***	0.04059*	0.04218*	0.04453*
	(0.034)	(0.035)	(0.035)	(0.018)	(0.018)	(0.018)
HH comp var	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Community FE	Y	Y	Y	Y	Y	Y
Observations	2388	2388	2388	2389	2389	2389
F test	279.04	347.77	337.39	970.71	1159.10	1143.51
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Tabulated from KIDS panel data.

[1] This specification is the same as the third specification in Appendix Table 1- Remittances interacted with quintiles. It is included again in Appendix Table 2 to facilitate comparison of results.

[2] This specification includes the following quintile interactions which were not reported: state-transfer*quintile and state-transfer*quintile*remit.

All specifications include the full set of covariates and fixed effects shown in Table 7.

HH Composition variables include share of household members <5, between 6-17, 18-49, >50.

Robust standard errors in parentheses

***p<0.001, **p<0.01, *p<0.05

Paper 3 - References

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Summary and Future Research

This research explores whether remittances, as a form of social protection, (1) secure basic consumption, (2) reduce fluctuations in consumption and/or avoid asset reduction, and/or (3) enable households to save, invest, and accumulate through reduction in risk and income variation. This dissertation has found evidence that remittances do help poor households secure basic consumption, remittances enable poor households to invest in better quality medical care at the margin, and that remittances help partially insure consumption against adverse health shocks. Evidence seems to support that remittances are a monetary flow that can relieve income constraints when seeking appropriate healthcare. Although not directly addressed, it is probable that households relying on remittances as an informal private coping strategy will less likely resort to strategies like depleting assets to smooth consumption. If private transfers are helping free household resources for other productive uses, this will likely have a welfare improving effect. This last point is an area where further research will provide additional insight.

The analysis indicates that there are differences among the way the poorest and wealthiest households use remittances. The results corroborate other empirical evidence suggesting that poorer households use remittances for basic consumption like food and health, and less for investment. In addition, the results suggest that remittances are enabling poorer households to access better quality care, at the margin, preferring to seek care from private medicine rather than traditional healers. In contrast, wealthier households receiving remittances invest more in consumer durable and housing related purchases. Since wealthier households are more likely to be covered by medical

insurance which reduces out of pocket expenses, they devote less budget shares towards health expenditures.

The research suggests that migrants' motivations for sending money home are based on economic and financial risk for poorer households. This is supported by evidence that remittances are used to supplement temporary short-falls in household income during health shocks. For poorer households remittances operate as informal insurance to partially insure consumption against short term adverse health shocks. This is relevant because the research suggests that poorer households are vulnerable to consumption poverty as a result of illness and they face higher barriers in accessing quality health care.

The government of South Africa has been experimenting with targeted grants and unconditional transfers in order to redress inequities in consumption and living standards afflicting the poorest households. Currently, South Africa's social grants target elderly, disabled people, poor families with children, war veterans, and households taking care of children and people in need. As reported, annual expenditure on grants increased 3.5 times in the 10 years between 1994 and 2004, from R10-billion to R34.8-billion. During the same period, the number of South Africans receiving social grants increased from 2.6 million to over 7 million.

The research, however, raises concerns about the effectiveness of state transfers in reaching the poorest households. The results indicate that (1) state transfers target middle income quintile groups (as opposed to households in the lowest income quintile), and (2) state transfers may be crowding out private transfers, since both remittances and state transfers are being used as informal insurance. Remittances, on the other hand, more

efficiently target the needs of poorer households, though more analysis is required to assess remitter characteristics and ties to origin households to better understand this observation. Overall, the evidence implies that there is room for significant welfare gain if existing risk sharing arrangements can be improved to help poorer households without access to medical insurance insure consumption from the economic costs of illness.

A major limitation in this dissertation research is the inability to differentiate between international and internal transfers, which likely differ in magnitude and in marginal impact on household consumption. Given the high costs associated with international migration, wealthier households are more likely to be able to send migrants abroad. Based on the evidence presented, remittances influence household expenditure differently depending on their relative position in the income distribution. Information regarding location of the remitter would provide meaningful estimates of the impact of remittances on household consumption, given that international transfers are likely targeting wealthier households and have a different impact than internal transfers which are likely targeting poorer households and acting as consumption insurance or to finance basic consumption. Evidence from this data sample indicate that migrants tend to originate from economically disadvantaged families, therefore, it is expected that most migration is internal.

Information about remitter characteristics or timing of remittance receipt would yield more accurate assessments regarding (1) the extent to which households are relying on informal private transfers as insurance, and (2) the motivation behind sending remittances in order to find ways to incentivize their increased use. Information about remitters wage earnings and the percentage of their earnings being remitted home would

also give a more complete picture of the welfare impact of there private transfers being used as a household safety net. If internal migrants faced constrained resources themselves but are sending money home, this welfare depressing impact on the remitter must be considered when deciding whether to encourage remittances as a household safety net, or whether governments must find a better way to deliver and target social insurance to the most vulnerable populations.

Notwithstanding the need for further investigation, the results indicate that government promotion of remittances can be an additional tool encouraged to possibly finance formal social insurance schemes. Since low-income countries generally have limited abilities to tax and collect revenue needed to finance social insurance, leveraging remittance use could provide an innovative source for financing social health insurance. The next steps would be to explore the effect of local and national policy choices on the flow of money sent by migrants.

In particular, policies which focus on reducing transaction costs of sending remittances may not only encourage more private transfers to be sent home, but also help move transfers from the informal to formal systems. The move to formal systems is important to maximize multiplier effects of remittances as bank deposits as well as contribute to deepening of financial systems. Appropriate regulations to foster competition should reduce the cost charged to send remittances, as in the case of Mexico. Policy interventions which also improve the distribution stage of remittance transactions, especially to remote areas where many of the most vulnerable populations reside, may also encourage remittance use. Possible solutions include partnerships between banks and non-bank financial institutions like savings and credit cooperatives, micro-finance

business, or postal offices. Understanding these inter-relationships on the flow of remittances can then help policymakers develop mechanisms that link remittances with financing social health insurance by re-directing remittance flows to benefit the direct recipient as well as the wider community in a sustainable manner.