

**Internal Migration, Remittances and Household Welfare:  
Evidence from South Africa**

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## **Abstract**

In this thesis, I investigate the economic linkages between internal labour migration and the welfare of migrant-sending households and communities. The analysis is couched in the new economics of labour migration theory, which recognises the familial participation in migration decisions and therefore the potential role of economic linkages between migrants and their original households. The contribution of this thesis is made through three empirical essays. In the first essay (chapter two) , I employ descriptive techniques, and use nationally representative data from South Africa, to assess the contribution of remittances and other income sources into the composition of poverty and inequality indices. Remittances are generally a small part of the aggregate household income vector, contributing about 5 percent of the total. However, this income source is available to about one in five of rural African household and contributes substantially to their total income. Since the decomposition methods do not establish causality, I employ regression techniques to examine the poverty impact of migration and remittances, in a second essay (chapter three). Specifically, I address the question of what would happen to household poverty if the migrant had not if the migrant had stayed. To this end, I use a treatment effects model which inherently addresses issues selectivity bias on the part of migrants. Results from a cross-section data analysis suggest that migration has negative effects on consumption and hence poverty, at least in the short term. In the third empirical chapter, I focus on individual remittance receivers and sender to unpack the factors that are associated with remittances. The risk sharing motive, proxied by remittance receiver's reported state of health, does not find support in the data. Further, I find limited support for a gender effect on remittances and no evidence of the crowding out effect of private versus public transfers. Of interest is the observation that remittance exchanges are not necessarily the

domain of nucleus family members, but often involves a wider array of participants, mostly from extended family.

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*soli Deo honor et gloria.*

To mum and dad

## List of abbreviations

AERC	African Economics Research Consortium
CLAD	Censored Least Absolute Deviation
FIML	Full information Maximum Likelihood
FGT	Foster - Greer - Thorbecke
IES	Income and Expenditure Survey
KZN	KwaZulu-Natal
LFS	Labour Force Survey
NIDS	National Income Dynamics Study
NRF	National Research Foundation
OLS	Ordinary Least Squares
PSLSD	Project for Statistics on Living Standards and Development
PSU	Population Sampling Unit
SALDRU	Southern African Labour and Development Research Unit
SARCHI	South African Research Chair Initiative
SSA	Statistics South Africa

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# 1 Introduction

## 1.1 Overview of the thesis

The purpose of this thesis is two-fold: firstly, to examine economic linkages between labour migrants and their original households and, secondly, to analyse the welfare impacts of labour migration on the individuals and households that are linked to economic migrants. Within the scope of the investigation, the thesis focuses on remittances as the main economic linkage between labour migrants and migrant-connected households in South Africa. More specifically, the thesis attempts to answer three questions: what is the contribution of remittance income, in relation to other income sources, to household poverty and inequality? Secondly, to what extent do remittances affect poverty in migrant-connected households? And thirdly, what factors influence remittances income?

Interrogating the nature and persistence of internal migration, in view of its linkages to poverty and inequality in South Africa, could have important policy implications. A deeper understanding of the interaction between migration and household welfare could assist social planners and policy makers in revising ineffective policies and better achieve its goals in the fight against poverty and economic disparities. Indeed, given South Africa's history with regard to migrant labour and the large numbers of migrant workers and remittance transfers, government plans and programs need to incorporate the potential effects of internal migration on the basis of rigorous research and evidence.

## 1.2 Background to migration and welfare of migrant-connected households

Migration of labour has for many years been a key element of South Africa's labour markets and economic development. For a greater part of the twentieth century, labour migration within the country was closely regulated. To be specific, the *apartheid*<sup>1</sup> system passed laws, such as the urban influx control legislation, which barred some sections of the society, notably the black, from settling in the economically productive parts of the country. Instead, the majority were to stay in rural homelands where employment opportunities were limited. In effect, these restrictions together with the contractual nature of employment particularly in mines, gave rise to temporary and circular migration: many migrant workers would retain a base in the household of origin (often rural), to which they returned every year (see Wilson, 1972; Kok *et al*, 2003; Posel, 2010). Survival for many households depended on the economically active, mostly men, finding contractual employment in mines, in urban industry or on white-owned farms. ). The *apartheid* system thus ensured that the minority white population superseded other demographic groups and, as its legacy, supplanted a clear socioeconomic hierarchy far more unequal than most comparable societies (Treiman, 2005).

However, since the fall of apartheid in the early 1990s, the country has witnessed important changes which have possibly changed the shape of labour migration trends and invariably impacted on urbanization as well as poverty and inequality. Among other events, the repeal of urban Influx Control legislation in the late 1980's, the subsequent and sustained decline in labour absorption capacity of the South African economy and the dramatic increase in the

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<sup>1</sup>A system of racial segregation in South Africa enforced through legislation by the National Party (NP) governments, which ruled the country from 1948 to 1994. Apartheid policies defined four main racial groups in South Africa: blacks/Africans, Indians, Coloureds and Whites. Africans constitute approximately 75 percent of the South African populace. Under this system, the rights of the majority black inhabitants were curtailed while white minority rule was maintained.

incidence of HIV-AIDS infections in the Southern African region have, in all likelihood, played a central role in the restructuring of labour migration streams. Recent trends in labour migration seem to suggest that internal labour migration has been on the increase. According to Posel and Casale (2006), labour migration within South Africa increased significantly in absolute terms between 1993 and 2002. The two authors argue that most of the increase was due to rural-to-urban migration, on account of limited employment and income generating activities in the rural areas. More recently, however, there is a suggestion from new survey data that a larger part of labour migrants could be changing preferences in favour of settling in destination areas rather than migrating temporarily (Posel, 2010).

The gender aspect of migration also appears to be changing as female labour migration has also been on the rise. Whereas there was little change in the proportion of rural African men who were reported as labour migrants between 1993 and 1999, the proportion of African women identified as migrant members of rural households increased. Consequently, there was a small but identifiable shift in the gender composition of labour migrants in the 1990s: in 1993, an estimated 30 percent of African migrant workers in South Africa were women; by 1999, this had increased to approximately 34 percent. During the same period, particularly after the transition from the apartheid regime to democratic rule, South Africa's development policy underwent some re-orientation, paying more attention to addressing issues of widespread poverty and inequality.

In spite of the best intentions of the post-apartheid government to fight the socioeconomic challenges, there seems to have been persistence and possible worsening of both poverty and inequality. Leibbrandt *et al* (2010) show that the country's high aggregate level of income

inequality increased between 1993 and 2008 and that the same was true for inequality within each of South Africa's four major racial groups<sup>2</sup>. There appears to be a consensus on these inequality findings as earlier studies also show that inequality had increased during the latter part of the 1990s (see Ardington *et al.*, 2006). Other studies on the increasing inequality show inter-racial income disparities declined due to rising income for blacks. However, from intra-racial inequality among the black population prevented a significant decline in aggregate inequality and poverty (van der Berg and Louw, 2004; Van der Berg *et al.*, 2008).

Linked to deepening inequality was persistent poverty. An analysis of income and expenditure data between 1995 and 2002 suggests that headcount<sup>3</sup> poverty declined marginally from 51 percent to 48 percent, but the actual number of people living below the poverty line increased by more than one million, while those living in extreme poverty – (living on less than one united states dollar a day) increased from 9.4 percent to 10.5 percent of the population. Leibbrandt *et al.* (2010) find that although aggregate poverty slightly fell between 1993 and 2008, the African and coloured population groups experienced deepening of poverty, implying those who were still in poverty were on average poorer than before.

Against this background, there is a need to know more about the underlying causes of poverty and inequality: the factors that drive it and those which maintain it. More importantly, we need to know more about the ways in which disadvantaged people cope with poverty, and the strategies by which they try to escape. Furthermore, there is need to understand what shapes

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<sup>2</sup> White, Coloured, Asian/Indian and Black/African

<sup>3</sup> the proportion of people living below the 1995 poverty line of R354 per adult equivalent per month

the success and the failure of these strategies. Migrant labour and remittances play a potentially important role in this regard.

The importance of migration in the rural development context has recently been recognised in the theoretical literature. In the next section, I review some of the migration and development models. A separate but related body of literature, focusing primarily on remittances, is introduced and discussed in the fourth chapter.

### **1.3 Migration and welfare: a theoretical context**

The literature on labour migration has largely concerned itself with explaining migration decisions and factors that sustain migration streams (see Lucas, 1997). The dominant influence of economic factors is a standard theme, mostly focusing on the migrants themselves. That, notwithstanding, the phenomenon has attracted research attention from diverse disciplines, including demography, sociology and geography. In the rest of this section, I give an overview of the evolution of the various economic schools of thought on migration and, importantly for the purposes of this study, try to identify the economic linkages between migrants and their original households (or communities).

#### *1.3.1 The neoclassical approach to migration analysis*

Theoretical explanations of migration, specifically of the rural-urban type, can be traced back to Ravenstein's articles on the "laws of migration" (Ravenstein, 1885). According to these laws, differences in availability of opportunities between rural and urban areas are the main driving factor behind migration decisions. The main tenets of the Ravenstein laws pertain to three

factors namely (i) distance as a regulating factor of migrant's choice of destination<sup>4</sup> (ii) the existence and extent of return streams, and (iii) the role of trade and industry in accelerating the migration process.

The first well-known economic model of development to include as an integral element the process of rural–urban labour transfer was that of Lewis (1954) and later extended by Fei and Ranis (1961). One version of the Lewis model considers migration as a wage equilibrating mechanism between labour-surplus and labour-deficit sectors. The Lewis model is, in this regard, based on the concept of a two-sector economy, comprising a subsistence (agricultural) sector characterized by underemployment, and a modern industrial sector characterized by full employment. In the subsistence sector, the marginal productivity of labour is zero (or very low) and workers are paid wages to their cost of subsistence, so wage rates in this sector barely exceed marginal products. Because of high productivity or labour union pressures, wages in the modern urban sector are much higher. Migration occurs from the subsistence to the industrial sector as a response to the wage differential. This increases industrial production as well as the capitalists' profit. Since this profit is assumed to be reinvested in the industrial sector, it further increases the demand for labour from the subsistence sector. The process continues as long as surplus labour exists in the rural areas and as long as this surplus is reflected in significantly different wage levels. It might continue indefinitely if the rate of population growth in the rural sector is greater than or equal to the rate of growth of demand for labour out-migration, but it must end eventually if the rate of growth of demand for labour in the urban area exceeds rural population growth.

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<sup>4</sup> Migrants tend to move to nearby places, often in a staged process leading eventually to longer-distance moves to bigger cities: in other words, step-migration.

Ranis and Fei (1961) noted that the Lewis model failed to present a satisfactory analysis of the agricultural sector. Indeed, the sector has to grow if the mechanisms that Lewis designed were to continue without grinding to a premature halt. They therefore enrich the dual economy model by, *inter alia*, pursuing this notion of the requirement of balance growth to a logically consistent definition of the end of the take-off process.

In spite of being highly acclaimed, two-sector model has come under more criticism. For instance, A major critique relates to the validity of the assumption that migration is induced solely by low wages and underemployment in rural areas, although these are undoubtedly important influences. Further, the assumption of a modern industrial sector in a developing country setting seemed rather unrealistic. In contrast, rural–urban migrants would probably not be entering the industrial sector but picking up low-productivity and still quite low-paid jobs in the informal economy of the city – for instance as street-vendors, casual laborers or construction workers. Hence, it seemed that, whilst the Lewis model had the strength of being simple and intuitively attractive, and whilst it did seem to be roughly conformed with the historical experience of economic/industrial growth in the West, it has some characteristics, noted above, which are at variance with the realities of development processes and rural–urban migration in many Third World countries (Todaro, 1976).

Sjaastad (1962) advanced a theory of migration which treats the decision to migrate as an investment decision involving an individual's expected costs and returns over time. Returns comprise both monetary and non-monetary components, the latter including changes in psychological benefits as a result of location preferences. Similarly, costs

include both monetary and non-monetary costs. Monetary costs include costs of transportation, disposal of property, wages foregone while in transit, and any training for a new job. Psychological costs include leaving familiar surroundings, adopting new dietary habits and social customs, and so on. Since these are difficult to measure, empirical tests in general have been limited to the income and other quantifiable variables. Sjaastad's approach assumes that people desire to maximize their net real incomes over their productive life and can at least compute their net real income streams in the present place of residence as well as in all possible destinations; again the realism of these assumptions can be questioned since perfect information is not always the case, by any means.

Undoubtedly one of the most influential frameworks for understanding the driving forces behind rural–urban migration in developing countries is the model developed by Michael Todaro (Todaro, 1969; Harris and Todaro, 1970). Todaro's initiative was stimulated by his observation that throughout the developing world, rates of rural–urban migration continue to exceed the rates of job creation and to surpass greatly the capacity of both industry and urban social services to absorb this labour effectively. He realized, along with many others, that rural–urban labour migration was no longer a beneficent or virtuous process solving simple inequalities in the spatial allocation of labour supply and demand.

Todaro suggested that the decision to migrate includes a perception by the potential migrant of an expected stream of income which depends both on prevailing urban wages and on a subjective estimate of the probability of obtaining employment in the modern urban sector, which is assumed to be based on the urban unemployment rate (Todaro, 1969). Todaro's model is both an extension of the human capital approach of

Sjaastad and an attempt to accommodate the more unrealistic assumptions of the dual economy model as regard Third World cities.

According to the Todaro approach, migration rates in excess of the growth of urban job opportunities are not only possible, but rational and probable in the face of continued and expected large positive urban–rural income differentials. High levels of rural–urban migration can continue even when urban unemployment rates are high and are known to potential migrants. Indeed Todaro (1976) outlines a situation in which a migrant will move even if that migrant ends up by being unemployed or receives a lower urban wage than the rural wage: this action is carried out because low wages or unemployment in the short term are expected to be more than compensated by higher income in the longer term as a result of broadening urban contacts and eventual access to higher-paid jobs. The approach therefore offers a possible explanation of a common paradox observed in Third World cities – continuing mass migration from rural areas despite persisting high unemployment in these cities.

Todaro's basic model and its extensions consider the urban labour force in developing countries as distributed between the relatively small modern sector and a much larger traditional sector (Harris and Todaro, 1970). Wage rates in the traditional sector are considered not to be subject to the partially non-market institutional forces that maintain high wages in the modern sector but to be determined competitively. As a result, they are substantially lower than those in the modern sector, but still significantly higher than in the traditional rural subsistence sector. Most urban in-migrants are assumed to be absorbed by the traditional sector while they seek better employment opportunities in the modern sector.

Apart from the methodological and conceptual problems of estimating expected incomes and their differentials for particular origin and destination areas, a major weakness of Todaro's model is its assumption that potential migrants are homogenous in respect of skills and attitudes and have sufficient information to work out the probability of finding a job in the urban modern sector. Despite the refinement of expected incomes, the model remains one based on the notion of rational and well-informed decision-making. It also rests on an underlying assumption that the migrants aspire to become permanent residents in the city, and ignores other forms of migration or mobility, including circular movement. Moreover, both the Todaro and the human investment models do not consider non-economic factors and abstract themselves from the structural aspects of the economy. A better understanding of the causes of migration requires an analysis of the macro-economic and institutional factors that generate rural-urban differentials. A distinction is needed between socio-economic structural factors and the specific mechanisms (unemployment, wage differences *et cetera.*) through which the structural factors operate.

### 1.3.2 *A pluralistic approach*

The economics literature has traditionally treated migration as an individual decision motivated mainly by economic considerations. These theoretical foundations that we have looked at so far give flesh to this notion. Over the past three decades, the neoclassical view - that migration decisions are exclusively a domain of the individual migrant - has been challenged by an alternative paradigm that views migration decisions as a collective outcome involving family and households (Stark and Bloom, 1985; Stark, 1991). According to Stark, and others who have abridged his arguments, migration must often be seen as a family or group decision

which seeks to minimize risks and diversify resources rather than to maximize cash income alone. This strategy is viewed as a form of a portfolio investment of the labour of the various members of the family in various places or positions in the origin region and elsewhere (abroad, or a town or city in the home country). Importantly, it involves widening the focus of the investigation away from the single, individual migrant and puts emphasis on channeling investment and consumption goods back to the home village rather than (as in the neoclassical model) on the economic progress of the migrant in the destination.

Although such new economics approaches have generally been applied to the international migration context (reflecting the dominant concern in migration studies with this form of movement in recent years), the principles apply almost equally well to internal migration fields, especially within large developing countries which are sharply differentiated internally. Massey et al. (1998) explicitly recognize this when they state that

However, apart from the more promising unit of analysis than that of the individual in a job lottery, the new economics seems to be firmly grounded in a functionalistic and individualistic economic framework (de Haan, 2006). The migration decision is presented as a household strategy, representing the congruent interests of all household members. Limited attention is paid to the non-economic factors that drive such decisions (Posel, 2002).

### *1.3.3 The institutional approach*

Further departing from individual or behavioural models of migration are analyses that emphasise the institutions that are determining for migration. Migration decisions are viewed as part of a continuing effort, consistent with traditional values, to solve recurrent problems to do with a balance between available resources and population numbers. Proponents of the

institutional approach accept that the migration decisions are made primarily as a risk minimising objective. However, they argue further choice must take into consideration a set of conventions, rules, norms and value systems that are specific to each society and constitute the institutional context of the migration process (Guilmoto and Sandron, 2001).

The institutional approach shows some important limitations that the neoclassical theories appear to overlook. That is, migration does not approximate a lottery and migration options are not open to everybody. Further, people do not move *en-masse* forced by economic or political factors. Rather, migration streams are highly segmented, and people's networks, preceding migrations and various social institutions determine, to a large extent, which migrates, and from which areas. An important implication of this aspect of migrations is that the gains accruing from migration, whether to the migrant himself or to those connected to him, are not distributed equally.

#### 1.3.4 *Summary*

In a nutshell then, the migration literature has evolved from migrant- focused theories in the early twentieth century to bring to the core the welfare of those who remain behind but remain connected to migrants after the migration decision has been implemented. This theoretical discourse, therefore, demonstrates the growing recognition of migration as a family livelihood strategy and hence as a potential welfare change factor.

## **1.4 Purpose and Motivation of the study**

In the foreseeable future, internal migration will continue to play a key role in South Africa's labour market and in the search for better livelihoods. However, labour migration within national boundaries continues to receive marginal attention in discussions and debates on development policy. Among other reasons, this marginalization emanates from lack of in-depth studies, which in turn is due to data limitations in some cases and the complexity of the migration-development nexus (de Haan, 2006). Although this challenge is common in the developing world, its manifestations and solutions are dependent on country-specific characteristics. However, the issue needs to receive more attention particularly considering the potentially important role that migration plays in alleviating poverty as well as its close linkage to the HIV-AIDS pandemic. The South African context is appropriate as the country continues to face growing income inequality and entrenched poverty in the rural areas.

Research on internal migration in South Africa since the abolition of influx control remains scanty, despite the importance that migrant labour markets offer to the economy. The present study therefore makes a contribution by attempting to fill these knowledge gaps in the context of the South African economy.

## **1.5 Hypotheses and Methods**

The background analysis above has attempted to show linkages between migration and household welfare as well as highlight the potential significance of migration to rural households in developing countries, with a special reference to South Africa. In this regard, the following hypotheses are proposed:

- Labour migration improves household welfare among rural black South Africans by reducing income poverty.
- Labour migration reduces income inequality between rural black households.
- Migrants' remittances are motivated by familial motives. That is, families diversify their income source through labour migration, which in turn implies that remittances are motivated by the insurance motive.

## **1.6 Structure of the thesis**

To assess the contribution of various income sources to household welfare, the thesis applies decomposition techniques to a standard Foster, Greer and Thorbecke (1984) poverty index and a Gini inequality index. Despite the fact that remittances are a relatively small component of the total income vector, decomposition results indicate that they are not an ignorable source of income for poor households and are associated with lower levels of income poverty and inequality.

After a rigorous assessment of the contribution of various incomes to household welfare, the thesis proceeds in the third chapter to test the hypothesis that labour migration and remittances reduce poverty in South Africa by investigating the poverty impact of remittances on migrant-connected households using an econometric model of household consumption expenditure. The pertinent question is how households would fair if migrants had not left, hence attempts to estimate a counterfactual income distribution. I use a treatment effects model of household per capita expenditure in order to account for the possibility of self-selection on the part of migrant households. I find evidence of sample selectivity, where

households that would naturally be exposed to higher welfare outcomes are more likely to participate in migration and receive remittances. However, the (short term) impact of remittances on household welfare is negative. It is likely that although many migrant households are not in the higher brackets of income distribution, the most indigent households are not able to participate in migration. This result supports Gelderbloom (2007) who suggested that poverty constrains migration in South Africa. In the fourth chapter, I turn to the question of what factors influence remittance levels. I employ descriptive methods to profile remittance senders and recipients, as well as remittance flows. An econometric model of remittance income is then used to identify the individual and household level characteristics of remittance income. I find evidence of the insurance motive in remittance variation. Although circular migration is perceived to have declined, higher levels of remittances are associated with couples, often the husband supporting sending to his wife as a familial obligation. Further, the hypothesis that genetic relatedness predicts remittances is confirmed. Chapter 5 summarises findings from the study and discusses possible implications emanating from the finding and offers suggestion for future research.

## **2 The Effect of Remittances on Household Income Poverty and Inequality**

### **2.1 Introduction**

Private resource transfers play an essential role in the livelihoods and survival of many poor people in developing countries. Remittances, for instance, provide a means of achieving consumption smoothing and alleviating liquidity constraints (Taylor and Rozelle, 2003; Yang and Choi, 2007), thus availing a vital economic linkage between labour migrants and their original households. Moreover, international evidence supports the view that remittances from migrants have the potential to spatially redistribute income and relieve some income inequalities (de Haan, 2006) suggesting further that economic migration has a strong relationship with poverty and social exclusion.

In South Africa, like in most parts of the developing world, these transfers are believed to constitute a significant share of household income for many indigent households (Posel, 2001; Leibbrandt and Woolard, 2001). Although there is a large literature focusing primarily on the motives behind remittances and the relationship between public and private transfers (Cox, Hansen and Jimenez, 2003; Jensen, 2003), the welfare impacts of remittances at the household level remain relatively understudied (Dimolva and Wolff, 2008). An understanding of the distribution and possible impacts of remittances is crucial for sound public policy design because, among other things, such transfers provide social and economic benefits similar to those of public programs (Cox and Jimenez, 1990).

Moreover, the South African case deserves attention from development researchers because of the significantly high levels of economic inequality and poverty, particularly among previously disadvantaged demographic groups. Since the early 1990s, South Africa's public policy has been re-shaped to pay more attention to addressing issues of widespread poverty and inequality (Bhorat and Kanbur, 2006). For instance, coverage of the means tested old age pensions was expanded in 1993 to include elderly Africans (Case and Deaton, 1998). The rolling out of child support grants in the late 1990s further enhanced access to disposable income by low income households (Woolard and Leibbrandt, 2010).

In the case of poverty, while there is contention over the magnitudes, there is a broad consensus over the direction. This consensus suggests that poverty was either constant or worsened slightly between 1994 and 2001, and then began to improve as the impact of the new child support grants came to be felt (van der Berg, Burger, Louw and Yu, 2005; Meth, 2006; Leibbrandt and Levinsohn, 2011). In addition, while the various state interventions have had positive impacts on poverty, there is documented evidence that state pensions tend to crowd out private transfers (Jensen, 2003).

The present chapter uses nationally representative household data sets to explore the extent of inter-household economic linkages as manifest in remittance flows. Through an investigation of remittance flows and their contribution as an income source to income inequality and poverty in rural South Africa, this chapter assesses whether remittances, and hence work-related migration, are important to poor households.

The chapter proceeds in four further parts. Part 2.2 discusses relevant empirical literature, focusing on poverty and inequality impacts of remittances. Section 2.3 presents data and definitions. Thereafter, section 2.4 discusses analytical tools for decomposing poverty and

inequality indices while sections 2.5 and 2.6 presents empirical results for poverty impacts and redistributive effects. The chapter concludes with section 2.7.

## **2.2 Related literature on remittances and household welfare**

### *2.2.1 Remittances and income disparities*

One strand of the literature on migration and welfare focuses on the relationship between migrants' remittances and household income disparities in migrant sending regions. However, empirical studies on the topic often yield conflicting results and there appears to be no strong consensus on both the direction and magnitude of the redistributive impact of remittances. Remittances sometimes go disproportionately to better-off households, and so, widen disparities, but in other cases they appear to target the less well off, causing disparities to shrink (Taylor and Wyatt, 1996).

Conflicting results are also shown in a recent study by Lopez-Feldman, Mora and Taylor (2007) who find that remittances increased inequality in Mexico when considered at national level, while contributing positively (to inequality reduction) in some regions of the same country. Adams (1989) finds that income inequality declined with increasing remittances in rural Egypt, but the same author (Adams,1996) finds that internal remittances have a positive effect on equality while international remittances have a negative effect rural Pakistan, yielding in sum a neutral effect on overall inequality.

It would seem that calculations that impute incomes for the erstwhile migrants, had they stayed and worked at home, tend to show an increase in inequality from the combined effect of migration and remittances. For example, inequality was found to have increased in Bluefields,

Nicaragua, when an imputation was made for the lost domestic income of migrants, but it fell when the domestic income of migrants was ignored (Barham and Boucher, 1998). Two recent studies, however, did not find an increase in inequality even after controlling for the counterfactual income loss from migration. Adams (2005) finds that the inclusion of international remittances in household expenditures among Ghanaian households leads to only a slight increase in income inequality, with the Gini coefficient remaining relatively stable, between 0.38 and 0.40. De and Ratha (2005) report that in Sri Lanka, the Gini coefficient drops from 0.46 to 0.40 because of remittance receipt.

Differences in findings on the impact of remittances on inequality also stem from varying geographic and historic circumstances, such as the distance from high-income destinations and the prevalence of networks of earlier migrants (Ratha, 2006). The cost of migration tends to be lower for shorter distance destinations and where migrant networks are well established. Consequently, migration becomes available as an option for poorer households. For a case in point, remittances to a Mexican village with a well-established history of international migration had an equalizing effect, whereas remittances to another Mexican village for which international migration was a relatively new phenomenon tended to make the distribution of income more unequal (Stark, Taylor, and Yitzhaki, 1986). For a large number of Mexican communities, the overall impact of migration and remittances is estimated to reduce inequality for communities with relatively high levels of past migration (McKenzie and Rapoport 2004).

In addition, differences in outcomes may stem from methodological differences. Bardan and Boucher (1998) identify two key sources of methodological variation, namely the specific economic question being asked and the econometric or statistical techniques used to generate estimates of income and income distributions. Variation in the economic question under

investigation arises, because remittances can be treated, in effect, as an exogenous transfer by migrants or as a potential substitute for home earnings. When treated as an exogenous transfer, the economic question is how remittances, in total or on the margin, affect the observed income distribution in the receiving community. When treated as a potential substitute for home earnings, the economic question becomes how the observed income distribution compares to a counterfactual scenario without migration and remittances but including an imputation for home earnings of erstwhile migrants.

The overall impact of migration on economic inequality at origin is *a priori* indeterminate and largely depends on where migrants are drawn from in the initial wealth distribution, and on the impacts of their migration decisions on other community members. If migration costs are sizeable, migrants will be initially primarily drawn from households in the upper or middle brackets of the community's wealth distribution, causing inequality to initially increase as such households get richer from income earned abroad. In contrast, if migration costs are low or liquidity constraints do not bind, the lower part of the distribution is also able to migrate, resulting in a more neutral or even inequality reducing effect of migration income. The migration diffusion theory put forward by Stark et al (1986) provides some basis for the various as well as conflicting results. At the beginning of the migration diffusion process, migration may only be available to well off households. Consequently, remittances would only increase the income gap, hence become unequalising, since they would only accrue to households that are already better off. If income becomes diffused to households at the lower end of the income distribution, remittances might become less unequalising and possibly equalising. I demonstrate, after introducing analytical tools for Gini inequality index decomposition (in section 2.4.3 below), how the migration diffusion hypothesis relates to indeterminate inequality changes in a dynamic environment.

### 2.2.2 *Remittances and Poverty*

It is notable that, unlike the case of income inequality, the literature has paid less attention to analysing the impacts of migration and remittances on household poverty. Adams (2004) blames two factors for this dearth in the international literature, namely difficulties in estimating accurate and meaningful poverty levels in developing countries and the absence of useful data on the size and volume of remittances.

The impacts of migration related remittances on poverty could be located between two possible extremes, according to Taylor *et al.* (2005). At one end is the optimistic scenario where migration reduces poverty in migrant-source areas by shifting population from the low-income rural sector to the relatively high-income urban economy. Income remittances by migrants contribute to incomes of households in migrant-source areas. Conditional on remittances being significantly sizable for the beneficiary households, remittances should necessarily reduce poverty. The other extreme describes a ‘pessimistic’ scenario where poor households face liquidity, risk, and perhaps other constraints that limit their access to migrant labour markets. This scenario holds particularly for international migration, which usually entails high transportation and entry costs. Households and individuals participating in migration benefit, but these beneficiaries of migration may not include the rural poor. If migration is costly and risky, at least initially, migrants may come from the middle or upper segments of the source-areas’ income distribution, rather than from the poorest households. Consequently, the poor will not benefit unless obstacles to their participation in migration weaken over time.

This latter perspective finds empirical precedence in Reardon and Taylor (1996), who examined the impacts of agro climatic shocks on both income inequality and poverty in rural Burkina Faso. Using simulations of the Foster-Greer-Thorbecke poverty index before and

after a severe drought, one of their findings revealed that remittances and other off-farm income, failed to shield poor households against agro climatic risks mainly because the poor lacked access to off-farm income. However, when the poor have access to remittances, the effect differs. Adams (2004) finds that both internal and international remittances reduce the headcount incidence, depth and severity of poverty in Guatemala. This was largely true because households in the lowest income decile received a very large share of their total household income from remittances. Indeed, when these 'poorest of the poor' households receive remittances, their income status changes dramatically with a potentially large effect on any poverty measure that considers the number, distance and distribution of poor households beneath the poverty line. Not surprisingly, Adams finds that remittances have a greater impact on reducing the severity as opposed to the level of poverty in Guatemala. Similar results are shown in a multi-country study of seventy-one developing countries, where Adams and Page (2005) show that international remittances significantly reduce poverty in the developing world.

There are very few studies that have explored the impacts of remittances on poverty in South Africa. This lacuna is often appropriated by the lack of comprehensive and nationally representative data on migration and remittances. Posel and Casale (2005) attempts to link household poverty to internal migration in South Africa. Their descriptive analysis from multiple data sources shows that the majority of rural migrant households, which are mainly African, are found both to be poor and significantly poorer than non-migrant households. However, the authors do not find enough evidence to decipher any causal impact of internal migration and remittances on poverty. However, the relative importance and possible poverty impacts of remittances to rural households are highlighted by Woolard and Klaasen (2005), who find that changes in remittance income accounted for around 10 percent of household

transitions into and out of poverty in KwaZulu-Natal province between 1993 and 1998. This finding corroborates the results of Maitra and Ray (2003) who show that remittances were positively associated with household consumption expenditures.

In summary then, whereas there is no strong agreement on the direction of impacts of remittances on income inequality, there appears to be more agreement on the poverty reduction impacts of remittance receipt. This essay uses descriptive techniques to decompose poverty and inequality indices. FGT indices are decomposed using the Shorrocks (1999) approach, where Shapley value algorithm is employed. To decompose Gini coefficient of inequality, I use the algorithm of Lerman and Yitzhaki (1985). The migration impact on welfare and poverty is extended using econometric analysis in the next chapter.

## **2.3 Remittances: Data, definitions and distribution**

### *2.3.1 Data Sources*

Since the early 1990s, Statistics South Africa has been fielding a number of nationally representative surveys to collect data on various aspects of households' socio-economic conditions. In the present chapter, I use data from two editions of the Income and Expenditure survey (IES), which has been fielded on a five yearly basis since 1995. The IES instrument is designed to solicit information pertaining to household expenditures, but also includes a detailed section on incomes, both regular and otherwise, accruing to households over a specified period. To date, four rounds of the IES have been conducted since 1995, with about 28,000 households sampled in 1995 and a thousand less in 2000. However, the IES is not a panel survey and hence not directly comparable between the different waves. In addition,

the survey methodology was changed in subsequent versions<sup>5</sup> which meant that information contained in the new dataset differed even more from the earlier editions. For this reason, most of the work using the IES has been limited to static analysis.

For the purpose of this chapter, an attractive feature of the IES is that it contains a fair amount of detail pertaining to the categories and magnitudes of income sources accruing to households over one year prior to the date of survey. Market returns, both from the labour market productivity and household business transactions, are a prominent feature in the IES. In addition, the state provides social transfers in the form of old age pensions, disability and child grants, which form another substantial part of household income. Private transfers, including regular income from non-resident family members and marital maintenance, are also recorded in the IES. Many South African households also received other incomes in the form of irregular or windfall events.

In the present chapter, I use the same categorisation but combine some of the components, largely in line with standard practice in previous studies (see, for example, Leibbrandt *et al*, 2001a). The categorisation includes the following:

1. *Wages* include labour incomes such as salaries, bonuses and overtime income.
2. *Remittances* defined in the IES survey instruments as regular incomes from family members living elsewhere; also includes alimony.
3. I define *Capital* to include market contributions to household incomes by way of profits from business, professional earnings, and farming on full time, rents, royalties, interest and annuities.

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<sup>5</sup> Since the 2000 survey, there has been two more rounds in 2005/6 and 2010/11

4. In the category of state transfers, I include two separate components namely *social pension* and *state grants*; the latter includes disability and child grants, and workmen's compensation.
5. A sixth income category includes *private pensions*.
6. Finally, there is an array of other incomes, which flow into the household but mostly at no regular intervals. Included in this category are incomes from hobbies, sale of assets, gratuities and claims.

### 2.3.2 *Shares of income sources*

Even though one fifth of households receive remittances, this source of income contributes only a small proportion of total income. In 1995, remittances amounted to an average of 4 percent of total income for African households and 6 percent among those living in rural areas. In the 2000 sample, remittance households represented 6 percent of total income for African households and 8 percent among rural African households.

Table 2.1: Shares of total household income sources

Income source	1995		2000	
	All	Rural	All	Rural
Wages	0.632	0.553	0.710	0.633
Capital	0.065	0.061	0.048	0.047
Private pension	0.012	0.013	0.011	0.008
Social pension	0.057	0.087	0.046	0.084
Grants	0.015	0.017	0.015	0.019
Remittances	0.042	0.062	0.059	0.078
Other	0.178	0.207	0.111	0.131
Total income				

Source: author's calculations using IES (1995, 2000)

Labour market incomes, in the form of wages and salaries, contribute the largest share of income at 63 percent of total income in the 1995 sample and 71 percent in the 2000 sample.

However, rural households depended less on wages and private pensions, in favour of remittances and social grants (including public pensions), when compared with the full sample.

In order to assess poverty changes due to the inflow income from these sources, it is also essential to define the poor in South Africa. A commonly agreed upon poverty line has remained elusive in South Africa (Posel and Casale, 2005). Various poverty lines, both absolute and relative, have been used in different studies. In their recent work, Hoogeveen and Özler (2006) draw normative poverty lines using the cost of basic needs approach. According to their calculations, a suitable poverty line for South Africa must lie between R322 and R593 per capita per month in 2000 prices. In addition, they also use the US \$2/day poverty line for purposes of international comparison and in order to describe what is happening to the welfare of those at the bottom end of the distribution. The latter equates to R174 per month in year 2000 prices. I use both the Hoogeveen and Özler (2006) lower bound (of R322 per month) as our poverty line and the two United States dollars per day to define deep poverty. My categorization of poor and non-poor households is based on *per capita* real incomes, computed from the total household nominal income and weighing all household members equally.

### 2.3.3 *Who receives remittances?*

According to the IES, the proportion of households that reported positive remittances as part of their regular income was between 12 and 18 percent in 1995 and 2000 with a substantial share of remittance households identified as African/Black<sup>6</sup> households. Table 2.2 below shows that at least one in every five Black households reported that they received remittances

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<sup>6</sup> In the IES and other surveys, households are categorised into four races, namely African, Coloured, Asian/Indian and White. These are determined by the race of the household head.

on a regular basis, compared to 9 percent among Asians, 7 percent among Coloured and only 5 percent among White South Africans in 2000. The distribution pattern was very similar in the 1995 survey where 15 percent Blacks received remittances compared to 5 percent among Coloureds and Asians and 3 percent among White people. This observation is quite important in that any disregard of racial differences could downplay the possible significance of remittances.

Table 2.2: Share of households receiving remittances by race and year

Population Group	1995		2000	
	National	Rural	National	Rural
All	11.3	15.6	19.3	25.3
black/African	15.1	17.8	20.9	27.1
coloured	5.5	1.5	7.8	4.9
Asian	5.8	1.3	9.3	6.6
White	2.9	2.0	5.0	3.0

Source: author's calculations using data from STATS SA (IES 1995, 2000)

These differences also feature prominently in terms of the rural-urban divide. In both surveys, remittance receipt is significantly rendered a rural phenomenon, with (proportionately) twice as many remittance-receiving households in rural areas as in the urban areas. For instance, 15.6 percent of rural households received remittances in 1995 as compared to only 8 percent among urban households. The 2000 survey recorded a larger proportion of households, both urban and rural, as recipients of remittances. Unsurprisingly, some previous studies (Leibbrandt, Woolard and Woolard, 2000; Lu and Treiman, 2007) have focused on African/Black (and rural) households.

The impact of remittances on the distribution of income is displayed graphically using density functions in figures 2.1 and 2.2 (below). The densities plot the proportion of households against their respective (natural logarithm of) *per capita* household income all African

households. In addition, a vertical line representing the Poverty Line of R322 per person per month is also shown. This is revealing as to where the addition of remittance income makes a difference in the distribution of household income. In both cases, the lower (left) tail of the distribution shifts further left when remittance are not included, essentially indicating that it is mostly households/individuals in the middle and lower quintiles (the poor) who benefit from this income source.

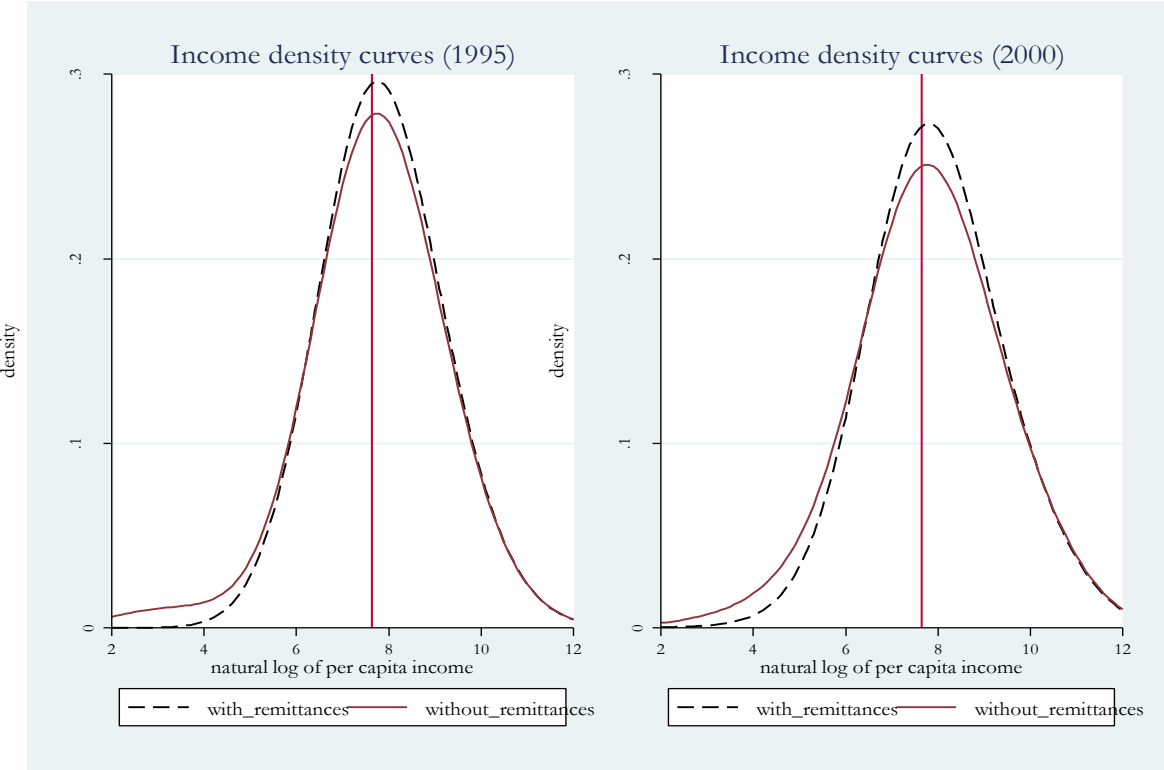


Figure 2.1: Income distribution for African households, 1995 and 2000

The suggestion that the poor benefit most can also be observed from the mean incomes of remittance households in terms of income decile.

Table 2.3 below shows the average incomes for households that reported positive remittance receipt<sup>7</sup>. It is interesting to note that for remittance households, a substantial amount of their total incomes comes from remittances. For instance, an average remittance household in the first income decile gets over 70 percent of its monthly income as remittances.

These observations point to a high level of dependency on remittances for those households, which receive remittances. This observation also sharply contradicts the belief that remittances are generally a negligible component of household income.

Table 2.3: Mean total and remittance incomes by income decile for remittance households in Rural South Africa

Income decile	1995		2000			
	n	Mean income (rands)	Mean remittance (rands)	n	Mean income (rands)	Mean remittance (rands)
1	265	641 (159)	479 (239)	322	518 (167)	399 (194)
2	260	1046 (101)	701 (349)	326	974 (109)	651 (323)
3	266	1380 (100)	878 (482)	410	1337 (118)	906 (444)
4	228	1709 (107)	988 (585)	409	1772 (135)	1087 (610)
5	244	2131 (146)	1263 (711)	313	2253 (150)	1360 (771)
6	194	2694 (189)	1459 (977)	316	2846 (210)	1590 (963)
7	194	3485 (275)	1801 (1189)	289	3846 (370)	2118 (1277)
8	122	4644 (459)	2350 (1662)	194	5374 (574)	2539 (1855)
9	92	7024 (957)	2762 (2472)	144	8925 (1877)	3967 (3097)
10	58	22681	4638	45	26257	7065

<sup>7</sup> Since there are many households that do not receive any remittances, the idea behind focusing on receiving household only is to show whether or not remittances are a substantial proportion of total income among those who actually receive positive amounts

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Notes:

1. Source: Author's calculations, using IES (1995, 2000);
2. Figures in parentheses are standard deviations.
3. Income deciles computed using per capita income. 1 represents lowest 10% and 10 are highest 10%.

### 2.3.4 *Summary*

While remittances contribute only about 5 of aggregate household income, they comprise a significant proportion of income particularly for indigent households. The IES data also shows that remittances are significantly biased towards rural and African households, when compared with their white, coloured and Asian counterpart. In the ensuing sections and the rest of the study, therefore, I focus mainly on the rural African households.

## 2.4 **Analytical tools for decomposing poverty and inequality indices by income source**

In this section, I introduce the decomposition techniques that are used to compute the direct impacts of remittances on poverty and income inequality. I discuss, in the first instance, the FGT poverty index and its decomposition by income source before proceeding into a similar exposition of the Gini inequality index and its decomposition.

### 2.4.1 *The FGT Poverty Index*

In poverty analysis, the Foster, Greer and Thorbecke (1984) family of indices has become the standard metric for poverty analysis. The FGT poverty measure can be expressed as

$$P_{\alpha}(y, z) = \frac{1}{nz^{\alpha}} \sum_{i=1}^q g_i^{\alpha} \quad (2-1)$$

where  $y$  is *per capita* household income,  $z$  is a predetermined income threshold that categorises households as income poor or otherwise, and  $\alpha$  is a poverty aversion parameter which captures the sensitivity of the index to changes in income.  $g = \left(\frac{z-y}{z}\right)$  is the income shortfall (the gap between the household income and poverty line) of the  $i$ th poor household.

As is well known,  $P_0$  is the poverty headcount index representing the proportion of the population whose income falls below the poverty line. The headcount ratio, while intuitive and easy to interpret, treats poverty as a discrete rather than a continuous characteristic and consequently fails to account for changes in poverty below a given poverty line. Indeed, if the incomes of the very poor increase but not enough to put them above the poverty line, the headcount index is unaffected poverty line. However, for any  $\alpha$  equalling or in excess of unity,  $P_\alpha$  becomes increasingly sensitive to the distribution of incomes among the poor. Hence, in order to provide a complete picture of how poverty changes under different scenarios, the *poverty gap* index,  $P_1$ , and *poverty severity* ( $P_2$ ) measures are used in addition to the headcount measure. The poverty gap index measures the extent to which individuals fall below the poverty line as a proportion of the poverty line.

#### *Decomposition of FGT poverty Index*

The FGT poverty index is decomposable in various dimensions which enable the overall level of poverty to be allocated among subgroups of the population, such as those defined by geographical region, household composition, and labour market characteristics (see Duclos and Araar, 2006).

While the poverty indices are informative in and of themselves, a further interest in static analysis pertains to the roles of various income sources in producing a given level of poverty. Indeed, of interest to policy makers would be changes in the levels of poverty and the causes of such changes. One uncomplicated way of estimating the impact of changes in poverty due to a change in one income source involves arbitrarily changing the given source by some percentage and observing the resultant poverty level. Reardon and Taylor (1996), for instance, assume a 10 percent change in non-farm incomes and examine changes in the three variants of the poverty index. Clearly, such an exercise does not indicate where the income source change came from and cannot account for changes that would have happened in other income sources as a result of the same.

Shorrocks (1999) proposes an algorithm that computes the exact and additive contribution of various factors to a level of poverty or indeed its change. The basic idea originates from the classic question in cooperative game theory which asks how a certain amount of output, for instance, should be allocated among a set of contributors. When applied in welfare analysis, one possible question would be how much poverty (or inequality) is reduced by the inflow of any particular income component.

Ordinarily, the contribution of an income source to poverty alleviation can be given by the fall in poverty caused by the mean of that particular component after it is added to initial income. However, this fall in poverty necessarily depends on what the initial income was and thus the procedure defaults into a path dependency difficulty. Invoking the Shapley value (Shapley, 1953) algorithm can circumvent this difficulty (Duclos and Araar, 2006). The Shapley procedure consists in computing the marginal effect on such indices by removing each

contributing factor in a particular sequence of elimination and assigning to each factor the average of its marginal contributions.

Formally, suppose that  $\mathbf{y}$  is a vector of all household income sources ( $y_i, i = 1, 2, 3, \dots, n$ ). We can group some income sources into a subset  $S$  of  $Y$  ( $S \subseteq Y$ ) and let  $S_i$  be a strict subset of  $Y$  that does not include  $y_i$ , that is, ( $S_i \subset Y \setminus \{y_i\}$ ). Further, let  $\pi_\alpha(S_i, \mathbf{z})$  be a characteristic function that equals zero if  $S_i$  is empty (that is,  $\pi_\alpha(\emptyset, \mathbf{z}) = 0$ ). For any non-empty subset  $S_i$ , the function  $\pi_\alpha(S_i, \mathbf{z})$  estimates the contribution of the welfare elements included in  $S_i$  to total poverty change ( $\Delta P_\alpha(Y, \mathbf{z})$ ), regardless of the effect of that any external  $y_i$  may have.

It is notable that some elements of  $S_i$  may contribute more to  $\pi_\alpha(S_i, \mathbf{z})$  than others. The Shapley value induces a rule  $\pi_\alpha(\cdot)$  that allocates to each income source a weighted mean of the source's marginal incremental contribution to overall poverty reduction (Bibi and Duclos, 2008).

The poverty reduction that income source  $y_i$  contributes, given the characteristic function, is

$$\pi_\alpha(y_i, \mathbf{z}) = \frac{1}{2^{(n-1)!}} \sum_k [P_\alpha(S_i^R \cup \{y_i\}, \mathbf{z}) - P_\alpha(S_i^R, \mathbf{z})] \quad (2-2)$$

where  $R$  crosses through the possible  $2^{(n-1)!}$  permutations of  $Y$  and  $S_i^k \subseteq Y \setminus \{y_i\}$  is the subset of all income sources preceding  $y_i$  in the order  $k$ . The terms in square brackets in equation (2.2) represent the difference in poverty resulting from introducing any income source  $y_i$  to a household's income vector. By repeating the computation for all possible elimination sequences, I estimate the mean of the marginal effect of each income component.

*Poverty effectiveness of income sources*

Equation (2.2) above gives the absolute contribution of income source  $y_i$  to poverty reduction. The absolute impact, however, is highly correlated with the size and distribution of the various income sources. That is to say, income sources with large values and wider distribution have larger absolute impacts and the converse necessarily holds true for those with smaller means and distributions. It is important, therefore, to adjust the absolute or relative contributions so that they reflect the effectiveness in reducing the poverty incidence and deficit.

Bibi and Duclos (2008) propose a poverty effectiveness measure, which integrates the budgetary cost that an income source generates with the poverty change that it contributes. This, they suggest, can be done by deflating the absolute contribution by a measure of their size, the mean for instance.

To formalise ideas, consider  $y_i^*$  as income from source,  $i = 1, \dots, n$ ). Then the mean of  $y_i^*$ , expressed as a percentage of the predetermined poverty line,  $z$ , is

$$\bar{y}_i = \frac{100}{z} \int_0^{+\infty} y_i^* dF_y(y_i^*) \quad (2-3)$$

where  $F_y(\cdot)$  is a cumulative density function. The ratio of  $\pi_\alpha(y_i, z)$  to  $\bar{y}_i$  yields

$$\Gamma_\alpha(y_i, z) = 100\delta \frac{\pi_\alpha(y_i, z)}{\bar{y}_i} \quad (2-4)$$

the poverty impact of income source  $i$  for a value of  $\bar{y}_i$  equal to the poverty line. In equation (2.10),  $\delta \in (-1, 1)$ , depending on whether the income source  $i$  is positive or negative. It necessarily follows that whenever  $\Gamma_\alpha(y_i, z) > \Gamma_\alpha(y_j, z)$ , each rand received as income

source  $i$  reduces poverty more than the same rand received as income source  $j$ , both estimated at income poverty line  $z$ .

#### 2.4.2 *Income source decomposition of Gini Inequality Index*

Among the many inequality measures, the Gini coefficient has been the most often used in empirical work (Fields, 2001). For nonnegative incomes, the Gini coefficient takes values between 0 and 1, where the lower extreme represents absolute income equality and the top limit is indicative on perfect inequality. One attractive feature of the Gini coefficient is that it can be decomposed in terms of the contribution of various income sources. In order to disaggregate the Gini index in terms of the contributory income components, I use the notation of Stark, Taylor and Yitzhaki (1988) for a general expression for the Gini index as

$$g_y(v) = \frac{-v \text{Cov}(y, 1-F(y)^{v-1})}{\mu} \quad (2-5)$$

where  $y$  is *per capita* household income, distributed by function  $F(\cdot)$  and has mean  $\mu$ .  $v$  is a parameter representing degree of equity. In the special case where  $v$  takes the value of 2,  $g_y(2) = \frac{-2 \text{Cov}(y, 1-F(y))}{\mu}$  turns out to be the well known Gini coefficient.

Allowing  $y_i$  to be household income from income source  $i$ , where  $(i=1,2,3,\dots,n)$ , the Gini coefficient in equation (2.1) can be expressed as a sum of the covariance of the various income sources with the cumulative income distribution, written as

$$g = \frac{2 \sum_{i=1}^n \text{Cov}(y_i, F(y))}{\mu}$$

$$= \left[ \sum_{i=1}^n \frac{Cov(y_i, F(y))}{Cov(y_i, F(y_i))} \right] \left[ \frac{2 \sum_{i=1}^n Cov(y, F(y))}{\mu_i} \right] \left[ \frac{\mu_i}{\mu} \right] \quad (2-6)$$

which, in turn, can be abbreviated to

$$g = \sum_{i=1}^n s_i g_i r_i \quad (2-7)$$

where  $s_i$  represents the share of income source  $k$  in total income; the second term,  $s_i$ , is the Gini coefficient corresponding to the distribution of income component  $i$ ; and  $r_i$  is the correlation of income from source  $i$  with total income.

The relationship between these three terms has a clear and intuitive interpretation. The influence of any income component upon total income inequality depends on how important the income source is with respect to total income ( $s_i$ ); how equally or unequally distributed the income source is ( $g_i$ ); and the extent to which each income source is correlated with total income ( $r_i$ ). The larger the product of these three components, the greater the contribution of income source  $k$  to total inequality as measured by  $g$ .  $s_i$  and  $g_i$  are necessarily positive and not greater than one, while  $r_i$  can fall anywhere in the range  $[-1,1]$  since it shows how income from source  $i$  is correlated with total income.

By using this particular method of the Gini decomposition, it is possible to estimate the effect of small changes in a specific income source on inequality, holding income from other sources constant (Lerman and Yitzhaki, 1985). The partial derivative of the Gini coefficient with respect to a percent change in source  $k$  is equal to

$$\frac{\partial g}{\partial e} = s_i(g_i r_i - g) \quad (2-8)$$

where  $g$  is the Gini coefficient of total income inequality prior to income change. Dividing through equation (6) by  $g$ , we get an expression for the percentage change in inequality resulting from a small percentage change in income from source  $k$

$$\frac{\frac{\partial G}{\partial e}}{g} = \frac{s_i(g_i r_i - g)}{g} \quad (2-9)$$

The right hand side of equation (2.9) represents the excess of the original contribution of source  $k$  to income inequality over source  $i$ 's share of total income. The usefulness of this decomposition is attested to by its wide usage (Leibbrandt, Woolard and Woolard, 2000; Lopez-Feldman, Mora and Taylor, 2007).

However, it is instructive to note that the Gini inequality decomposition, though informative, are static in nature. Importantly, it can be shown that stages of migration diffusion can imply that the impacts of migration (and remittances) on income inequality can change over time. In the next section, I use an example to highlight the limitation of the static analysis.

#### 2.4.3 *Some insight from the migration diffusion theory*<sup>8</sup>

A simple example is offered to clarify the migration diffusion hypothesis. Consider a population with two types of income sources, that is remittance ( $y_r$ ) and non-remittances ( $y_{nr}$ ) either of which can be influenced by household migration ( $m$ ). Total household income would be

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<sup>8</sup> Following a comment by one examiner, I included section 2.4.3 in the thesis to illustrate limitations of the gini index decomposition in analysis a relationship that could be dynamic.

$$y(m) = y_r(m) + y_{nr}(m) \quad (2-10)$$

Using the definition of Gini coefficient of total income in equation 2.7 above, we have

$$G(m) = S_r G_r R_r + S_{nr} G_{nr} R_{nr} \quad (2-11)$$

where , as before,  $S_k$  is share of component  $k$  in total income;  $G_k$  is Gini coefficient corresponding to income source  $k$  and  $R_k$  is a correlation of income from source to total distribution of income. In this instance, the set of income is defined for  $k = \{r, nr\}$

The simple decomposition in equation 2.11 demonstrates that it is important to explicitly consider the indirect effects of migration on other income non remittance sources. Indeed, the first term could be positive or negative, depending on how migration and remittances affect other income sources. If the second term in the decomposition equation above is positive over some range of  $M$ , then even if the direct remittance effect is equalising, migration could increase inequality in migrant-source areas.

## 2.5 Poverty impacts and effectiveness of remittances

This section presents poverty estimates for rural and African/Black households according to the 1995 and 2000 IES data. I first present the poverty headcount and gap computed on per capita income with and without remittances. A discussion of the contribution of various income sources to poverty reduction follows before delving into the effectiveness of each income source.

### 2.5.1 Poverty headcount and gap

One uncomplicated method of examining the impact of different sources of income is to run a simulation of an income change and examine its attendant effect on the poverty index Taylor *et al.* (2005). This kind of approach assumes an exogenous cessation of remittance flows, which in turn affects total income, while all other income components remain unchanged. Clearly, households without remittance income are not affected.

I use this naive approach as a baseline and present in Table 2.4 below poverty estimates from the national and rural samples for both 1995 and 2000. Overall, an increase in remittances is associated with a decline in both proportion and depth of poverty. When income from remittances is ignored, poverty increases in all cases. For instance, headcount poverty increases by 3 percent in the absence of remittances in 2000 while the poverty gap increases by 6 percent nationally and 8 percent in the case of rural households.

In 1995, however, if remittances are ignored the poverty headcount increases by 1 percentage, while the poverty depth would have fallen by 5 percent nationally, and by the same margin when rural households are considered separately.

Generally stated, remittances appear to have a limited role in reducing the absolute numbers of the poor in South Africa, but are more effective in alleviating the depth and severity of poverty. This result accords with that of Adams (2004) who found that the ameliorative effect of remittance income is greater in terms of lessening dire poverty than it was in lifting households out of poverty in Guatemala. It is also notable however that the effects were generally stronger in 1995 than they were in 2000. This observation is possibly driven by the

fact that the 2000 sample recorded more households with incomes below the poverty line and with remittances as part of their total income.

Table 2.4: FGT Index for black African households

	<b>1995</b>		<b>2000</b>	
	<b>National</b>	<b>Rural</b>	<b>National</b>	<b>Rural</b>
<i>Poverty headcount</i>				
With remittances	0.58 (0.0036)	0.69 (0.0044)	0.52 (0.0034)	0.65 (0.0047)
Without remittances	0.59 (0.0035)	0.71 (0.0043)	0.55 (0.0034)	0.68 (0.0046)
Difference	-0.01 (0.0009)	-0.02 (0.0011)	-0.03 (0.0012)	-0.03 (0.0016)
<i>Poverty gap</i>				
With remittances	0.29 (0.0022)	0.36 (0.0030)	0.27 (0.0021)	0.36 (0.0032)
Without remittances	0.33 (0.0024)	0.41 (0.0033)	0.31 (0.0025)	0.43 (0.0037)
Difference	-0.05 (0.00009)	-0.05 (0.0014)	-0.04 (0.0012)	-0.07 (0.0018)

Source: Author's calculations using IES (1995, 2000)

### 2.5.2 Disaggregating poverty headcount and deficit by income source

I report in Table 2.5 below both the absolute and relative contributions of various income sources to poverty alleviation. For both the 1995 and 2000 samples, I use two poverty lines to compare the effects of income sources at those two poverty levels.

Looking at the 1995 results, wages contribute a relative share of 63 percent to the reduction in headcount poverty while remittances and social pension contribute 4.5 percent and 7.4 percent, respectively, all when considered at the poverty line of R322 per capita per month.

However, at the lower poverty line (of R174 per person per month), wages contribute about 55

percent while remittances and social pension contribute 7.4 percent and 10.9 percent respectively. Clearly, the increase in contribution of remittances and pensions point to the possibility that these incomes accrue to households that are more indigent and vulnerable than does the wage income.

In similar analysis, the 2000 estimates also show that wages contribute a share of 60.8 percent at the higher PL and only 48.5 percent at the lower PL, while remittances increase their contribution from 8 percent to 13 percent and social pensions from 10 percent to 16 percent. Notable, private pensions, other social grants and capital income do not register any significant changes at the different poverty lines.

The overall poverty gap shrinks from 0.36 in both 1995 and 2000, to 0.17 in 1995 and to 0.19 in 2000. The largest share of this shrinkage is due to wages as before. The shares for wages, capital and private pension decline along with the poverty line in both 1995 and 2000, while the shares for remittances, social pension and other grants increase at the lower power poverty lines.

In sum, while wage incomes are responsible for the largest share of poverty reduction, remittances and social grants appear to have an increasing effect on poverty reduction when various poverty lines are considered.

Table 2.5: Contribution of income sources to poverty alleviation among rural African households

<b>1995</b> <i>Income source</i>	<i>PL=3894</i>				<i>PL=2088</i>			
	FGT ( $\alpha=0$ ) <i>Contribution</i>		FGT ( $\alpha=1$ ) <i>Contribution</i>		FGT ( $\alpha=0$ ) <i>Contribution</i>		FGT ( $\alpha=1$ ) <i>contribution</i>	
	<i>Absolute</i>	<i>Relative</i>	<i>Absolute</i>	<i>Relative</i>	<i>Absolute</i>	<i>Relative</i>	<i>Absolute</i>	<i>Relative</i>
Wages	0.194	0.630	0.310	0.486	0.306	0.547	0.365	0.442
Capital	0.014	0.046	0.024	0.037	0.024	0.042	0.029	0.035
Private pension	0.005	0.018	0.010	0.016	0.010	0.017	0.013	0.016
Social pension	0.023	0.074	0.087	0.137	0.060	0.109	0.130	0.157
Grants	0.004	0.013	0.016	0.025	0.012	0.021	0.024	0.029
Remittances	0.014	0.045	0.059	0.093	0.041	0.074	0.088	0.106
Other	0.053	0.17	0.131	0.205	0.106	0.189	0.178	0.215
FGT	0.69		0.36		0.44		0.17	
<b>2000</b>								
<i>Income source</i>	FGT ( $\alpha=0$ )	FGT ( $\alpha=1$ )	FGT ( $\alpha=0$ )	FGT ( $\alpha=1$ )	FGT ( $\alpha=0$ )	FGT ( $\alpha=1$ )	FGT ( $\alpha=0$ )	FGT ( $\alpha=1$ )
Wages	0.205	0.608	0.281	0.442	0.277	0.485	0.319	0.394
Capital	0.017	0.051	0.033	0.052	0.031	0.054	0.042	0.052
Private pension	0.003	0.010	0.007	0.010	0.005	0.009	0.009	0.011
Social pension	0.035	0.103	0.109	0.171	0.096	0.168	0.153	0.189
Grants	0.006	0.018	0.020	0.032	0.015	0.027	0.029	0.036
Remittances	0.027	0.081	0.100	0.157	0.076	0.133	0.145	0.180
Other	0.044	0.129	0.086	0.135	0.071	0.124	0.112	0.138
FGT	0.66		0.36		0.42		0.19	

*Source: Author's calculations using data from IES(1995,2000)*

### 2.5.3 *Poverty effectiveness of remittances*

The relative effectiveness of the various income sources in reducing poverty is presented by G (0) and G (1) poverty headcount and poverty gap. For both 1995 and 2000, remittances are not as effective as wages and social pension, but do better than disability and child grants in reducing both the poverty headcount and the severity of poverty. In other words, the opportunity cost of spending a rand in any given income source is highest for wages, followed by social pension. Remittances have a lesser opportunity cost, but still greater than child and disability grants.

According to table 2.7, market incomes (wages, private pension, capital) are more effective, in general, than the social pension and remittances in reducing headcount poverty. Other grants come in the middle in terms of their effectiveness. However, the market incomes are less effective than the social and private transfers in reducing the poverty gap. In general, social transfers are not designed, on their own, to bring people out of poverty. That is, the amount that is given as a social transfer is often far less than what an individual would receive as market income, on average. Similarly, private transfers are often a proportion of market income. Therefore, they will not reduce headcount poverty as much as market income. Arguably, therefore, the headcount-based gamma can fail to assess properly the achievement of poverty objectives.

## 2.6 Redistributive impacts of remittances

### 2.6.1 Lorenz Curves

In order to demonstrate the direct impact of remittances on income distribution, I plot Lorenz curves for log of *per capita* income, including and excluding per capita remittances. The curve plots various percentiles of the households in question as a function of the proportion of income that they receive. Figure 2.2 below contains two panels, one depicting the 1995 Lorenz curve while the other displays the curve for 2000.

For perfectly equally distributed income, the Lorenz curve runs diagonally from the origin. In contrast, if all income is held by one individual, the curve would run along the horizontal axis and only turn perpendicularly at the 100<sup>th</sup> percentile. Any shift to the right, therefore represents a reduction in income inequality, and the converse is also true. In the present case below, the dashed line lies entirely below and to the right of the solid curve, meaning that income distribution is more equal in the no-remittance scenario as opposed to a scenario where remittances are included.

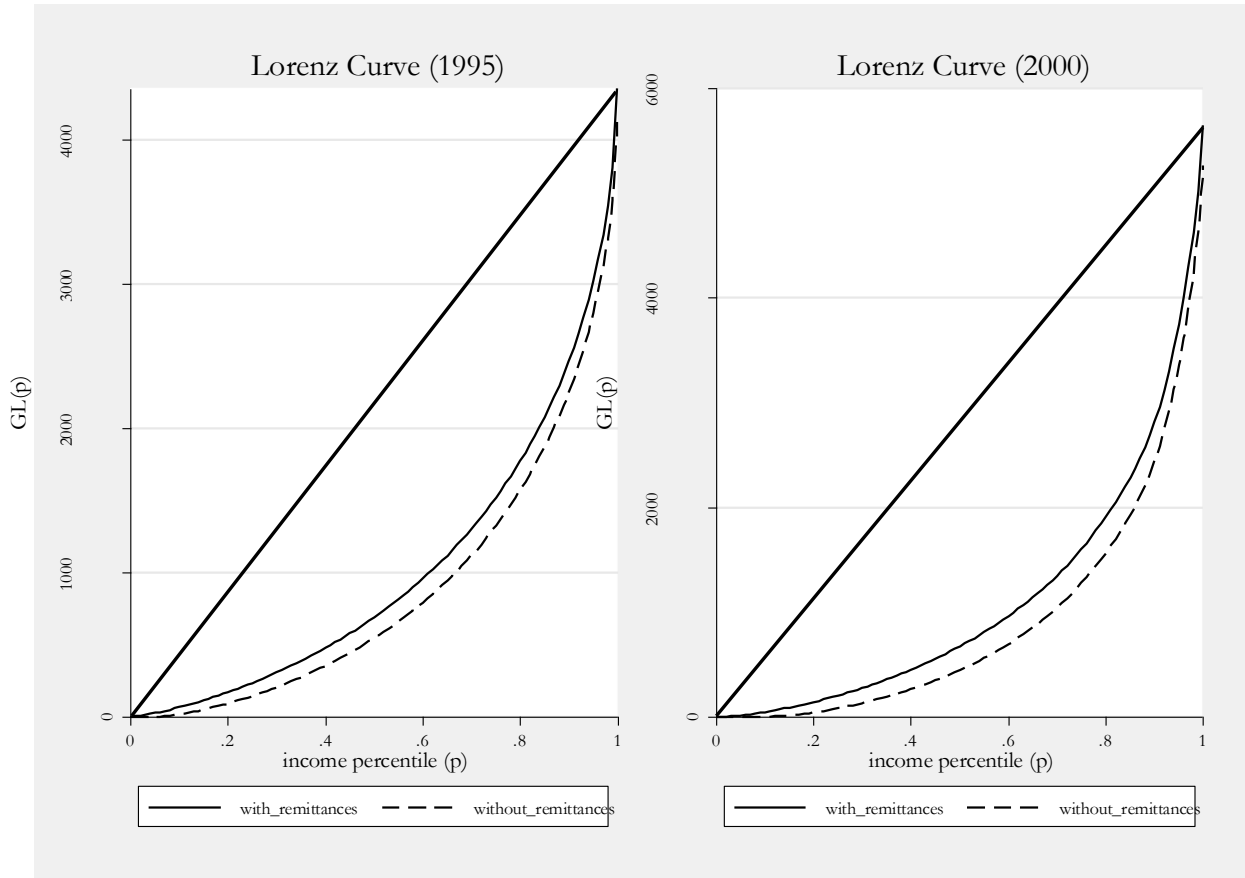


Figure 2.2: Income Lorenz Curve for Rural African Households (1995, 2000)

Succinctly stated, the inflow of remittances unambiguously reduces income inequality among rural Black South Africans.

### 2.6.2 Gini index decomposition by income source

The diagrammatic presentation in the previous subsection (above) can be augmented by estimating the extent to which remittances and other income sources contribute to income inequality. Table 2.6 and Table 2.7 below show estimations of the Gini inequality index and its decomposition by income source for the national sample of African households and its rural

subsample, in the top and lower panels, respectively. In both sets of tables, the respective columns from left to right represent shares of total income ( $S_k$ ), income source Gini ( $G_k$ ), correlation between income source and total income ( $R_k$ ), the share of inequality contributed by the income source and the source's marginal effect on inequality (% change).

Table 2.6: Gini Decomposition by Income Source, African households (1995)

Source	Sk	Gk	Rk	Share	% Change
<i>All African households</i>					
Wages	0.632	0.719	0.898	0.717	0.085
Capital	0.065	0.981	0.755	0.084	0.019
priv_pension	0.012	0.987	0.42	0.009	-0.003
social_pension	0.057	0.851	-0.036	-0.003	-0.06
Grants	0.015	0.965	0.083	0.002	-0.013
Remittances	0.042	0.916	0.107	0.007	-0.035
Other	0.178	0.82	0.718	0.184	0.006
Total income		0.569			
<i>Rural African households</i>					
Wages	0.553	0.744	0.868	0.66	0.107
Capital	0.061	0.984	0.778	0.087	0.026
priv_pension	0.013	0.987	0.46	0.011	-0.002
social_pension	0.087	0.831	0.087	0.012	-0.075
Grants	0.017	0.965	0.128	0.004	-0.013
Remittances	0.062	0.897	0.141	0.015	-0.048
Other	0.207	0.779	0.71	0.212	0.005
Total income		0.54			

Source: authors own computation using IES(1995,2000)

Table 2.7: Gini decomposition by income source, African households (2000)

Source	Sk	Gk	Rk	Share	% Change
<i>All African</i>					
Wages	0.71	0.762	0.928	0.809	0.099
Capital	0.048	0.971	0.609	0.046	-0.002
priv_pension	0.011	0.995	0.681	0.012	0.001
social_pension	0.046	0.886	0.026	0.002	-0.044
Grants	0.015	0.964	0.154	0.004	-0.011
Remittances	0.059	0.895	0.235	0.02	-0.039
Other	0.111	0.866	0.696	0.108	-0.003
Total income		0.621			
<i>Rural African</i>					
Wages	0.633	0.806	0.917	0.764	0.131
Capital	0.047	0.969	0.599	0.045	-0.002
priv_pension	0.008	0.994	0.586	0.008	0
social_pension	0.084	0.854	0.203	0.024	-0.061
Grants	0.019	0.964	0.249	0.007	-0.011
Remittances	0.078	0.844	0.152	0.016	-0.062
Other	0.131	0.859	0.741	0.136	0.005
Total income		0.612			

Source: author's computation using IES (2000)

The immediate impact of remittances is to reduce income inequality. For any given change in the amount of rand received as remittance, income inequality is reduced by a larger margin in rural areas than it is in urban areas. Specifically, as shown in table 2.6 and 2.7, a 10 percent increase in remittances is associated with a 0.4 percent decrease in the Gini coefficient (for all black households) while the same takes away between 0.5 and 0.6 percent from the Gini index when only rural African households are considered.

Turning to other income sources, state transfers in the form of old age pension and other grants also reduce income inequality. However, the impact of other grants is smaller than that of old age pensions and appears uniform in magnitude in rural and urban areas. Old age pensions, much like remittances, have a stronger impact on income inequality in rural areas. In contrast, labour incomes consistently worsen income inequality, both in urban and rural areas, with a larger effect though among rural households. The smaller income sources, private pensions and capital income, appear inconsistent in their impact, improving inequality in some instance and worsening income distribution in another. In sum, our Gini decomposition analysis makes a clear suggestion that remittances militate against income inequality among Black households in South Africa.

## **2.7 Concluding remarks**

This chapter set out to investigate how remittance incomes are linked to poverty and income inequality. The analysis employed decomposition techniques of both the Gini inequality coefficient and the FGT poverty index. The patterns of remittance receipt indicate that remittance activity is more widespread among African/Black people than other racial groups and the share of remittance receiving households is larger among rural households when compared with their urban counterparts.

Focusing on Black households, the chapter finds remittances are positively associated with lower poverty levels and to some extent, a more equitable income distribution. While remittances are only a marginal income source in the overall household distribution of income, they make a significant income contribution to the poor.

These descriptive results point to the significance of remittances and related issues such as internal migration issues in the design of development and poverty reduction strategies. In order to go beyond these findings and perform actual policy recommendations, it is essential to take into account possible behavioural interactions and responses, including the processes of migration and labour participation as well as the various social programs that may affect market and net income.

## 3 Estimating the Impact of Migration on Household Welfare

### 3.1 Introduction

In the preceding chapter, I focused on the contribution of remittances and other household income sources to poverty alleviation and income disparities. Using decompositions of poverty indices, I demonstrated that remittances are an important source of income for indigent households in rural South Africa. The inflow of remittances, however, often follows the outmigration of some household members. The combined effect of these two processes - outmigration and remittance inflow- may trigger changes in household production and economic choices such as labour force participation on the part of those who remain. As such, the welfare impact of such dynamics would not be accounted for in the descriptive analysis of the last chapter.

An important methodological issue emerges in attempting to measure the household welfare effects of migration and remittances. Specifically, the set of remittance households is not likely to be a random selection from the wider population (Barham and Boucher, 1998; Acosta *et al*, 2007). Arguably, this emanates from self-selection by economic migrants. The literature on internal and international migration has long insisted on the selectivity of migrants. Both migration theory and existing empirical evidence emphasize the unique features of migration and migrants compared to other processes in, and members of, society. Theoretical predictions posit the possibility of self-selection, particularly in the international context, where inequalities are more prevalent in origin than in destination economies (Borjas, 1987; Borjas, Bronars and

Trejo, 1992). Existing literature on migration suggests that migrants self-select, in terms of observable characteristics such as education attainment and skills (Chiquiar and Hanson, 2006; McKenzie, Gibson and Stillman, 2006). Recent evidence on internal migration in South Africa suggests the prevalence of positive selection among migrants from rural areas (Naidoo, Leibbrandt, & Dorrington, Magnitudes, Personal Characteristics and Activities of Eastern Cape Migrants: A Comparison with Other Migrants and with Non-Migrants using Data from the 1996 and 2001 Censuses, 2008). Hence, there is need for careful methodological attention when estimating the welfare effects of remittances.

Failure to account for the potential selectivity bias and the possibility of endogeneity of migration and remittances in the household welfare model can yield biased estimates. In the present chapter, I recognise the possibility that migration of household members and the subsequent inflow of remittances could be an integral part of a household's livelihood strategy. Accordingly, I attempt to model the impact of migration and remittances on household welfare taking into account the possible endogeneity of these factors.

The rest of the chapter proceeds in six further sections. Section 3.2 reviews relevant literature on migration remittances and household welfare. I discuss various methodological issues and options in section 3.3, before presenting a chosen empirical strategy in section 3.4. Section 3.5 introduces the data and discusses summary statistics pertaining to a chosen sample. In section 3.6, I discuss estimated results and conclude the chapter in section 3.7.

## 3.2 Related Literature

### 3.2.1 *A theoretical overview of migration and poverty linkages*

Research on migration is relatively large, with pioneering work going back to the contributions of Sjaastad (1962) and most remarkably, the seminal works of Todaro (1969) and Harris and Todaro (1970). As discussed in Chapter 1, according to the Todaro model, migration takes place from rural areas to urban areas, driven essentially by relatively higher expected earnings in the urban sector. Thus, the model operates as a cost-benefit process, which persists until the net expected gain for the migrant goes to zero. This conceptualisation focuses on the welfare of the migrants who individually decides to migrate for their personal benefits. Notwithstanding its strengths, the model's focus on the individual has drawn a fair amount of criticism, mostly by authors who argue instead that migration can better be explained as a collective household decision that can serve to minimise risks in the face of uncertainty and many market failures prevalent in developing countries (Stark and Bloom, 1985; Stark, 1991). This critique, often termed the new economics of labour migration, attempts to recast the Todaro class of models in a collective household decision making paradigm.

A related, but separate, body of literature is dedicated specifically to the economics of remittances. Like the migration literature, this body of literature focuses on competing theories of motives for remittances. The unsettled debate rages among the competing hypotheses of altruism hypothesis, asset accumulation and, risk sharing and co-insurance (Lucas and Stark, 1985; Poirine, 1997; Gubert, 2002; Rapoport and Docquier, 2005). The literature has tried to garner evidence on these competing motives as well as on the drivers for migration, but most

such studies have tended to focus on wage differentials so as to test the competing theories of remittances.

Indeed much attention, both theoretical and empirical, has been paid to the issues surrounding the causes of internal migration and motives for remitting. However, knowledge gaps remain on the consequences of migration including the economic linkages between migration and their original households. In recent years, there has been a growing interest in remittance flows and their impacts on migrant sending economies, mainly in developing countries (World Bank, 2006). The international literature is now awash with studies on the consequences of labour migration on the welfare of both the migrants and their original countries and communities. A disproportionate bias, however, seems to favour international migration and case studies of Latin American countries. Ironically though, the largest flows of people take place within country borders and, not necessarily from villages to cities, but from economically lagging to leading rural areas (World Bank, 2009). Furthermore, the sub-Saharan African region, which hosts masses of poverty-stricken citizens, has received much less attention as far as internal labour migration and domestic remittances are concerned.

In theory, the poverty impacts of (migration-related) remittances in migrant sending households and communities could be located between two possible extremes (Taylor *et al.* 2005; de Haas, 2010). One end of the spectrum features the optimistic scenario in which migration reduces poverty in migrant-source areas by shifting population from the low-income rural sector to the relatively high-income urban economy. Income remittances then contribute to incomes of households in the migrant-source areas, necessarily increasing household welfare. The other extreme describes a 'pessimistic' scenario where poor households face liquidity and risk constraints that limit their access to migrant labour markets. This scenario is

posited particularly for international migration but would hold in any scenario in which migration entails high transportation and entry costs. Households and individuals participating in migration may benefit, but these beneficiaries of migration may not include the rural poor. If migration is costly and risky, at least initially, migrants are likely to come from the middle or upper segments of the source-areas' income distribution, not from the poorest households.

The empirical literature, tends to side with the optimistic scenario in that it portrays a generally rosy picture in favour of the poverty reducing effects of remittances in recipient countries or communities. Indeed, the findings for a number of country-based studies seem to show that migration and remittances have a positive effect on the earnings of the individuals and households who participate in migration (Adams, 1989; 2006; Adams and Page, 2005; Barham and Boucher, 1998; Rodriguez, 1998; Yang and Martinez, 2006). The estimated effect however, differs in strength from country to country. In a few cases though, it was found that remittances did not sufficiently offset losses from migration such that the overall effect was to increase poverty (Acosta *et al.*, 2007).

The context under which migration takes place is thus important in determining poverty impacts. Several perspectives can be identified from the literature in this regard. At one level, differences in type of migration, typically domestic or international, can determine the magnitude of poverty reduction. Lokshin *et al* (2007) for instance show that international remittances are larger than domestic remittances in Nepal and, to this extent, are perceived to have a greater effect in reducing poverty.

A few studies use a cross section of countries to unveil the remittance impacts on poverty from an international perspective. For instance, Adams and Page (2005) show that remittances have a strong poverty reducing effect after analysing evidence from a pooled sample of 74 low

and middle income countries. However, this unanimous finding is challenged by Acosta, Calderon, Fajnzylber and Lopez (2007) who find mixed results for a sample of 12 Latin American countries, after examining each country's evidence separately. The difference in findings demonstrates the importance in considering the heterogeneity of different country experiences when analysing the migration and remittance impact.

The bulk of the literature on remittances and poverty focuses on Latin American countries, where labour, and not necessarily the poorest people, migrates to the United States and Canada for better employment opportunities. The large amounts of remittances that these migrants send to their original countries seem to attract a lot of attention. Less attention is paid to poor countries in Sub Saharan Africa, where a large volume of migration happens within countries, mainly from rural to urban (or peri-urban) areas.

### *3.2.2 Evidence from South Africa*

The impacts of migration and remittances remain understudied in the South African literature, possibly due to lack of appropriate data. In one study, based on a panel dataset from the KwaZulu Natal province, Klaasen and Woolard (2006) show that changes in remittance flows are among the important factors responsible for both entry into and exit from poverty at the household level. The study uses income mobility transition matrices and thus, does not account for the possibility of endogeneity of remittances and migration in the household's income vector. Using several cross section surveys, Posel and Casale (2006) find some descriptive evidence that migration has been effective in lifting households out of poverty in the post 1994 decade. In addition, Posel and Casale report that migrant households are significantly poorer than non-migrant households and that the gap between the two household

types seems to be widening. When compared with social welfare payments, private transfers have been shown to be more effective in influencing household expenditure and reducing poverty (Maitra and Ray, 2003).

While, on the one hand, a rosy picture portrayed of the impacts of migration on household poverty, it has been noted, on the other hand, that poverty may also constrain migration in South Africa. Specifically, it is argued that costs and risks of migration may prevent or delay potential migrants from moving to urban or other areas which are perceived to have better economic opportunities (Gelderbloom, 2007). This view is corroborated by empirical evidence, albeit from a different angle, that suggests that old age pensions may have influenced the outflow of prime age household members to look for employment elsewhere (Case and Ardington, 2007). Stated differently, it is likely that prime age individual fail to migrate due to unavailability of funds or absence of adults who would take care of their children if they migrated.

In a nutshell, these few studies generally seem to indicate that migration and remittances alleviate household poverty. However, it is not known whether the same results would obtain if more rigorous econometric methods were used to estimate the poverty outcome. The present study therefore attempts to fill this gap by using treatment effect models to estimating welfare outcomes of migration and remittances.

### **3.3 An overview of methodological issues**

Although the notion that migration contributes positively to household livelihoods appears to have become a stylised fact, a major challenge remains in assessing the extent of such benefits. In order to assess such benefits, it is essential to observe households in two different states, at

least. That is, before the household sends a migrant and after a migrant has left. Such an analysis necessarily requires longitudinal data. However, these panel data remain scarce, particularly in developing countries, and therefore the appropriate assessments remain infeasible.

Consequently, the researcher armed with cross section data, has to resort to counterfactual analysis in order to infer the magnitudes of those outcomes (Ravallion, 2005). Counterfactual analysis attempts to address the challenge by estimating potential outcomes under non-participation scenarios. In considering the appropriate counterfactual, an unsettled empirical debate persists on whether the benefits and costs of migration accrue to treated individuals only or their household and community as well. For example, Posel (2001) argues that remittances are directed at specific individuals, rather than at entire households, implying that an impact analysis should focus on the same individuals. Azam and Gubert (2003), on the other hand, assert the contrary in their cross country study of African countries. Using multi-country evidence, they demonstrate that remittances are often directed at households rather than at individual household members. In this study, I follow Azam and Gubert in focussing on household impacts. Indeed, this seems appropriate since the main aim is to analyse poverty impacts, which are often measured at the household level. Further, the collective approach has become firmly embedded in the new economics of labour migration (Stark and Bloom, 1985), where migration has increasingly been modelled as the outcome of a joint utility maximisation made by the erstwhile migrants and their family, household or community members (Ghatak, Levine and Price, 1996; Poirine, 1997).

A further issue pertains to the two-way causation running between migration and household welfare. A number of studies apply Rubin's Causal model as a framework for estimating the

treatment effect of migration on household welfare and other outcomes (Imbens and Wooldridge, 2008). An important ingredient in this framework is the potential outcomes specification, which defines realised and counterfactual outcomes of a treatment process. In turn, conditional probabilities of receiving the treatment as a function of potential outcomes and observed covariates have to be specified. This “assignment mechanism” can range from (completely) randomised experiments to non-experimental methods which have dependence on the potential outcomes.

### *3.3.1 Experimental methods*

Randomised experiments provide the first best answer to the assignment problem because they ensure that the potential earnings of migrant households, if they had not migrated, are well represented by the randomly selected control group. Causal effects are then estimated by comparing the average outcome of interest for the two groups. Gibson, McKenzie and Skillman (2006, 2009) exploit randomisation provided by a procedure in the New Zealand immigration policy on Tongan migrants, using lotteries to allocate migration permits, to compare the outcomes for remaining household members with those for members of similar households that were unsuccessful in the ballots.

However, the use of experiments in migration studies is still scarce. Indeed, social experiments have been conducted at various times, but they have not necessarily been the sole method for establishing causality. In fact, they have been regarded with some level of suspicion concerning the relevance of the results for policy purposes. According to Imbens and Wooldridge(2008), this scepticism may be due, in part, to the fact that it is generally not possible in Economics to do blind (or double blind) tests, which would create the possibility of placebo effects that

compromise the external validity of the estimates. Consequently, observed data from surveys therefore remains more commonly used.

### 3.3.2 *Non-experimental methods*

A number of statistical techniques have been developed to estimate migration impacts using longitudinal or cross sectional data. Using the former - panel data- is advantageous in identifying migration and remittance impacts essentially because the researcher can allow for control of time-invariant unobservable factors. When the panel includes a migrant sample only, a single difference estimator can compare post with to pre-migration outcomes and take the average difference as the mean impact of migration. On the other hand, when the panel (data set) includes both migrants and non-migrants, a difference in difference estimator can be used to directly estimate changes attributable to migration. Notably, the same analysis can be done using cross sectional data with retrospective variables (McKenzie and Sasin, 2007; McKenzie and Rapoport, 2007). However, large sample panel data remain scarce in developing countries, which explains why the majority of studies rely on cross sectional data to estimate counterfactual outcomes that would have obtained had the decision to participate in migration not been taken.

Adams (1989) introduces the migration-poverty strand of the literature in his empirical study of rural Egyptian households. In essence, Adams estimates a regression of earnings for non-migrants and then uses the estimated parameters to predict expected earnings for migrants. While the procedure appears solid enough when considered at the level of individual workers, it becomes more complicated when the aim is to estimate household earnings. For instance, one needs to account for changes in household size and behavioural impacts resulting from

the assumed return of the migrant household member. This is the essence of the method introduced by Rodriguez (1998) in his estimation of a household income equation for Philippine households. In addition to the usual household characteristics, Rodriguez introduces other variables (such as the number of adults and migrants) on the right hand side of his linear model to account for the likelihood that migrants would contribute more (or less income) to the household. It is important to note, however, that both studies treat migrant households as a non-random sample of the population. In addition, the feasibility of this approach depends on the availability of demographic and labour market information pertaining to the migrants.

As alluded to in the preceding sections, self-selection into migration could imply that earnings estimates derived from these procedures are wrong. In order to alleviate this problem, the sample-selection model introduced by Heckman (1979) is often employed. In essence, the procedure involves estimation of an earnings function as well as one or more selection equations. Barham and Boucher (1998) for instance impose a specific probability distribution structure on their model which explicitly incorporates two selection rules. The first rule is a migration decision equation which accounts for differences between the two sub-samples that is migrants and non-migrants. Because their geographical area of study has low labour force participation rates, the authors also include a second rule to account for labour force participation. However, as pointed out by Deaton (1997), a drawback of this approach is that results are potentially compromised by biases in the counterfactual estimators given the strong distributional assumptions of the Heckman self-selection model.

In recent times, matching techniques have gained popularity as a method of estimating treatment effects (Imbens, 2004). Under matching methods, the objective is to assess the

causal effect of a treatment (for example, migration) on a particular outcome experienced by those affected by the treatment, after correcting for non-random selection of participants (Ravallion, 2005). In the spirit of regression methods, the source of bias under matching methods is to be found in covariates. However, the two methods differ in that (unlike regression) treatment effects are constructed by matching individuals with the same characteristics.

The use of matching estimators to correct for self-selection relies on the assumption that there exists a set of observable conditioning variables for which the non-migration outcome is independent of the migration status. Stated differently, matching assumes that there is a set of observables conditioning variables that capture all the relevant differences between the treated and the control groups so that the non-treatment outcome is independent of treatment status, conditional on those characteristics (Caliendo and Kopeinig, 2008). Notably, this is a potential limitation of extending the matching methodology to estimate migrants counterfactual income, for it is conceivable that unobservable characteristics, such as an entrepreneurial nature of household members, could be correlated with the migration decision.

### *3.3.3 Way forward*

As noted in the preceding paragraphs, there are a number of methods that can be used to estimate the joint impact of migration and remittances on household welfare outcomes. While experimental methods are not often practicable due to unavailability of experimental data, each of the alternative methods also comes with its own advantages and weaknesses. To this end, the nature of available data often drives the researcher's choice of methodology. In the next

section, I discuss a simple analytical framework that I later use to estimate the poverty effects of migration and remittances.

### 3.4 Estimation strategy

#### 3.4.1 *Econometric framework*

The empirical strategy used in this chapter is based on instrumental variable methods (see Wooldridge, 2002). The basic structure includes an outcome and treatment equation, specified respectively as

$$E(y_i | x_i, m_i) = f(x_i\beta + \gamma m_i) \quad (3-1)$$

$$\Pr(m_i = 1 | x_i, z_i) = g(x_i\theta + z_i\alpha) \quad (3-2)$$

where the outcome of primary interest ( $y_i$ ) is explained by a linear combination of factors in equation 3.1. Among the explanatory variables in equation (3.1) is an indicator variable  $m_i$  which gives an indication of whether the dependent variable is observed or not. Further,  $x_i$  and  $z_i$  are vectors of exogenous variables, while  $\beta, \gamma, \theta$  and  $\alpha$  are vectors of unknown coefficients.

Under parametric estimation, the method has been applied in endogenous treatment effects models (Madalla, 1983; Vella, 1998; Vella and Verbeek, 1999a) to estimate the impact of binary endogenous variables on a continuous outcome variable.

### 3.4.2 Specifying household expenditure model with sample selection

According to the new economics of labour migration (Stark and Bloom, 1985; Stark, 1988), migration decisions are made by and involve entire (migrant-sending) households rather than by individual migrants themselves only. As such, the migrant sending household's welfare function is likely to be driven by factors including the household's participation in migration, which in turn also relates to subsequent remittance flows. Following this perspective, the unit of analysis ( $i = 1, \dots, N$ ) in equations 3.1 and 3.2 is the household.

Since some households take part in migration while others do not, I treat migration as a categorical variable of binary<sup>9</sup> type. To formalise ideas, I define a log *per capita* expenditure equation (that accounts for household migration status)

$$\mathbf{y}_i = \mathbf{x}'_i \boldsymbol{\beta}_i + \boldsymbol{\theta} m_i + \boldsymbol{\varepsilon}_i \quad (3-3)$$

where  $\mathbf{y}_i$  is the log of *per capita* household expenditure. The vector  $\mathbf{x}'_i$  contains variables that predict household welfare while the indicator variable  $m_i$  shows whether the household participates in migration. This binary choice is modelled as an outcome of a latent variable,  $m_i^*$ . By assumption,  $m_i^*$  is a linear outcome of the covariates  $\mathbf{z}_i$  and a residual term  $\mathbf{u}_i$ . Specifically

$$\mathbf{m}_i^* = \mathbf{z}_i \boldsymbol{\gamma}_i + \mathbf{u}_i \quad (3-4)$$

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<sup>9</sup> In more detailed models migration choice may be categorized by, *inter alia*, specific destination, reason for and duration of migration. For instance, Adams (2006) compares domestic migrants (within Ghana) with international migrants and non-migrants

where  $z_i'$  are predictors of the household decision to participate in migration. By definition,  $m_i^*$  is not observable but can be determined from data observations in terms of which households participated in migration and which ones did not. The decision to participate in migration is made according to the rule which says that

$$m_i = \begin{cases} 1, & \text{if } m_i^* > 0 \\ 0, & \text{otherwise} \end{cases} \quad (3-5)$$

The variables in  $z$  may overlap with  $x$  but it is assumed that at least one element of  $z$ , denoted as  $z_1$ , is a unique and significant determinant of  $m_i$ . That is, there is at least one independent source of variation in  $m_i$ . I return to a discussion on the choice of instrumental variables  $z_1$  in section 3.4.4 below.

### 3.4.3 Estimation Issues and Procedure

Apart from the sample selection problem, which is corrected by using the selection equation, there may also be feedback effects between (participation in) migration and household welfare (in equation 3.3). In other words, migration and other variables may be endogenous, and hence correlated with the error term. The presence of endogenous variables would generally yield inconsistent estimates if ordinary least squared (OLS) estimation is employed of  $\beta$  over the subsample corresponding to  $m_i = 1$  due to the correlation between  $d_i$  and  $\varepsilon_i$  operating through the relationship between  $x_i$  and  $u_i$  (Vella, 1998). It is difficult to find variables that are truly exogenous in the migration and expenditure equations (Adams, Cuecuecha and Page, 2008; Adams and Cuecuecha, 2010).

A number of remedies exist, though. First, the two stage least squares approach which essentially eliminates the nonzero expectation between  $\varepsilon_i$  and  $u_i$ . Second the ML method which relies heavily on the distributional assumption regarding the two error terms. However, for continuous outcomes of interest, the 2SLS involves a substantial loss of efficiency when compared with treatment effects models estimated using full information maximum likelihood (FIML) (Dimova and Wolff, 2008; Deb and Seck, 2009). The analysis of this chapter uses treatment effects model (which is) estimated using maximum likelihood methods.

In a nutshell, the Maximum Likelihood method requires the assumption that the error terms ( $\varepsilon_i, u_i$ ) are independently and identically distributed as  $N(0, \Sigma)$  where

$$\Sigma = \begin{bmatrix} \sigma_\varepsilon^2 & \sigma_{\varepsilon u} \\ \sigma_{\varepsilon u} & \sigma_u^2 \end{bmatrix} \quad (3-6)$$

and  $\sigma_{\varepsilon u}$  may also be written as  $\rho_{\varepsilon u}\sigma$ . The log likelihood function for the specified model is given in Madalla (1983). For observation  $j$ , the parameters of the model can be estimated by maximising the log likelihood function

$$\ln L_i = \begin{cases} \ln \Phi \left\{ \frac{z_i \gamma_i + (y_i - x_i \beta_i + \theta)^\rho / \sigma}{\sqrt{1 - \rho^2}} \right\} - \frac{1}{2} \left( \frac{y_i - x_i \beta_i + \theta}{\sigma} \right)^2 - \ln(\sqrt{2\pi}\sigma), m_i = 1 \\ \ln \Phi \left\{ \frac{z_i \gamma_i + (y_i - x_i \beta_i + \theta)^\rho / \sigma}{\sqrt{1 - \rho^2}} \right\} - \frac{1}{2} \left( \frac{y_i - x_i \beta_i + \theta}{\sigma} \right)^2 - \ln(\sqrt{2\pi}\sigma), m_i = 0 \end{cases} \quad (3-7)$$

The estimation algorithm (see Adams, Cuecuecha and Page, 2008) involves two steps. In the first step, a logit model is estimated taking into account sample selection. In the second step, the expenditure equation is estimated using the method of maximum likelihood.

#### 3.4.4 *Variable selection and exclusion restrictions*

In the development literature, economists have relied on money metric measures of utility – income and consumption expenditure – as the preferred indicators of poverty and living standards. Income is generally a measure of choice on developed countries while consumption expenditure emerges as the preferred metric in developing countries (Sahn and Stifel, 2003). The choice of expenditures over income is often dictated by a number of challenges involved in measuring income in developing countries, including seasonal variability in such earnings and the large shares of income that come from self-employment. The sample used in this study comes from rural South Africa, which has generally lower living standards. It seems prudent, therefore, to employ *per capita* expenditure as an indicator of welfare.

Various sets of determinants of household welfare have been used in the literature. A key challenge involves the choice of appropriate specification of the aggregate model in addition to selecting predictors of household wellbeing. Essentially, the model should include human capital characteristics and factors that affect household production as well as attributes that relate to location of household (Lokshin *et al*, 2007). The former includes household demographics, education and ethnicity, among others, while the latter mainly includes region-specific variables for the migrant sending household.

Because household heads are often the main income earner, a number of attributes pertaining to their human capital characteristics are included to represent the households' earning capacity. Ordinarily, the head's education attainment, age and gender are used as predictors of household income. In households with more than one income earner, it is possible that the head's education level could misrepresent the households' earning capacity. For example, a recent study of Ghanaian households (Joliffe, 2002) finds that maximum and average

education attainment of working age adults in the household perform better in comparison with either the head's or the minimum education attainment (among prime-age members) as household income predictors. In light of this, I experiment with the standard representation of household education against the average education attainment of working age members, given the available data.

The gender dimension of poverty is quite well known (Lanjouw and Ravallion, 1995; Gruen, 2004). A number of factors play a role in determining the disproportionate representation of women headed households in poverty. For instance, women on average earn less than their male counterparts. By extension, female-headed households are more likely to have lower earnings than male headed households. Hence, a gender (and marital status) indicator factors out the contribution of gender to differences in household earnings.

Apart from the gender factor, it has been shown that poverty is generally more prevalent in larger households (Lanjouw and Ravallion, 1995), and often positively associated with higher family dependency ratios. I include in the model variables representing the number (or proportion) of people in the household that are below the age of seven, representing infant dependency and between 7 and 18 to capture child dependency.

In the remittance equation, I include the same set of variables as those explaining per capita expenditure, in addition to the exclusion restrictions. The rationale for including these variables follows standard literature on migration and remittances. The standard human capital model (Becker, 1993) stipulates that human capital variables are likely to affect migration because more educated people enjoy greater employment and expected income earning possibilities in destination areas. In the literature, household characteristics are also hypothesised to affect the chances of migration and remittance receipt. In particular, some

authors have suggested that migration is a life cycle event in which households with older heads, more working age males and fewer children are more likely to participate.

#### *3.4.5 Identifying the per capita expenditure model*

The specified *per capita* expenditure model above is identifiable if there is at least one variable in the migration/remittance equation that uniquely and non-trivially predicts migration, but is independent of household income. Formally, a valid instrument would be one that is highly correlated with the household's propensity to participate in migration and affects expenditure only through receipt of the remittance.

Different instruments have been used to identify household participation in migration. Previous migration research finds that social networks are an important driver of migration decisions (Carrington, Detragiache, and Vishwanath, 1996; Woodruff and Zenteno, 2007). Arguably, such networks serve to lower the costs of migration for rural people by providing information about job opportunities, helping potential migrants secure employment as well as supplying credit to cover reallocation expenses, and ameliorating settling costs upon arrival. Munshi (2003) tests the role of networks in promoting migration and finds a greater propensity toward migration in villages with existing migrants. Munshi's result could be understood to mean that there is significant propensity for new migrants to follow in the footsteps of existing migrants.

There seems to be no standard metric for migration networks, but a number of direct and indirect factors have been considered. For instance, one direct measure is achieved by simply counting the number or proportion of migrant households in a geographical locality, in

essence the strategy used by Lokshin *et al* (2010) in their study of Bulgarian migration. However, in cases where information on migration is very limited, the prevalence of migration networks could also be determined by other proxies of association. For instance, Adams *et al* (2008) use ethnicity and religious affiliation to represent social networks in Ghana. Acosta *et al* (2007) decipher migration incidence from remittance flows and use the distribution of remittances in a defined area (e.g. ward or district) as a useful proxy for the extent of social networks. The direction of flow of remittances can also be a useful indicator. That is, if remittances mostly flow from parents to children, then the presence of living parents to members of a household can be used to as a predictor of remittance receipt (Dimova and Wolff, 2008). Deb and Seck (2009) use the distance to major urban centres as an identifying restriction of their migration equation. This variable, though attractive, may not offer a useful choice if internal migration is not dominated by the rural-urban stream.

Exclusion restrictions thus vary from one specific study to another, and depending on the availability of particular information in the data set. In this chapter, I experiment with a number of instruments. Firstly, following Acosta *et al* (2007), the distribution of remittances in a district seems a plausible option. I also include province and language dummies to reflect the ethnicity and bias due to political history of South Africa. In addition, I experiment with a variable indicating the presence of a pensioner in a household. The rationale behind this variable is that rural households with older heads are more likely to have the capability and means of sending away their younger members out as migrant labour. There is growing evidence that the arrival of pension in a household affect labour migration among prime aged individuals (Ardington, Case and Hosegood, 2009). This is explained in at least two ways:

firstly, pension funds finance migration activity and secondly, the presence of a pensioner gives a prime age individual to leave her children at home and look for work elsewhere.

### 3.4.6 *Estimating predicted expenditure functions*

This section discusses how counterfactual expenditure estimates for households in the no migration situation can be developed by using predicted expenditure equations to identify the expenditures of households with and without remittances. The methodology for obtaining these estimates follows the literature on the evaluation of programs and have been used previously by Dimova and Wolff (2011) and Adams, Cuecuecha and Page (2008).

This is done in two steps. First, I start with observed expenditures as reported in the survey. And, using the estimated parameters, I predict expenditures for households of type  $j$ , given that they chose type  $j$ . specifically,

$$E[y_i|m = 1] = x_i\beta + \theta + \rho\sigma \left[ \frac{\varphi(z_i'\gamma)}{1-\Phi(z_i'\gamma)} \right] \quad (3-8)$$

where  $\rho$  is a correlation coefficient between the error terms in the outcome and treatment equations. And similarly,

$$E[y_i|m = 0] = x_i\beta + \rho\sigma \left[ \frac{-\varphi(z_i'\gamma)}{1-\Phi(z_i'\gamma)} \right] \quad (3-9)$$

As a second step, I obtain counterfactual expenditures for households defined as the expected value of expenditures for households of type  $r$ , conditional on them choosing type  $j$ . For each household, I compare observed income with the potential outcome of participating in

migration. Subsequently, I need to consider the total gross benefit (or loss) for all households that participated. For each participant, with characteristics  $X$  and  $Z$ , I can compare the outcome  $y_{1i}$  with the expected outcome with no migration, that is  $E[y_i|m = 0]$ . Under the normality assumption that  $(\varepsilon_i, v_i) \sim N(0, 0, \sigma_\varepsilon^2, 1, \rho)$  I can estimate the average treatment effects model of *per capita* expenditure which account for the possibility of non-random selection of households into migration treatment.

The difference in *per capita* expenditure between remittance and non-remittance households is thus

$$E[y_i|m = 1] - E[y_i|m = 0] = \theta + \rho\sigma \left[ \frac{\phi(z_i'\gamma)}{\Phi(z_i'\gamma)(1-\Phi(z_i'\gamma))} \right] \quad (3-10)^{10}.$$

If the selectivity term is negative, it provides evidence in favour of overestimated levels of *per capita* expenditure because of the selection of households with genuinely lower living standard standards into receiving a remittance. Conversely, if *lambda* is positive, OLS would underestimate per capita expenditure because households with higher living standards were selected into receiving remittances. The correct estimates would have to be computed net of selectivity bias.

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<sup>10</sup> In the likelihood estimation results (in STATA 11), the  $\sigma$  and  $\rho$  are not directly estimated. Instead, the natural logarithm of  $\sigma$  and the inverse hyperbolic tangent of  $\rho$  are estimated directly. The hyperbolic tangent is computed as  $atanh\rho = \frac{1}{2} \ln \left( \frac{1-\rho}{1+\rho} \right)$

## 3.5 Data and Summary Statistics

### 3.5.1 Data Sources

The analysis in this chapter uses two South African data sets, the income and expenditure survey (IES) and labour force survey (LFS), collected by Statistics South Africa in the year 2000. Both surveys draw on a nationally representative sample covering about 28000 households and contain information on an array of socioeconomic and demographic characteristics. The IES is fielded every five years and focuses on household expenditures, but also collects information on various income sources. However, the IES is not designed to collect in-depth information on demographic and labour market attributes of household members. The LFS, on the other hand, has greater depth on the demographic and labour market characteristics of respondents.

In the year 2000, Statistics South Africa carried out the two surveys using approximately the same sampling framework. As such, the IES can be merged with the September wave of the LFS data files (see Pauw, 2005)<sup>11</sup>. The merged data set thus avails information on demographic composition of household members, labour market participation, educational attainment and various income sources, including regular incomes from family members living elsewhere.

Neither the IES nor the LFS is designed as a migration survey. Nonetheless, the survey instruments contain information that is relevant for the purposes of this study. A major

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<sup>11</sup> The most recent available IES (ie the 2005/6 version) is not compatible with the LFS because different samples were used in the survey. Further, a number of significant changes were incorporated in the new survey instrument such that it is not directly comparable with the 2000 version.

limitation with the data sets, though, is that it is not possible to directly observe absent family members and hence, households that participate in migration are only identifiable indirectly. Specifically, migrant households are known only if they report that they receive income from family members living elsewhere.<sup>12</sup> The question on remittances is covered in both surveys, albeit differently. The LFS, on its part, asks whether the household received income/remittances from family members living elsewhere while the IES asks how much income the household received from family members who were living elsewhere on the survey date.

In light of this, it is important to note the possibility of misclassifying households if we categorise them in terms of whether they received remittances or not. That is, some households may have family members living elsewhere as migrants but who do not send remittances, in which case they would be classified as non-migrant households. In the absence of detailed data on migrants, it is not possible to ascertain the extent of these misclassifications.

Dimova and Wolff (2008) attempt to circumvent the misclassification problem by primarily focusing on (the impact of) remittances while allowing migration status to play a secondary role. The Dimova-Wolff approach seems plausible even in the case of South African households. In particular, it is important to note that the indigenous African household often comprises many extended family members and thus differs from the household as referred to in standard western literature (Russell, 2003). Specifically, Russell argues that in contemporary Southern Africa, the tradition of patrilineal descent in black families entails a much wider set of options for co-residence as relatives disperse to make a living in the global economy. Indeed,

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<sup>12</sup> The September version of the LFS began to include a dedicated migration section, starting with its 2001 edition. However, the LFS does not contain information on household income or expenditure and hence is limited in use with respect to household poverty analysis.

the African household comprises a broader formation, often including aunts, uncles and other relatives. This, he compares with the western household which has bilateral descent and therefore a fairly standard pattern of co-residence. In light of this observation, remittances may flow between extended family members rather than simply between parents and their children. For this reason, I follow Dimova and Wolff (2008) in highlighting the welfare impact of remittances.

Table 3.1 below presents a list of variables used in the estimations of this chapter. The table includes expenditure, explanatory variables and a set of exclusion restriction. The sample characteristics are in turn discussed in the next subsection.

Table 3.1 : Description of Variables

<b>variable name</b>	<b>description</b>
Expenditure	natural log of <i>per capita</i> household expenditure
Remittance	dummy variable for remittance receipt: yes= 1 (LFS 2000)
Poor	poor ( <i>per capita</i> income below higher poverty line)
Ultra poor	poor ( <i>per capita</i> income below lower poverty line)
<i>household head characteristics</i>	
Age	age of household head in years
age squared	age squared /100
Gender	dummy variable for gender of household head: female=1
lives with spouse	head of household is married and lives with spouse (sp_present=1, 0 otherwise)
Married	dummy variable for marital status: married=1, 0 otherwise
Primary	attended primary education, at most
Secondary	attended secondary education, at most
post-secondary	attended post-secondary education, at most
<i>human capital characteristics</i>	
highest education	maximum years of education for members aged 18-59
average education	average years of education for members aged 18 to 59
number of infants	number of household members younger than 7
number of children	number of household members aged between 7 and 18

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number of pensioners	number of household members aged 60 and older
adults with primary education	number of household members aged 19-59 with primary education
adults with secondary education	number of household members aged 19-59 with secondary education
adults with postmatric education	number of household members aged 19-59 with post-secondary education
<i>exclusion restrictions</i>	
Network	proportion of household receiving remittances in a primary sampling unit
share of female-headed households	proportion of households that are female headed in a primary sampling unit
number of female-headed households	number of female headed households in primary sampling unit

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### 3.5.2 *Sample Characteristics*

Table 3.2 below contains a summary of the socioeconomic and demographic characteristics of all rural households and the sub-sample that receives remittances according to the 2000 IES and LFS data. The broader sample comprises only those households that are identified<sup>13</sup> as Black/African and living in rural<sup>14</sup> areas of South Africa while the subsample of remittance households includes those who responded positively in the LFS to the question of whether or not they received remittances. About 23 percent of all rural African households reported that they were receiving remittances. However, of these remittance households, only about 75 percent of these remittance households gave a positive amount of remittances in the IES. It is possible that they did not receive any remittance in the previous year, though they had a

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<sup>13</sup> Household demographic type is identified by population group of household head.

<sup>14</sup>Slightly over half of South Africans reside in urban areas according to the 2000 IES and LFS. However, remittances are heavily biased towards rural households, with about 64 percent of households that reported regular receipt of remittances living in rural areas.

migrant benefactor or indeed there might have been an error in either of the surveys. However, I stick to the remittance sample in terms of the LFS response, and hence include the possibility of migrant households which received zero remittance in the year.

Table 3.2: Household Summary Statistics

<b>Variable of interest</b>	<b>all households</b>	<b>remittance households</b>	<b>non-remittance households</b>	<b>T-test (rem vs. non-rem households)</b>
<i>Sample size</i>	10045	2570	7475	
Sample proportion	1	0.23	0.77	
<i>Mean per capita</i>				
Income	5729 (9352)	2824 (4058)	6728(10391)	27.03
Expenditure	5780 (8989)	3208 (3883)	6664(10018)	24.87
Reported nonzero remittances (IES)		0.72 (0.45)	0.24 (0.43)	
<i>Poverty incidence (headcount index)</i>				
Poverty line	0.51	0.71 (0.45)		
Ultra poverty line	0.29	0.45 (0.49)		
<i>Household head characteristics</i>				
age (in years)	48.2 (16.9)	43.9 (17.5)	49.7 (16)	14.66
Female	0.46 (0.49)	0.68 (0.47)	0.38 (0.49)	-27.8
Married	0.52 (0.49)	0.47 (0.49)	0.54 (0.5)	
<i>Education</i>				
no education	0.31 (0.46)	0.27 (0.45)	0.32 (0.47)	4.38
Primary	0.39 (0.49)	0.38 (0.45)	0.39 (0.49)	1.07
Secondary	0.26 (0.44)	0.31 (0.46)	0.24 (0.43)	-5.31
post-secondary	0.03 (0.17)	0.02 (0.13)	0.03 (0.17)	-1.19

average education	6.86 (0.04)	7.36 (0.08)	6.69 (0.04)	-7.2
Maximum education	9.12 (0.09)	8.67 (0.05)	8.78 (0.05)	-4.26
Household				
Women only				
<i>Other household characteristics</i>				
Household size	4.44 (0.03)	4.77 (0.06)	4.32 (0.04)	-4.26
Number of infants	0.71 (0.01)	0.89 (0.02)	0.64 (.0.95)	-10.56
Number of children	1.45 (0.02)	1.87 (0.03)	1.31 (0.02)	-10.59
Number in working age	1.88 (0.01)	1.71 (0.02)	1.94 (0.02)	-15.7
number of pensioners	0.36 (0.01)	0.26 (0.01)	0.40 (0.63)	10.83
<i>Human capital</i>				
Adults with primary edu	0.77 (0.01)	0.82 (0.01)	0.65 (0.02)	9.02
Adults with sec. edu	0.67 (0.01)	0.68 (0.02)	0.66 (0.01)	-1.23
Adults with tertiary edu	0.28 (0.01)	0.28 (0.01)	0.29 (0.01)	0.52
remittance household in PSU	0.06 (0.05)	0.09 (0.05)	0.05 (0.05)	

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Source: own calculations using IES and LFS

Notes: 1. Figures in parentheses are standard deviations. \* Proportion of IES remittance households that also reported receiving remittances in LFS.

As in chapter 2, I use the Hoogeveen-Ozler (2006) normative poverty line. According to their cost of basic needs calculations, a suitable poverty line for South Africa lies between 322 and 593 rands *per capita* per month in 2000 prices. In addition, they also use the US \$2/day poverty line (which is also popularly used in international literature) to describe what is happening to the welfare of those at the bottom end of the distribution. The latter equates to 174 rands per month in year 2000 prices. Using these poverty lines, I am able to categorise the chosen sample into poor and non-poor households. In this study, I term those below the lowest poverty line

(at R174 per month) as *ultra poor*, as opposed to the larger subset of the *poor* who live below the R322 per month poverty line.

The mean *per capita* consumption expenditure of remittance households is about half of the average in the broader sample, indicating that remittance households are poorer on average than the average rural African household. Indeed, remittance households are proportionately over-represented in the poor categories, at both the higher and lower poverty lines. About 71 percent of remittance households are poor, when considered at the higher poverty line, representing a considerably higher proportion than the national headcount of 51 percent. Similarly, the *ultra*-poverty line sits above 45 percent of remittance households as compared to only 29 percent of all households.

Although remittance households are poorer, they have more educated household heads than non-remittance households. About 31 percent of all rural households (in the sample) are headed by a person who has no formal education, while 39 percent had some primary education. The subsample of remittance households has slightly lower proportions in both categories, with 27 percent having no education and 38 percent having received only primary education. This would seem to suggest that heads of remittance households are proportionately more educated than their counterparts in non-remittance households.

With an average household size of 4.8 individuals, remittance households are slightly larger than non-remittance households, which have an average household size of 4.4. When disaggregated by age category at the household level, the difference appears to come from a larger number (and proportion) of individuals below the age of 19. Remittance households have more minors (aged under 18), and hence a larger child dependency ratio than the average

household. In sum, the sample characteristics portray remittance households in rural South Africa as poorer and larger, on average but with a higher education attainment record.

## 3.6 Results and discussion

### 3.6.1 Migration, remittances and per capita expenditure

I first look at the selectivity corrected impact of remittances on *per capita* expenditure and the determinants of remittance receipt.

Table 3.3 below shows maximum likelihood estimates of the *per capita* expenditure model alongside the remittance equation. I report three columns of each pair of equations pertaining to three specifications based on the different representations of the education variable (that is, maximum, average and heads education attainment). Treatment effects<sup>15</sup> model of per capita expenditure estimated using two-step method is reported in Table 3.4 and the *per capita* expenditure model estimated using ordinary least squares procedure in Table 3.5.

The inverse mills ratio (*lambda*) in Table 3.3 is positive (in all three specifications) and statistically significant suggesting that the error terms in the remittance and expenditure equations are positively correlated. Parameter estimates obtained from OLS estimation would hence be biased (upward). This positive correlation means that unobserved factors that make remittance receipt (or migration) more likely tend to be associated with higher *per capita* expenditure. That is, households that receive remittances are more likely to have been positively selected in terms of their unobserved characteristics. Conversely, households that are less likely to receive remittances will have been negatively selected in the same regard. Further,

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<sup>15</sup> Models with endogenous binary regressor variable(s) are a special case of instrumental variable models. A general term for this type of model is ‘treatment effect model’

Table 3.3: Per capita expenditure model using treatment effects estimation (FIML<sup>16</sup>)

variables	model A		model B		model C	
	<i>expenditure</i>	<i>Remittance</i>	<i>expenditure</i>	<i>remittance</i>	<i>expenditure</i>	<i>remittance</i>
age	0.004 (0.003)	-0.060*** (0.006)	0.006* (0.003)	-0.055*** (0.006)	0.001 (0.004)	-0.055*** (0.006)
age_sqrd	-0.001 (0.003)	0.040*** (0.006)	-0.003 (0.003)	0.035*** (0.006)	-0.001 (0.003)	0.035*** (0.006)
female_head	-0.118*** (0.026)	0.618*** (0.045)	-0.159*** (0.027)	0.634*** (0.045)	-0.143*** (0.027)	0.633*** (0.045)
Married	0.177*** (0.023)	0.181*** (0.045)	0.188*** (0.023)	0.185*** (0.045)	0.184*** (0.023)	0.184*** (0.045)
educ_primary	0.248*** (0.029)	0.233*** (0.054)				
educ_secondary	0.365*** (0.039)	0.041 (0.061)				
educ_postsec	0.942*** (0.053)	-0.285*** (0.079)				
n_infants	-0.056*** (0.012)	0.024 (0.022)	-0.059*** (0.012)	0.034 (0.022)	-0.041*** (0.012)	0.033 (0.022)
Hhsize	-0.147*** (0.007)	0.036*** (0.010)	-0.148*** (0.006)	0.021** (0.010)	-0.171*** (0.007)	0.023** (0.010)
adults_primaryedu	-0.091*** (0.017)	-0.196*** (0.031)	-0.102*** (0.013)	-0.081*** (0.022)	-0.105*** (0.013)	-0.081*** (0.022)
adults_secondaryedu	0.049*** (0.014)	-0.056** (0.026)	-0.073*** (0.014)	-0.022 (0.025)	-0.049*** (0.014)	-0.015 (0.024)
Remittance	-0.611*** (0.072)		-0.622*** (0.071)		-0.605*** (0.072)	
Network		2.997*** (0.078)		2.991*** (0.080)		2.991*** (0.080)
educ_average			0.078*** (0.003)	-0.005 (0.005)		
educ_maximum					0.058*** (0.003)	-0.007 (0.004)
Constant	8.496*** (0.101)	-0.152 (0.160)	8.249*** (0.099)	-0.209 (0.156)	8.571*** (0.098)	-0.198 (0.152)
Observations	9,822	9,822	9,813	9,813	9,813	9,813

1. Standard errors in parentheses
2. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1
3. Variable definitions are provided in table 3.1

<sup>16</sup> Full information maximum likelihood method

Table 3.4: Per Capita Expenditure Model (Two-step method)

VARIABLES	Model A		Model B		Model C	
	expenditure	Remittance	expenditure	remittance	expenditure	remittance
Age	0.008** (0.003)	-0.064*** (0.006)	0.010*** (0.003)	-0.059*** (0.006)	0.004 (0.003)	-0.060*** (0.006)
age_sqrd	-0.005 (0.003)	0.045*** (0.005)	-0.006** (0.003)	0.040*** (0.005)	-0.004 (0.003)	0.040*** (0.005)
female_head	-0.138*** (0.022)	0.671*** (0.036)	-0.182*** (0.022)	0.685*** (0.036)	-0.168*** (0.022)	0.686*** (0.036)
Married	0.176*** (0.020)	0.193*** (0.037)	0.181*** (0.019)	0.198*** (0.037)	0.177*** (0.019)	0.198*** (0.037)
educ_primary	0.255*** (0.025)	0.256*** (0.050)				
educ_secondary	0.373*** (0.029)	0.073 (0.058)				
educ_postsec	0.935*** (0.035)	-0.168** (0.068)				
n_infants	-0.053*** (0.012)	0.040* (0.022)	-0.054*** (0.011)	0.048** (0.022)	-0.037*** (0.012)	0.048** (0.022)
Hhsize	-0.153*** (0.005)	0.036*** (0.010)	-0.155*** (0.005)	0.023** (0.009)	-0.178*** (0.005)	0.023** (0.009)
adults_primaryedu	-0.094*** (0.014)	-0.204*** (0.029)	-0.103*** (0.011)	-0.092*** (0.021)	-0.104*** (0.011)	-0.092*** (0.021)
adults_secondaryedu	0.037*** (0.013)	-0.058** (0.024)	-0.080*** (0.012)	-0.037* (0.023)	-0.054*** (0.012)	-0.030 (0.023)
Remittance	-0.598*** (0.044)		-0.592*** (0.043)		-0.573*** (0.043)	
Network		3.054*** (0.078)		3.057*** (0.078)		3.058*** (0.077)
educ_average			0.076*** (0.002)	0.002 (0.005)		
educ_maximum					0.056***	-0.002
Lambda	0.217*** (0.028)		0.202*** (0.027)		0.195*** (0.027)	
Constant	8.447*** (0.080)	-0.210 (0.146)	8.223*** (0.078)	-0.275* (0.142)	8.541*** (0.077)	-0.232* (0.137)
Observations	9,822	9,822	9,813	9,813	9,813	9,813

1. Standard errors in parentheses
2. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1
3. Variable definitions are provided in table 3.1

Table 3.5: Per Capita Expenditure Equation estimated using OLS<sup>17</sup> estimation

Variables	model A expenditure	model B expenditure	model C Expenditure
Remittance	-0.296*** (0.026)	-0.311*** (0.025)	-0.304*** (0.025)
Age	0.010*** (0.003)	0.012*** (0.003)	0.006* (0.003)
age_sqrd	-0.000** (0.000)	-0.000** (0.000)	-0.000 (0.000)
female_head	-0.196*** (0.025)	-0.237*** (0.024)	-0.219*** (0.024)
Married	0.150*** (0.022)	0.162*** (0.021)	0.158*** (0.021)
educ_primary	0.225*** (0.029)		
educ_secondary	0.360*** (0.039)		
educ_postsec	0.968*** (0.053)		
educ_average		0.079*** (0.003)	
educ_maximum			0.059*** (0.003)
n_infants	-0.058*** (0.012)	-0.062*** (0.012)	-0.044*** (0.012)
Hhsize	-0.155*** (0.007)	-0.153*** (0.007)	-0.177*** (0.007)
adults_primaryedu	-0.070*** (0.016)	-0.091*** (0.013)	-0.095*** (0.013)
adults_secondaryedu	0.059*** (0.014)	-0.066*** (0.014)	-0.044*** (0.014)
Constant	8.303*** (0.087)	8.062*** (0.085)	8.386*** (0.082)
Observations	9,841	9,832	9,832
R-squared	0.388	0.411	0.394

Notes:

1. Standard errors in parentheses
2. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1
3. Variable definitions are provided in table 3.1

<sup>17</sup> Ordinary Least Squares method

receipt of remittances come from the lower part of the income distribution. The finding that the receipt of remittances reduces household welfare could partly be explained by the fact that migration takes away productive household members and hence the income that they may have contributed to the household.

I began by assuming that remittance, the dummy variable that characterises household as either migration-participating or not, is endogenous. A test of endogeneity confirms that remittance is not exogenous and a conclusion can be made that it is endogenous. (see Table 3.6 below)

**Table 3.6: Durbin-Wu–Hausman test of endogeneity on binary regressor remittance**

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Ho: variables are exogenous	
Robust score chi2(1)	= 167.579 (p = 0.0000)
Robust regression F(1,9808)	= 168.749 (p = 0.0000)

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The rest of the explanatory variables in the expenditure model have expected signs. Female-headed households with larger numbers of children (under six years of age) and (therefore) larger households are likely, as the results suggest, having lower levels of per capita expenditure. In contrast, if the household head is married (and living with their spouse), the level of *per capita* welfare turns out to be better. The marriage status compares with unmarried status (due to widowhood, divorce or just single), each of which would seem to militate against better household welfare.

The household head's education attainment also increases with household welfare, as expected. Advancement from primary to secondary levels of education, on the part of the household head, is compensated for by higher welfare returns. However, while the head needs some

education for positive returns, the presence of more adults with only primary education in the household reduces the welfare outcome. This is also in contrast with the presence of better educated (that is, with at least secondary school education) members who contribute positively to *per capita* welfare.

Surprisingly, however, the results also suggest that the age of the household head does not matter for household welfare, but matters for remittance receipt. However, in the OLS results (in table 3.3), the coefficient on the age variable is positive and statistically significant. This could be explained in two ways: firstly, households with pensioners could indeed be facilitating migration. The second explanation pertains to the possibility of unobserved household likelihood ratio tests<sup>18</sup> reject the null hypothesis that the error terms of the expenditure and remittance equations are not correlated. On the basis of these results, the alternative hypothesis that the remittance variable introduces endogeneity (due to selection bias) in the expenditure model is accepted, hence justifying the need for correcting for sample selection bias.

The actual receipt of remittances, however, is associated with lower household expenditure. The negative coefficient on the remittance variable suggests that a household that receives remittances is likely to face lower welfare outcomes and *vice versa*. As noted earlier, most households that reported characteristics (as captured by the inverse mills ratio) being correlated with the age of the household head, and therefore, the change on magnitude of coefficient and standard error being due to multicollinearity.

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<sup>18</sup> Unweighted data was used to perform likelihood ratio tests.

Turning to the remittance equation (in table 3.2), the results suggest that if a household is female headed, larger in size and whose head has minimal education, it is more likely to receive remittances. In contrast, households with more educated adults are less likely to receive remittances. The variable that has been used as an exclusion restriction, migration networks, is also positive and significant indicating that social networks improve the chance of migration and subsequently remittances.

Table 3.3 presents the treatment effects model estimated using the two-step procedure. Results are very similar to the maximum likelihood estimations discussed in the preceding paragraphs, with slight differences in the magnitude of some of the coefficients.

Turning to the OLS results (in table 3.4), the proposition that OLS parameters will be biased is supported.

### 3.6.2 *Remittances and Poverty*

As a next step in the analysis of this chapter, I estimated the probability of being in poverty, using the same predictors as in the previous section and accounting for sample selection in similar manner. Results of the probit model with sample selection estimations are presented on tables 3.6. Columns (1) and (2) in table 3.6 (below) give results estimated on a poverty indicator using a higher poverty line while columns (3) and (4) a lower poverty line.

When the lower poverty line is used, results seem to suggest that the two error terms are correlated whereas at the higher poverty line the correlation loses its significance and changes sign. This appears to suggest that the hypothesis of endogeneity holds true only for some part of the income distribution. That is, correcting for sample selection is valid when the sample is divided at the lower poverty line.

At the lower poverty line, households that are headed by older females and which have more children under the age of six are more likely to be poor. Household size also enhances the likelihood of being in poverty. However, at the higher poverty line, the age of the household head as well as number of infants do not matter anymore.

Factors that reduce the probability of being in poverty include education and marital status of the head. Households headed by married individuals are less likely to be poor. The education attainment of the head also increases progressively the chances of being above the poverty line. In addition, if other household members have some post primary level education, the household is more likely to live above the poverty lines. Interestingly, if other members have

Table 3.7: Determinants of poverty status

variables	(1)	(2)		(3)	(4)	
	probit poor_hpl	Bivariate Probit poor_hpl rem1		probit	Bivariate probit poor_lpl rem1	
rem1	0.591*** (0.052)	1.097*** (0.103)		0.399*** (0.042)	0.715*** (0.086)	
Age	-0.006 (0.006)	0.002 (0.007)	-0.057*** (0.007)	0.018*** (0.006)	0.024*** (0.006)	-0.057*** (0.007)
Agesq	0.000 (0.000)	-0.000 (0.000)	0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	0.000*** (0.000)
Gender	0.435*** (0.042)	0.302*** (0.046)	0.628*** (0.045)	0.224*** (0.038)	0.144*** (0.042)	0.636*** (0.045)
Married	-0.162*** (0.044)	-0.189*** (0.043)	0.171*** (0.045)	-0.182*** (0.038)	-0.206*** (0.038)	0.172*** (0.046)
p_educ	-0.219*** (0.069)	-0.256*** (0.066)	0.238*** (0.055)	-0.170*** (0.049)	-0.195*** (0.049)	0.238*** (0.055)
s_educ	-0.320*** (0.068)	-0.333*** (0.067)	0.022 (0.060)	-0.256*** (0.061)	-0.264*** (0.061)	0.028 (0.060)
t_educ	-1.892*** (0.128)	-1.780*** (0.124)	-0.569*** (0.116)	-1.500*** (0.155)	-1.444*** (0.153)	-0.552*** (0.116)
nlt6	0.044 (0.031)	0.041 (0.030)	0.024 (0.022)	0.091*** (0.024)	0.090*** (0.024)	0.026 (0.022)
Hhsize	0.306*** (0.018)	0.283*** (0.017)	0.038*** (0.011)	0.257*** (0.013)	0.246*** (0.013)	0.039*** (0.011)
Hcapprim	0.058 (0.045)	0.094** (0.043)	-0.201*** (0.032)	0.014 (0.031)	0.037 (0.031)	-0.197*** (0.032)
Hcapsec	-0.262*** (0.036)	-0.234*** (0.034)	-0.048** (0.023)	-0.220*** (0.025)	-0.206*** (0.024)	-0.049** (0.024)
mig_net	-0.446** (0.176)		3.002*** (0.077)	-1.452*** (0.159)		2.992*** (0.076)
Constant		-0.703*** (0.180)	-0.254 (0.164)		-1.620*** (0.162)	-0.282* (0.167)
Athrho			-0.387*** (0.065)			-0.232*** (0.052)
Observations		9,862	9,862		9,862	9,862

1. Standard errors in parentheses
2. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

only a primary education, they do not make any difference to the likelihood of exiting or entering poverty.

### **3.7 Conclusion**

I set out in this chapter to estimate the household welfare impact of migration and remittances in Black rural households of South Africa. I used a treatment effects model of household per capita expenditure in order to account for the possibility of self-selection on the part of migrant households. I find evidence of sample selectivity, where households that would naturally be exposed to higher welfare outcomes are more likely to participate in migration and receive remittances. However, unlike previous studies on South Africa, the (short term) impact of remittances on household welfare is negative. It is likely that although many migrant households are not in the higher brackets of income distribution, the most indigent households are not able to participate in migration. This result bodes with Gelderbloem (2007) who suggested that poverty constrains migration in South Africa. The results also highlight the importance of careful modelling of the poverty effects of migration, which may not be captured when descriptive methods are employed. However, it is important to properly qualify these results. Although the model attempts to capture collective effects at the household, migration may have broader (and community level) impacts effects which can only be accounted for in a careful general equilibrium analysis.

## **4 Determinants of Migrant's Remittances: Evidence from South Africa**

### **4.1 Introduction**

In the second chapter, we showed that remittances are a non-negligible income component for many black households in South Africa. The present chapter interrogates new nationally representative survey data to investigate the microeconomic determinants of migrants' remittances. Specifically, the chapter examines the role of gender and locational differences in the context of the insurance motives. In what follows, I begin by making a case for the study of remittances by offering a brief background from the international literature. Thereafter, I give an overview of theoretical and empirical literature on income transfers and remittances.

### **4.2 Remittances in the international literature**

The economic impact of migrants' remittances - the monetary and non-monetary contributions sent by migrants to their original countries - has attracted increased attention over the recent past. This renewed wave of interest was largely ignited by reports of rapid growth in international remittance flows to low- and middle-income migrant sending countries since the 1990s<sup>19</sup>. Moreover, comparisons between remittances and other foreign resource inflows indicate that remittance volumes caught up (and in some cases, exceeded) development aid flows as well as foreign direct investment to many low income countries (World Bank, 2009). Propelled by these observations, the development research agenda has resuscitated a

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<sup>19</sup> The World Bank global economic prospectus (2006) reports that remittances to developing countries increased from about \$31 billion in 1990 to about \$200 billion fifteen years later.

lively debate on the migration-development linkages. Succinctly, contemporary development discourse has sought to understand the economic linkages between labour migration, migrants' remittances and welfare changes in the receiving economies, both at household and macroeconomic levels. The literature appears to generally suggest that remittances, and hence migration, have net positive effects on the welfare of those left behind even though some studies fail to find evidence of a positive effect on economic growth (Acosta *et al*, 2008; Singh *et al*, 2010).

In spite of this research interest, much of the remittance work remains restricted to case studies of Latin American countries where the dominant migration stream flows north into the United States of America and Canada. Other parts of the world, most notably the sub-Saharan Africa, have received disproportionately less attention. Indeed, much of the current knowledge on migrants' remittance motivations and welfare effects, in the African case largely infers from aggregate secondary data analysis which could be highly dubious (Brown, 1997). Interestingly, though, both the World Bank (2009) and the United Nations development arm (UNDP, 2009) highlight the importance of labour migration and remittances in developing countries, the majority of which are in sub-Saharan Africa. Crucially, their reports also recognise the critical role that internal labour migration plays as a livelihood strategy for many indigent rural households. Furthermore, many resource-constrained people fail to migrate across international borders due to high migration costs (Ghatak *et al*, 1996), which suggests that the welfare benefits of international migration may not be directly available to the poorest households.

In addition to the high levels of poverty, inequality and income volatility, the unique context in which remittances take place in developing countries fortifies the case for paying particular attention to their behaviour and motivating factors (Rapoport and Docquier, 2006). That is, many developing countries are also characterized by pervasive capital markets imperfections, which often fail to offer market response to the needs for credit and insurance of the majority of the population. Therefore, despite being voluntary and altruistic to a large extent, remittances differ from most private transfers observed in the industrialised world in that additional motives (insurance, investment, and exchanges of various types of services) are central to explaining transfer behaviour. Furthermore, with possibly a few exceptions, private transfers in the Western countries either take place anonymously - in the sense that donors do not necessarily know the identity of the beneficiaries (philanthropy, for example) - or within a very restricted familial group (Rapoport and Docquier, 2006). By contrast, remittances are increasingly recognized as informal social arrangements within extended families and communities in the developing world.

From a policy perspective, the determinants of remittances are key to unpacking poverty and inequality dynamics where labour migration is common. Indeed, while remittances are an injection of resources into the household, they may also be instrumental in uncovering the welfare incidence of public transfers depending on what factors motivate them. More specifically, the literature identifies a number of factors that drive remittance supply. If, for instance, these remittances are driven by migrants seeking to increase their inheritance claims, then public transfers such as the old age pension crowd in remittances by boosting potentially-inheritable household wealth. But if remittances are motivated by altruism, or occur only to equalise *per capita* consumption when individual incomes vary, then the pension will be

expected to crowd out private transfers, with remitters capturing some of the pension's benefits (Jensen, 2003; Sienaert, 2007).

### **4.3 Related theoretical literature**

In chapter one, I introduced the migration and development literature, and culminated our discussion with economic models that recognise migrant-sending households as an integral part of the migration process. I further identified, in the new economics of labour migration models, the role of remittances as the main economic link between migrants and their original households, families or communities. Quite often, the study of labour migration overlaps with remittances literature, although the two are and can be studied separately.

A broad theoretical framework on the economics of giving encompasses family transfers, reciprocity and other forms of sharing. The microeconomic paradigms which attempt to explain the factors that motivate remittances form the core of this literature (for detailed reviews, see Rapoport and Docquier, 2005; Laferrere and Wolff, 2006). To a great extent, the economics literature on remittance behaviour is based on the influential work of Lucas and Stark (1985). In theory, remittance behaviour can be explained from the perspective of the remitter or indeed various combinations of remitter-recipient roles.

#### *4.3.1 Altruism and self interest*

The remitter can be motivated by altruism on the one hand or pure self-interest on the other. Under altruism, remittances could be a manifestation of behaviour where the remitters or migrants only care about their beneficiaries. Economists assume that migrants/remitters are

purely altruistic if they derive positive utility from the welfare of their original households (Stark, 1991; Agarwal and Horowitz, 2002). The migrants are thus concerned with the situation of their original households to whom they send remittances so as to enable their family to smooth consumption.

Altruistic behaviour would manifest in two key relationships, if tested empirically (Funkhouser, 1995; Vanwey, 2004). First, it implies a negative relationship between remittances from a sender and pre-remittance standard of living of the recipient. That is, the altruistic remitter will send more when the beneficiary's income declines and less when the opposite obtains. Secondly, altruistic behaviour implies a positive relationship between remittances from a sender and the pre-remittance standard of living of the sender. The remitter will send more as his standard of living improves. Together, these relationships imply that a migrant who behaves altruistically will return income or goods to his or her family of origin in proportion to his or her income, *ceteris paribus*, and the number of dependents in the origin household and in inverse proportion to his or her family of origin. The reverse should obtain for families of origin: they will remit in proportion to their income and in reverse proportion to the number of their dependents and to the migrants' income (Rapoport and Docquier, 2005).

If migrants act in their own interest, their remitting behaviour will be independent of the welfare of their original household or family. Indeed, as pointed out by Lucas and Stark (1985), the self-interested motive could manifest in a number of ways and for various reasons. For instance, the migrants could be motivated by their own aspirations to inherit wealth or assets in future. In this regard, the migrant may send remittances in exchange for various types of services, including taking care of assets. This is often a sign of temporary migration where the migrant intends to return to the original home. In addition, they may send remittances to be

used to acquire assets in the home area. Accordingly, remittances are expected to increase with the household's assets and income, the probability of inheriting, the migrant's wealth and income but decrease with risk aversion.

However, in reality remitters are not necessarily held at either ideological corner. Rather, they may act in a number of ways that reflects both motives. In addition, the remittance beneficiaries arguably have a role in the remittances processes. The influential work of Lucas and Stark (1985) on factors that motivate labour migrants to send remittances arguably represents an important turning point in the literature on determinants of remittance behaviour. In their view, Lucas and Stark argue that remittances are necessarily linked with migration decisions which are taken at the household level, and therefore, should be understood in that broader context<sup>20</sup>. The Lucas-Stark school of thought was a significant departure from earlier approaches which were largely shaped by neoclassical thinking and hence viewed labour migration as an investment strategy on the part of migrating individual, aimed at maximising their lifetime earnings (Todaro, 1969; Harris Todaro, 1970).

#### *4.3.2 Migrants' remittances in the new economic of labour migration (NELM)*

While the motives discussed in the previous section focus on the remitter's perspective, the new economics of labour migration departs from the individual-centred approach to include motives that incorporate the migrant sending household. Lucas and Stark (1985) identify these intervening familial perspectives in the realms of co-insurance and repayment of investment in human capital. Under tempered altruism – also termed enlightened self-interest – it is posited that remittances consist of the repayment of an informal loan taken out by emigrants during

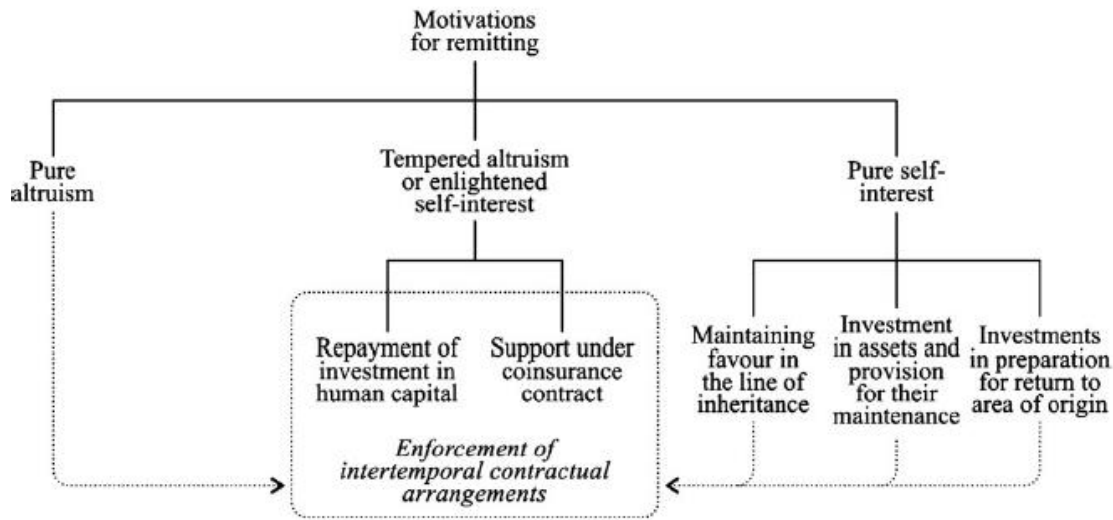
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<sup>20</sup> See also Stark and Bloom, 1985.

their youth in order to secure better education that later makes them more productive in the modern sector, constituting the implicit loan arrangement model (Ghatak, Levine and Wheatley-Price, 1996; Poirine, 1997). A competing theory argues that remittances are part of an implicit coinsurance arrangement (Stark and Lucas, 1988; Yang and Choi, 2007). Hence, remittances are viewed as components of a self-enforcing, operative contract between the migrants and their original household. Remittance flows thus allow the household to undertake riskier ventures and have the ability to cope with economic shocks.

Briefly, the NELM holds that, due to market failures in a source economy, a household member migrates to a different labour market, entering a co-insurance agreement with the household that is left behind. In this setup, remittances are sent home when the home economy faces shocks and to enable the household to invest in new technology. The household, on its part, also supports the migrant by paying for migration costs, for instance. Consequently, remittances increase when the household's income decreases or a negative shock occurs but also when the risk level of the migrant increases.

Figure 1 below portrays the Lucas-Stark exposition of the structure of remittance motivations in a new economics of labour migration framework. Enforcement of inter-temporal contractual arrangement is a function, not only of pure altruism or pure self-interest, but also and more like, of tempered altruism/enlightened self-interest.



Source: Carling (2008)

Figure 4.1 :Remittances in the new economics of labour migration

Beyond the Lucas-Stark framework, remittances could be explained as part of a strategic interaction aiming at positive selection of migrants. Under asymmetric information, where migrants are heterogeneous and their skills unobservable, it is posited that employers in a migrant destination economy will set wages according to the marginal productivity of the lowest skilled migrants. It follows, in theory that highly skilled migrants will attempt to obtain and sustain higher wages by ‘bribing’ their lower skilled counterparts with the aim of preventing them from migrating (Rapoport and Docquier, 2005).

#### 4.4 Related Empirical Literature

The theoretical models discussed in the previous section highlight the various motivational factors that are pivotal to remitting behaviour. This section assesses relevant empirical literature. Specifically, I pay attention to the focus of various studies, pertaining to motivations

and methodology, with the intention of picking out important variables as well as identifying gaps in the literature.

#### *4.4.1 Modelling of remittances: correlates and predictors*

In most of the empirical work on remittances, the main issue concerns the degree of altruism that may be inferred from migrants' behaviour, since the pure altruism hypothesis lacks widespread empirical support. The task in these studies, therefore, is to identify and isolate the various motives which drive remittance behaviour. The seminal work of Lucas and Stark (1985) on remittances from internal migrants in Botswana is one of the first studies that attempt to accurately discriminate between various motivations to remit. Lucas and Stark's estimates uncover a positive relationship between the level of remittances received and recipient households' pre-transfer income, hence ruling out pure altruism<sup>21</sup> as an explanation for remittance behaviour. The authors interpret this finding as suggestive of the presence of other motives other motives, such as exchange, investment and inheritance could also play a role in determining remittance flows.

In order to test whether remittances are a return to educational investment earlier in the migrant's life, Lucas and Stark explore the causal relationship between remittances and the migrant's years of schooling. Their estimations reveal a significant positive relationship, possibly indicating that remittances are likely to result from an understanding to repay initial educational investments. However, the combined effect of "own young" and schooling turned out to be positive but not highly significant, possibly suggesting that another motive is at play.

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<sup>21</sup> Pure altruism theory postulates that remittances are directed to poorer individuals/communities, hence a negative relationship between remittances and recipients income level.

Hence, the authors turn to the inheritance motive which they test by exploiting the fact that sons are more likely than daughters to inherit assets. This, they do by adding a dummy variable for whether the household holds a cattle herd larger than twenty cattle. The results showed that indeed, sons remit more to families with larger herds while the associated coefficient is weakly negative for daughters and their spouses. Hence, sons behave significantly differently from daughters and other relatives in that they remit more to households with large herds, which is consistent with a strategy to secure inheritance. However, it could also be the case the male children keep their cattle with those of the household, which could be explained as the exchange hypothesis. That is, remittances compensate the recipients for taking care of the sons' own cattle. In a nutshell, the three potential explanations for the positive relation between remittances and the household's income were all shown to be consistent with the evidence from Botswana.

In addition, Lucas and Stark also test the insurance hypothesis, which implies that remittances should increase during bad economic times in the rural sector and be directed to households who possess assets with volatile returns. They use, for each village sampled, an index reflecting the gravity of drought and include it in the remittance equation, both separately and interacted with (the logarithm of) two familial assets, namely cattle and agricultural land. When omitting the interaction terms, the coefficient on the drought index alone proved significantly positive, a finding that could be interpreted as suggestive of either altruism or insurance. Yet, with interactions terms included, existence of drought conditions or possession of more drought-sensitive assets did not stimulate greater remittances *per se*, but the interactions of drought with these drought-sensitive assets did. This is consistent with rural households sending members to urban areas for the prospect of insurance.

However, as noted by Rapoport and Docquier (2006), the same pattern of remittances could be reconciled with pure altruism if, for example, past remittances sent with an altruistic intent contribute to raise today's income. This possibility is not explored by Lucas and Stark since longitudinal data were not available to them. The majority of micro-level studies face to the same limitation.

Indeed, over the past three decades many papers have set out to analyse the determinants of remittances with reference to the framework suggested by Lucas and Stark (1985) in different empirical contexts. Unlike Lucas and Stark, who encompassed a number of motives, most of the recent empirical literature has concerned itself with testing for a single motive (e.g. Hoddinott, 1994; Gubert, 2002) or compare two competing factors (e.g. de la Briere *et al*, 2002; Cox *et al*, 1998). In particular, positive relationships between transfer amounts and recipients' incomes have repeatedly been uncovered by this literature in developing countries

In a Peruvian study, Cox *et al.* (1998) analyse the determinants of private transfers which mainly consist of remittances. The authors focus on altruism versus exchange and test the effect of recipient households' pre-transfer incomes on the size and probability of remittances. Cox *et al.* (1998) test these two motives for both children-to-parents and parents-to-children private transfers, controlling for social security benefits, gender, marital status, household size, home ownership, education, and for whether transfers are transitory or permanent. In the case of child-to-parent transfers (which consist mostly of remittances), their results indicate that the probability of transfer is inversely related to parental income, a finding which is consistent with both altruism and exchange. But the effect of income on the amount transferred, conditional

on receiving a transfer, is first positive, then negative (i.e., inverse-U shaped), as suggested by the bargaining-exchange hypothesis. The same pattern applies to parent-to-child transfers, leading the authors to conclude that the bargaining-cum-altruism framework appears more powerful than the strong form of the altruistic model. Furthermore, Cox *et al.* (1998) also find that private transfers are targeted toward the unemployed and the sick, a finding consistent with both altruism and insurance; however, public pension transfers and private transfers from children to parents are shown to be complements rather than substitutes, a finding which makes sense in a bargaining framework but is incompatible with altruism. It is notable that this result differs from the evidence uncovered by Jensen (2003) for South African households. Jensen reports that public pensions crowd out private transfers in South Africa, albeit partially.

de la Brière *et al.* (2002), use data from migrant-sending households in the Dominican Republic, also test for the relative strength of two non-exclusive motives, namely inheritance seeking and insurance. After confirming support for both insurance and inheritance, with a larger effect being accounted for by the inheritance motive, the authors explore household heterogeneity and proceed to contrast migrants by various characteristics. Their results highlight that the relative importance of each motive is affected by the migrant's destination (United States or Dominican cities), the migrant's gender, and the composition of the receiving household. Interestingly, insurance appears as the main motivation to remit for female migrants who emigrated to the U.S.; the same result holds true for males, but only when they are the sole migrant member of the household and when parents are subject to health shocks. Investment in inheritance, on the other hand, seems to be gender neutral and only concerns migrants to the United States.

While some studies have focused on assessing the impact of various motives, others compare determinants of remittances between countries (Funkhouser (1995) using decomposition methods. Using data from receiving households in Nicaragua and El Salvador, he examines the determinants of remittances from international migration. Whereas the average remittances in San Salvador are over double in absolute as those from the Managuan data, it is interesting that he only finds small difference in the role of observable characteristics in explaining differences in the level of remittances. Rather, the difference is explained by differences in behavioural coefficients and by differences in self-selection bias of those who remit out of the pool of emigrants between the two countries.

More evidence of the insurance motive has been uncovered in other studies by Gubert (2002) using Malian household data and Agarwal and Horowitz (2002) for Guyana. Gubert (2002) tests various determinants of the remittance flow, using data from the Kayes region in Mali. Focussing on the insurance motive, she tests the impact of various shock variables: the number of household members who fell ill during the year turns out to be significant in most specifications. So too is the number of those who died during the year, but with a lower margin. Then, three different measures of crop income shock are tested as well, two of them generated as residuals from a production function. The results suggest that negative income shocks are a robust determinant of remittance flows, providing some further support to the insurance hypothesis. However, they do not reject the loan interpretation either, as a variable indicating whether the migrant received some financial assistance from a household member also has a significant impact.

Some studies have explored the effect of having two or more migrants from one household. Aggarwal and Horowitz (2002) analyse the effect of other migrants in the household to distinguish between insurance or other self-interest motives and altruism. The authors argue that under the insurance or other self-interest motives, the number of migrants in the household should not affect the amount of per-migrant remittances. However under altruism, the presence of other migrants will reduce the average size of remittances, as then, the first migrant is not solely responsible for the wellbeing of the household. On the other hand, Aggarwal and Horowitz (2002) find support for the presence of altruism. They find a negative relationship between the number of migrants in the household and the probability and the amount of remittances in Guyana. Similarly Naufal (2008), shows that the amount of remittances sent by Nicaraguan migrants decreases as the number of migrants from the household increases. Hoddinott (1994) and Pleitez-Chavez (2004) find a positive impact of other migrant members on the probability of receiving remittances and an insignificant effect on the size of remittances. This is consistent with the self-interest and exchange theory of remitting whereby the presence of other members increases the probability that the migrant sends money and that any contract the migrant engages in with the household should not depend on the activity of other members of the household.

Beyond insurance, investment and other self interest motive, a number of studies have explored the remittance decay hypothesis which predicts that remittances decline over time. That is, the longer the period of residence in the host country the lower the incidence of remittances, though for those who intend to return home eventually could be likely to remit more towards investments in assets, real estate and social capital. Lowell and de la Garza (2000) show that for every one percent increase in time spent by immigrants in the United States, the likelihood of

remitting decreases by two percent whereas Glystos (1997, 1998) found that Greek immigrants to Germany remitted larger amounts (due to return illusion) than migrants to Australia and United States. Aggarwal and Horowitz (2002), Osaki (2003) and Pleitez- Chavez (2004) find no evidence in favour of the existence of such relationship. Brown (1997) rejects the remittance-decay theory together with the pure-altruism hypothesis when tested on data from the islands of Tonga.

#### *4.4.2 Beyond Altruism and Self interest*

Most of the empirical literature on remittance behaviour has been driven by the Lucas-Stark model, and hence there is a common and repeated focus on altruism. Carling (2008b) notes that this focus could however be unfortunate for several reasons. Firstly, most of the empirical work simply confirms what Lucas and Stark (1985) cogently argued, that altruism alone does not fully explain remittances. Furthermore, the two authors noted that it may be impossible to probe the balance between altruism and self-interest in the true motivation of migrants.

Quite importantly, therefore, the empirical exploration of remittance motivations extends to contextual differences, which would generally fail to lend support to a general explanation for remittance motives. Carling (2008a) specifically identifies (i) migration histories and dynamics, (ii) the sociological nature of families and households, and (iii) the norms and values relating to migration and remittances as contextual differences that may contribute to the variations in remittance behaviour.

To be clear, the migration context differs in a number of ways which in turn define the manner of remitting behaviour. For instance, many people migrate temporarily and hence maintain a firm home in their place of origin, while others migrate permanently together with immediate household members and only remit to elderly parents. In similar regard, variation in migration

context would manifest between international and internal remittances, a matter that is often overlooked in the literature (Carling, 2008).

The nature of families and households could also limit the extent to which remittance behaviour can be generalised. For instance, the degree of cohesion with and attachment to families ought not to be overlooked in understanding remittance behaviour. It is notable that the NELM and most of its empirical pedigree applies to Mexico where patriarchal families dominate (Sana and Massey, 2005). Whether the same model may apply to matriarchal communities or indeed societies where conjugal unions are unstable is doubtful. It is thus important to realise that family transfers, in general, and remittances in particular take place within a variety of normative settings. According to Carling (2008b), moral values play an important role in migrants' activities including remittance behaviour. In some societies, migrants feel enormous pressure to remit because relatives feel entitled to receive support.

The migrants themselves are hardly a homogenous group of individuals and the factors that drive remittance behaviour are likely to differ among the various types of migrants. As shown by Bowles and Posel (2005), factors such as genetic relatedness play a key role in determining remittances from labour migrants to their original homes in South Africa. Elsewhere, Hoddinot (1992) showed that remittance behaviour was significantly driven by parents' inheritable assets in the case of male migrants, while the same did not hold for female migrants. Evidence, both local and international, seems to suggest that women remit a substantially larger portion of their income than men (Rahman and Fe, 2009; Posel, 2001). The gender dimension also held true in the Dominican study (de la Briere et al, 2002) which showed in addition that remittance behaviour also differs by destination of migrants and the household composition of the migrant sending households.

#### 4.4.3 *On estimation methods*

Apart from the challenge of selecting appropriate variables, the choice of a statistical or econometric model is also crucial for achieving robust estimations and results. Existing studies on the determinants of remittances have used a variety of methodologies, with earlier studies (e.g. Lucas and Stark, 1985) mostly employing ordinary least squares (OLS) to estimate remittance models. However, using OLS may be problematic due to a restriction on the values taken by the dependent variable, given that the sample (of potential remitters) usually consists of remitters and non-remitters. Specifically, if the migrant does not remit, the analyst has no data on the remittance levels although he may have data on the regressors. Hence, the dependent variable is a mixture of discrete and continuous parts and is thus censored at zero. This turns out to be one example of the censored dependent variable problem (Tobin, 1958; Amemiya, 1984).

Although recognised as such, a number of studies ignore the censoring problem, paying no special attention to the zero-inflated nature of the dependent variable, and proceed to use the ordinary least squares estimation procedure, which clearly leads to biased and inconsistent estimates in this context (Madalla, 1992; Greene, 2005). Some analysts, while recognising the problem, attempt to circumvent it by restricting their sample to those observations with values greater than zero. But this too degenerates to using only the subsample of remitting migrants, which may hardly be representative of the population of migrants. This practice would consequently yield estimates of parameters that are both biased and inconsistent (Wooldridge, 2003).

The literature suggests at least two ways of correcting the data censoring problem<sup>22</sup>, the choice of which depends on whether the decision to remit is conceived as a two-stage sequential process or a one stage simultaneous process (Hoddinott, 1992). That is, the analyst estimates a probit model for the decision to remit followed by a corrected OLS equation. To be clear, the two stage procedure is employed where it is understood that the model separates the decision to remit and the subsequent decision of how to send. The two stage process has its own disadvantages too. For instance, Amuedo-Dorantes and Pozo (2006) argue that using a two-part selection model can lead to identification issues. In these Heckman type models, the two equations ordinarily use the same set of explanatory variables. However, due to the semi parametric nature of the model, one of the variables in the outcome equation should not appear in the participation equation (Cameron and Trivedi, 2005). The challenge, notably, is to find defensible exclusion restrictions.

Alternatively, if the remittance process is seen as simultaneous, then a Tobit model would be more appropriate (see for example Brown, 1997). The advantage of this approach is that it allows a regressor to affect the decision to remit and the level of remittances differently. However, the Tobit model may also yield biased estimates if the variance of additive error term is not constant (Cameron and Trivedi, 2005). In addition, the Tobit requires that the residual be normally distributed, a condition that may not always obtain.

Aside from the standard censored regression models, other specifications that are used, albeit less widely, includes the random *effects* model<sup>23</sup> and the censored least absolute deviation estimator. The random effects model specifically takes care of clustering while censored least

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<sup>22</sup> Alternatively termed *corner solution problem* (Cameron and Trivedi, 2005)

<sup>23</sup> In their specification, the error term is decomposed into a household random term and an individual error term

absolute deviation (CLAD)<sup>24</sup> estimator gives consistent estimates even in the presence of heteroscedasticity. Some econometricians suggest the use of a Poisson model instead of the log normal, arguing that the latter is not appropriate under conditions of heteroscedasticity (Santo Silva and Tenryro, 2006).

Recognising the various problems that each of the models presents, a common approach is to employ several alternative statistical models to run the estimations. For example, de la Briere *et al.* (2002) use four different models and, in their final analysis, interpret the results that seem most robust.

#### *4.4.4 Existing work on remitting behaviour in South Africa*

Empirical literature on the determinants of remittances in South Africa remains slim. To my knowledge, Posel (2001a) was the first to estimate a microeconomic model of remittances for South African households using data from the remittance receiving household. Realising the short falls of using one-sided information, the same author (Posel, 2001b), using a regional data set for the KZN province, estimates a remittance model based on information collected at the remittance sending point. Importantly, she notes that remittances are best modelled as flowing from one individual to another. Hence, in a sequel, Bowles and Posel (2005) treat the subject using the same 1993 PSLD data but with a dedicated focus on the genetic relatedness of the remitter and the sender. From a subsample of male migrants, they conclude that inclusive fitness is a much better predictor of remittance behaviour than average relatedness, although its effect is rather modest, explaining no more than a third of observed remittances. One reason for the scarcity of research is unavailability of appropriate migration and

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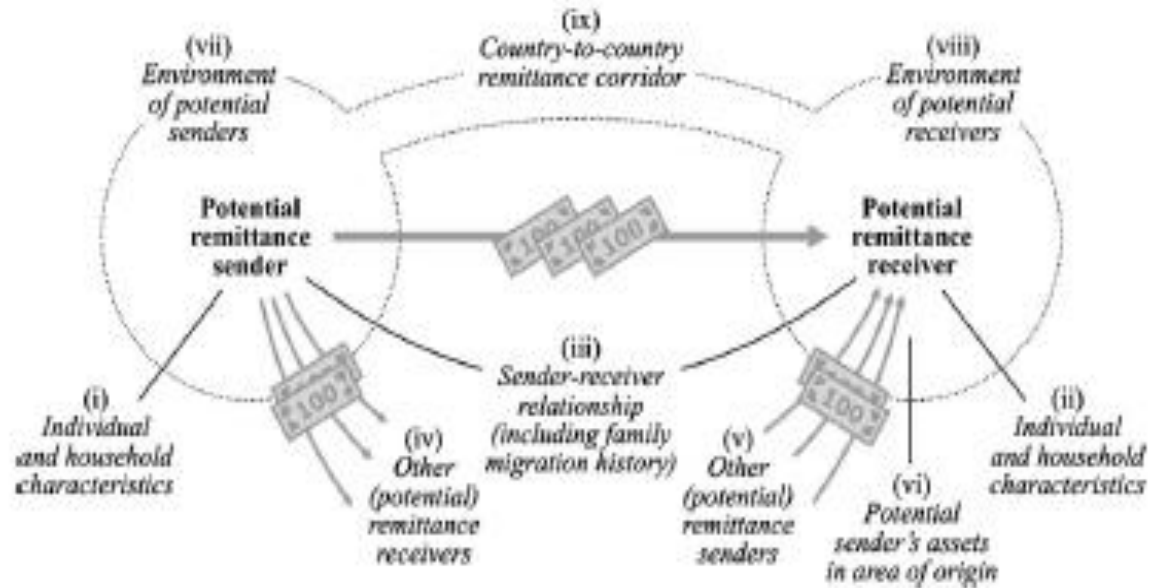
<sup>24</sup> CLAD estimates median regression for whole sample then iteratively re-estimates median regression after having discarded the observation with predicted negative values.

remittance data. Even for the available studies, the data used is generally not sufficient. For instance, the PSLSD (Saldru, 1993), information about the person sending remittances cannot be mapped onto information about the remittance sent, which restricts Posel (2001) study to household with one migrant. Yet, many households have more than one migrant. Further, the PSLSD collects data at household level rather than at individual level.

Over the past decade, several nationally representative surveys have collected information on migrants and remittances. Notably, the September version of the Labour Force Survey for the years 2001-2005 includes a section on migration. Most recently, SALDRU is informative on non-resident household members and contributions, both monetary and non-cash, flowing in and out of households, and importantly, to individuals within households. The present study thus differs from previous studies in that it uses a new dataset which has more disaggregated data about remittances. These data enable me to test the insurance and investment motives for remittances while also focusing on the role of gender and household composition in driving remittances.

#### 4.4.5 *Summary of Empirical Literature Review*

In a nutshell, the characteristics of migrants' remittance behaviour fall into two main categories. That is, demand *side* pressures on the migrant from the remittance-receiving end, in particular, family and community ties and *supply-side* factors that affect the migrants capacity to remit, such as income and net wealth; motivational characteristics that influence the migrant to remit (for example, altruism and self-interest) and time-related factors such as the duration of the migrant's absence and environmental factors (Brown, 1997). Carling (2008) summarises the locations of micro level determinants in the context of international remittances as presented in Figure 4.2 below.



Source: Carling (2008)

Figure 4.2: A framework for remittance determinants

Migrants send different amounts (and types) of remittances depending on a number of factors. Indeed, some do not send at all. One place to look for explanations for remitting behaviour, therefore, is in the characteristics of the remittance supply side, that is, the *potential sender*. These (characteristics) pertain to the migrants earning capacity, thus including human capital characteristics of the potential remitter such as education attainment, age, gender, some indicator of economic activity in which they are involved and ethnicity. In many empirical analyses, the sender's income and wealth is also considered as supply side factors.

Notably, this poses a data challenge, for the analyst is required to collect and use information from at least two households, both the remittance sending household and the receiving household, pertaining to the same period of time. Indeed, due to data constraints, many studies treat the receiver as a household rather than an individual. Some authors, however, insist that remittances are sent by and directed to individual household members (Posel, 2001),

and therefore remittance models should necessarily focus on individuals rather than households. Treated as such, the analyst is then able to characterise and explore the degree of relatedness between the sender and receiver (Bowles and Posel, 2005). Nonetheless, the presence and structure of the sending as well as receiving household cannot be ignored.

Another neglected aspect concerns the social determinants of remittance behaviour. Obviously, most studies control for individual characteristics of both migrants and receiving households, but tend to disregard the social context in which remittances take place. Community characteristics are generally absent from remittance regression analysis, except in very specific cases (e.g., when data on rainfalls or other climate variables at the village level are used to account for the volatility of individual incomes). However, few studies give weight to the potential benefits from broadening the analysis to include social determinants of remittances. One example is the study by Azam and Gubert (2005) on the Kayes region in Western Mali, which demonstrates the contextual fact that the migrants internalize the effect of their transfers on the social prestige of their clan that renders the implicit insurance contract enforceable.

The geographical drivers of remittances are also found statistically significant in a study on remittances from Ghanaian and Nigerian migrants in the US, UK and Germany. Ecer and Tompkins (2010) find that altruistic reasons for remitting may be associated with higher levels of remittances, while more self-interested reasons for remitting are associated with lower levels of remittances. These results indicate that it may be difficult to design policies to encourage the use of remittances for development purposes, as remittances are primarily used for basic needs.

The multiple locations of remittance determinants presented in the preceding subsections can have daunting implications for research. Specifically, the data requirements for an ideal analysis can be quite a stretch as they require multi-level information about both sender and receiver. Moreover, there seems to be a suggestion that proper unit of analysis would probably be at the individual (sender and receiver) rather than the household.

The empirical evidence on migration and remittances in South Africa suggests that within-household labour migration changed in the 1990s, while remaining a material feature of the labour allocation of (especially, but not exclusively, rural) households. The determinants of migration and remittance behaviour have been the focus of much less attention, with the very notable exception of the work of Posel (1999, 2001) and Bowles and Posel (2005).

#### **4.5 Data**

In the present chapter, I use household data from the first wave of the South African National Income Dynamics Study (NIDS) (SALDRU, 2008), a nationally representative survey which includes about 31 thousand South African individuals who are drawn from approximately 7305 households. In keeping with the previous chapters and the context of this study, I focus on the individuals from the black/African population group.

The literature survey identified correlates of remittance behaviour at multiple locations in the remittance flow path, between and including the sending and receiving individuals. While the ideal estimation model would empirically include all the relevant factors, a number of studies use information collected at the receiving end only, and quite often at the level of the household only. This drawback is often the case due to data limitations in large scale national

surveys. Although the NIDS is also another large scale survey that is not custom-designed for labour migration, it nonetheless contains a wealth of information on incomes, including remittances, at the individual level. Importantly for this study, it identifies individuals as resident or non-resident household members as well as including all information on both the senders and receivers.

In the ensuing empirical analysis, I first describe the characteristics of individuals who reported receiving or sending remittances in the survey. Every adult respondent was asked whether he had given or received cash or non-cash contributions to a person (who was residing elsewhere) in the year up to the date of survey. I use the responses to these two questions to identify the relevant sample for remittance behaviour analysis in terms of actual remittances sent or received and the potential remitters. This descriptive work serves as a prelude to the estimations of the remittance models, where I use information collected at the receiving end.

The question on remittances was presented to adult respondents only and therefore the relevant sample of interest includes about 12 thousand African adults, of which 973 sent contributions to between one and six persons over the course of the 12 months prior to survey date. About 1247 reported receiving a remittance from at least one person in the same period of time. Roughly, 10 percent of all African adults received remittances from at least one sender, while about 8 percent reported sending remittances.

### *Sampling and Weights*

Concerning household and person weights, the NIDS (SALDRU, 2008) provides two sets of weights: design weights and the post-stratification weights. This is because the NIDS used two-stage procedure. In the first stage, the design weights were calculated as the inverse of the

probability of inclusion. In the second, the weights were calibrated to the 2008 midyear estimates (produced by Statistics South Africa). The basis of the calculation of the design weights is the information that Statistics SA provided about the process of two-stage sampling from the Master sample. Two sets of calculations were necessary in deriving the design weights. First there is a calculation of the probability of sampling each population sampling unit (PSU) and, second, there is a calculation about the probability of including each specific household in each PSU in the SALDRU (2008) sample. The latter corrects for household non-response.

The second set of weights is the post-stratification weights. These weights adjust the design weights such that the age-sex-race marginal totals in the NIDS data match the population estimates produced by Stats SA for the mid-year Population Estimates for 2008.

#### *4.5.1 Characteristics of remitters*

Table 4.1 below presents summary characteristics of a number of variables pertaining to remitters. These include demographic information such as age, gender and marital status, but I also provide information on income, education attainment and location of residence.

Among remitters, there are more male participants than there are women. The share of people who reported that they had sent remittances is about 62 percent which is nearly 19 percent larger than the share of males in the African population. This large share would be consistent with a number of related factors, primarily the fact that there are more men in gainful employment than women and also that there are still more men involved in labour migration than there are women.

Table 4.1: Summary statistics of African Remitters [age&gt;16yrs]

Characteristic		Remitters	All adults
<i>Personal</i>			
Frequency/ sample size		2,431,488 (12%)	18,393,223 (100%)
Sample size		973	11,771
Gender shares	[male=1]	0.62	0.43
Mean age (in yrs.)	All	36.9 (11.1)	35.3 (15.6)
	Male	37.3 (11.6)	33.9 (15.1)
	Female	36.2 (10.5)	36.4 (15.9)
Employment status	[Yes=1, 0 otherwise]	0.67	0.26
Income (in rands)	From primary occupation	3388.16 (5219.12)	2511.02 (4084.18)
Education	None	0.05 (0.23)	0.11(0.31)
	Primary	0.20 (0.40)	0.21(0.40)
	Secondary	0.49 (0.50)	0.58(0.49)
	Post-sec	0.24 (0.43)	0.09(0.29)
Marital status	Married	0.38	0.26
	Never-married	0.39	0.54
	Other	0.23	0.20
<i>Share of population remitting by location (%)</i>			
	National	11.8%	
	Rural	6.3%	
	Formal	22.1%	
	T.A.	3.8%	
	Urban	16.3%	
	Formal	17.0%	
	Informal	14.1%	
<i>Household</i>			
	Average size	2.9 (2.4)	4.9 (3.4)
Income	Mean, monthly	5991(8339)	3819(5697)
Expenditure	Mean, monthly	4491 (6480)	3100 (4728)

## Notes

1. Author's calculations using SALDRU (2008)
2. Figures in parentheses are standard deviations
3. Survey design weights were used in all sample-based computations

Mindful that our sample comprises adults only (aged 16 and above), the average age of adult black South Africans is about 35.3 years, with women being slightly older on average than

men. This could be understood in the context of higher life expectancy for women. The average adult's age turns out to be slightly lower (by 1.3 years) than that of the average remitter in the same population grouping. From the summary statistics in Table 4.1, the age difference is mostly accounted for by male remitters being slightly older than their female counterparts.

The general expectation that most remittances would flow from migrant husbands to their wives, as was commonly the case under temporary labour migrancy, does not seem to be the predominant case, according to these data. Indeed, only 38 percent of all remitters are married while a similar share reported having no spouse (never married) at all. This is consistent with the observation that remittances mostly go to parents and children.

In the literature, the relationship between sender and receiver is potentially an important correlate of remittances flows. Table 4.2 below shows that the majority of remittances go to family members, although not exclusively to core/nucleus family members. Indeed, roughly 51 percent of the remittances were sent to biological parents or children. Spouses and partners comprised only 15 percent of the recipients, while only 11 percent of the receivers were biological siblings.

Table 4.2: Remitter relationship to receiver

	Sender (% of respondents received from)	Receiver (% of respondents sent to)
Spouse	21	16
biological child	15	26
Biological parent	30	26
Other family members	24	26
Non-family	10	6

Author's own calculations

The distribution of receivers is quite similar to that of senders. A third of all senders were biological parents of the receiver, while 20 percent were spouses. Non-family members comprise the smallest group with less than 10 percent of senders or receivers.

In terms of education, the sample of remitters would appear to be more educated than the general population. Interestingly, even though this is the case, the survey shows that some without education also remit, albeit being a small proportion. That is, only 5 percent of these who remit have no education, as compared to about 11 percent in the population (being on the no education category). For one to be able to remit, it logically follows that they must be earning money or, at least, has the means and wealth to remit. Therefore, most remitters are unsurprisingly in some form of employment.

Further, in relation to both the employment and education factors, the location of residence of remitters is expected to correlate with one's ability to remit. In the population, about 12 percent of all adult blacks are remitters. However, urban centres have a larger share of remitters (about 16.3 percent) than rural localities, which present only 6.3 percent. Further, and perhaps more interesting, is the difference between population shares of remitters between residents in formal and informal/traditional areas. In the rural areas, 22 percent of people in formal locations send remittances while only 3.8 percent of adults in traditional authority areas. Urban areas present a different picture in his regard. That is, the difference between urban-formal and urban-informal is very narrow, although urban formal areas still have a higher representation. To the extent that many African people migrate to either rural formal or urban centres, these differences would be consistent with the poverty reducing impact of migration and remittances.

Turning to household level characteristics, table 4.1 above presents statistics for household size as well as income and expenditure. The average household size among African households is 4.9 people. When we consider remitter households alone, the average size is much smaller at 2.9 individuals. Both household monthly earnings and expenditures are higher for household with remitting individuals than those without.

#### *4.5.2 Characteristics of remittance receivers*

Unlike remittance senders, among whom over 60 percent are men, the majority of remittances receivers are women. According to the NIDS data, about 66 percent of all receivers are women. The average age among the receivers is about 32, with males being overrepresented in the younger subset of receivers. The average age for male beneficiaries is 28 years old, which is 5 years younger than their female representative counterpart.

The distribution of receivers in terms of location of residence differs slightly with the population wide distribution. Indeed, with about 57 percent of receivers residing in urban areas, there appears to be a 4 percent bias towards urban residence when compared with the African population distribution, which is about 53 percent urban-resident. A notable difference presents, specifically among rural residents, when the samples are considered as resident in formal versus informal localities. That is, the urban sample of receivers seems to be higher for resident of formal urban areas than those in the informal.

Table 4.3: Summary statistics of remittance receivers

		<i>Remittance Receivers</i>	<i>All adults</i>
Frequency		2,234,660	21,351,984
Percentage		1247	
<i>Characteristic</i>		10.5	100
Gender	[male=1]	0.364	0.436
Age	All	32.5 (15.1)	34.5 (15.8)
	Male	28.0 (13.1)	33.2(15.3)
	Female	35.2 (15.6)	35.5 (16.2)
Marital status	Married	0.19	0.25
	Never married	0.65	0.56
	Other	0.16	0.19
Employment status	[Employed=1]	0.126	0.256
Location	Urban	56.6	53.3
	Rural	43.5	46.7
	Rural - formal	4.83	6.35
	Rural -trad-authority	38.8	40.35
	Urban-formal	42.6	40.25
	Urban-informal	13.7	13.05

Source: author's calculation using SALDRU (2008); numbers in brackets are standard deviations; survey design weights (SALDRU, 2008) were used in calculating

#### 4.5.3 *Remittance magnitudes, flows and frequency*

Turning to the remittances magnitudes, Table 4.4 (below) provides statistics on remittances received or sent by individuals during the 12 months preceding the date of survey. The data suggest that women remit less on average than men, an observation that is consistent with existing evidence. At the same time, women appear to be recipients of larger amounts of remittances than men. These two observations appear to be true for both rural and urban residents.

Table 4.4 : Mean annual remittance income (in rands) by location and gender

<i>location of sender/ receiver</i>	<i>Received</i>		<i>Sent</i>	
	<i>Male</i>	<i>female</i>	<i>Male</i>	<i>female</i>
Urban	3628.79 (7117.65)	3632.82 (8192.92)	5996.046 (9893.74)	3639.24 (6492.27)
	551,111	708,183	1,164,770	659,902
Non-urban	2736.70 (3709.53)	4602.19 (5324.61)	5542.57 (7307.66)	3156.14 (3346.11)
	263,337	712,029	354,098	252,818

Source: author's own calculations using SALDRU (2008)

Table 4.5 below shows a further disaggregation of remittance means by formal *versus* informal location (under both rural and urban areas) of sender/ receiver. Focusing first in the rows labelled rural, the stats suggest that women receive more than men and that people in informal areas get more than those in formal. However the differences are less pronounced on the part of rural senders although the statistics suggest that informal sends slightly more than formal.

The patterns obtaining in the case of rural areas do not come out in the case of urban areas.

Clearly though, people in formal urban receive more than those in informal urban.

In essence, this analysis is consistent with the central proposition of this study which recognises the rural bias of poverty and points to remittances as an important driver of poverty alleviation in such areas.

Table 4.5: Mean annual remittance income in ran by location and gender

	<i>Formal area</i>		<i>Informal area</i>	
	<i>male</i>	<i>female</i>	<i>Male</i>	<i>female</i>
<i>Receiver</i>				
Rural	1653.82 (2024.21)	4231.49 (5231.4)	2860.54 (3836.17)	4649.77 (5334.6)
Urban	3776.75 (7829.87)	4484.17 (9273.03)	3133.76 (3837.29)	1140.5 (1887.52)
<i>Sender</i>				
Rural	5593.28 (6018.64)	3169.52 (2782.37)	5492.67 (8384.54)	3144.44 (3770.24)
Urban	6953.51 (10910.29)	3942.73 (6764.979)	2670.85 (3193.67)	2339.96 (4953.73)

Source: author's calculations using SALDRU (2008); figures in parentheses are standard deviations

#### 4.6 Conceptual framework and estimation strategy

I adopt a framework proposed by Yang and Choi (2007) to formalise the risk sharing (or coinsurance) behind migration and remittances. The important question, in this regard, pertains to how we should expect remittance receipts to change when a household experiences a negative shock. A fundamental theoretical result is that if there is a Pareto-efficient allocation of risk across individual entities (household members, in this case) in a risk-sharing arrangement, individual consumption should not be affected by idiosyncratic income shocks.

Consider households consisting of two members, indexed by  $i \in \{1,2\}$ . Let one household member be located in the origin household and the other household member located in a

migration destination place. Assume that both household members work and are able to send funds back and forth to each other.

Individuals have an uncertain income in each period  $t$ ,  $y_{s_t}^i$  depending on the state of nature  $s_t \in \mathcal{S}$ , which could be good or bad. Household member  $i$  consumes  $c_{s_t}^i$  and experiences within-period utility of  $U(c_{s_t}^i)$  at time  $t$ . Let utility be separable over time, and let instantaneous utility be twice differentiable with  $U_i' > 0$  and  $U_i'' < 0$ . For the allocation of risk across household members to be Pareto-efficient, the ratio of marginal utilities between members in any state of nature must be equal to a constant:

$$\frac{U_1'(c_{s_t}^1)}{U_2'(c_{s_t}^2)} = \frac{w_2}{w_1} \quad (4-1)$$

for all states and time.  $w_1$  and  $w_2$  are the Pareto weights of members 1 and 2. Household members' marginal utilities are proportional to each other, and so consumption levels between members move *in tandem*.

Let utility be given by the following constant absolute risk aversion function:

$$U_i'(c_{s_t}^i) = \frac{-e^{\theta c_{s_t}^i}}{\theta} \quad (4-2)$$

Then, a relationship between individual household member  $i$ 's consumption and average consumption across the household members is obtained by:

$$c_{s_t}^i = \bar{c}_{s_t} + \frac{\ln w_i - 1/2(\ln w_1 + \ln w_2)}{\theta} \quad (4-3)$$

Efficient risk sharing implies that an individual's consumption level depends here only on mean consumption in the household, and an effect determined by the individual's Pareto weight relative to the other's. Because this latter term is constant over time, changes in

consumption for each individual will depend only on the change in mean household consumption. Said another way, individuals face only household-level risk.

The practical aspect of this type of risk sharing has some examples including sending remittances to another household member when that member experiences a negative shock.

Let consumption of individual  $i$  in state  $s_t$  be the sum of income  $y_{s_t}^i$  and net inflows of remittances  $r_{s_t}^i$

$$c_{s_t}^i = y_{s_t}^i + r_{s_t}^i \quad (4-4)$$

So then equation (4.3) can be rewritten

$$r_{s_t}^i = -y_{s_t}^i + \bar{c}_{s_t} + \frac{\ln w_i - 1/2(\ln w_1 + \ln w_2)}{\theta} \quad (4-5)$$

Yang and Choi (2007) demonstrate that equation (4.5) can be transformed into an empirically testable specification, by separating income  $y_{s_t}^i$  into two components, one permanent and the other transitory, such as

$$y_{s_t}^i = \bar{y}_i + z_{s_t}^i \quad (4-6)$$

where  $\bar{y}_i$  is permanent and  $z_{s_t}^i$  is transitory. Only the latter would be affected by the state of the world.

Consequently, equation 4.5 can be re-written as

$$r_{s_t}^i = -Z_{s_t} + \gamma_i + \varphi_t + \varepsilon_{it} \quad (4-7)$$

Where outcome variable  $r_{s_t}^i$  is remittance received and key variable  $Z$  is a transitory shock which causes changes on the domestic front. Mean household consumption is represented by

a time effect  $\varphi_t$ . Guided by the model in equation (4.6), I proceed to specify a general model for remittances in the next section.

## 4.7 Specifying a regression model for remittance income

Assuming there is a data generating process for remittances, this latent process can be expressed as

$$r_i^* = r^*(x_i) \quad (4-8)$$

Where  $x$  is a matrix of explanatory variables, including human capital and individual characteristics of the potential remitter and potential receiver, income and environmental/community characteristics. To be clear, the process that generates remittances is a function of the characteristics listed inside the brackets in equation (4.7). This process will ordinarily include random errors, which are explained in the next subsection.

### 4.7.1 *Statistical models and estimation issues*

As noted in the literature review, a number of issues have to be considered when estimating remittance equation. To be precise, for the reason that many potential remitters do not actually remit, the (dependent) variable that represents remittance flows would generally contain a disproportionate number of zeros. Ordinary least squares estimation is unsuitable for corner solution outcomes<sup>25</sup> models (Wooldridge, 2002), as it known to yield unreliable (that is, biased and inconsistent) estimates. Indeed, such estimates would imply unreliable inferences even in large samples. Instead, the Tobit model is appropriate in handling censored dependent variable

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<sup>25</sup> More commonly termed censored data in the literature.

models. While the Tobit is a simultaneous process model and is based on strong assumptions about the conditional data distribution and the functional form. Given that such a parametric model may be too constrictive, there are alternatives that treat the decision and how much to remit as separate and sequential processes. I first present the Tobit before outlining the alternative models.

#### 4.7.2 *Standard censored regression model - Tobit*

For a randomly drawn observation  $i$  from the population, the Tobit model can be specified as

$$r_i^* = x_i\beta + u_i \quad , \quad u_i \sim N(0, \sigma^2) \quad (4-9)$$

$$r_i = \max(0, r_i^*) \quad (4-10)$$

The dependent variable  $r^*$  denotes an underlying (remittance) process which produces  $r$ , the recorded value of remittances from the available data. The condition in equation 4.9 implies that observed remittances obtain at the underlying value ( $r = r^*$ ) only when  $r^*$  is greater than zero. Otherwise, (when  $r^* \leq 0$ ) the observed value of remittances will be zero. The objective is then to estimate  $\beta$ , the vector of coefficient estimates, and variance  $\sigma^2$ , where  $x_i$  is the vector of independent variables and  $u$  is the random variable that may be interpreted as the collective of all the unobservable variables that affect  $r^*$ .

Among various methods, the maximum likelihood is the most popular for estimating the Tobit model. In order to unpack the effects of various regressors on the dependent variable, it is important to compute their respective marginal effects.

Wooldridge (2003) shows that for a binary regressor, the Tobit partial effect

$$\frac{\partial E(y|x)}{\partial x_j} = \Phi\left(\frac{x\beta}{\sigma}\right) \beta_j \quad (4-11)$$

while the partial effect for a continuous variable is

$$\frac{\partial E(y|x, y>0)}{\partial x_j} = \beta_j \left\{ 1 - \lambda\left(\frac{x\beta}{\sigma}\right) \left[ \lambda\left(\frac{x\beta}{\sigma}\right) + \lambda\left(\frac{x\beta}{\sigma}\right) \right] \right\} \quad (4-12)$$

where  $\lambda = \frac{\varphi\left(\frac{x\beta}{\sigma}\right)}{\Phi\left(\frac{x\beta}{\sigma}\right)}$  is the *inverse mills ratio*.

Although the Tobit model is able to handle censored data well, it has a few drawbacks, the main one being that it relies heavily on distributional assumptions. Indeed, if the error term is either heteroscedastic or non-normal, the maximum likelihood<sup>26</sup> estimator is inconsistent (Cameron and Trivedi, 2005). Moreover, the Tobit estimator restricts the censoring mechanism to be from the same model as that generating the outcome variable. That is, it makes the strong assumption that the same probability function generates both zeros and positive values. But, this need not be the case. Ultimately, these weaknesses could render the Tobit model inappropriate if some requisite assumption failed. For example, if those who send remittances have some unobservable characteristics different from those who do not, then the assumption of constant variance (homoscedasticity) would not hold. As an alternative to the Tobit, some variants from of the class of two-stage estimation models have been suggested.

#### *Two-tiered models*

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<sup>26</sup> Tobin (1958) proposed maximum likelihood estimation of the Tobit model and Amemiya (1973) provided a formal proof that despite the mixed discrete-continuous nature of the censored density usual maximum likelihood theory did apply.

In a more general setting, the censoring mechanism and outcome can be modelled separately we could split the remittance decision into two sequential parts, the initial decision being whether to send a remittance or not (i.e.  $r > 0$  versus  $= 0$ ) while the second decision would be how much how much to remit, given that  $r > 0$ . One distinct advantage of these models is that they allow common regressors of either equation to affect the two decisions differently. Moreover, this class of models also allows one set of regressors to explain the participation decision and a different set to explain the level of remittances (Mahuteau, Piracha, & Tani, 2010). These two tiered models, while maintaining the assumptions about the functional form, partially relax the distributional assumptions (Cameron and Trivedi, 2005).

#### **4.8 Regression analysis**

The regression analysis in this section is based on both ordinary least squares and standard Tobit estimators<sup>27</sup>. The dependent variable is the natural logarithm of remittance income received by an individual in the 12 months to the date of survey, from a particular remitter.<sup>28</sup> The survey data provides information at both monthly level and for the 12 months prior to the survey date. I experiment with both figures, taking full cognisance of the possibility that remittances could be subject to seasonal variability. In this regard, some of that seasonality could be ironed out in the annual figure. Furthermore, the monthly figure could represent a once off occurrence of remittance inflow and therefore carry little semblance of remitting behaviour.

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<sup>27</sup> Ordinary least squares results are presented alongside the censored regression parameters to provide a baseline for comparison.

<sup>28</sup> A few respondents in the survey received remittances from 2 or more senders. For ease of estimation, the characteristics of the sender that I include are those of the first remitter.

### *Selection of explanatory variables*

On the basis of the literature survey, I expect remittances to respond to a broad range of factors including demand-side and supply side characteristics. In this regard, I include characteristics of the receiver, describing their human capital capability, household characteristics and proxies for various motivations. The relationship between sender and receiver is also included and so too are variables representing various motivational possibilities.

### *Variable definitions*

Specifically, the model includes:

Demand side (receiver) characteristics such as age (in years), gender (Male=1), education attainment represented by four dummy variables for primary, secondary, post-secondary (or skilled training) and no education. Marital status (married=1) is also framed as an indicator variable.

I also include variables describing the environment/household of the receiver. This category includes location (rural=1) Location of residence, capturing whether the individual dwells in a rural area or otherwise. (Rural=1), number of children that live with the receiver, household size (number of people in their household) and household income level.

A dummy variable indicating whether the person receives a state pension (OAP) or not;

The relatedness between remitter and receiver is represented by two indicator variables

- Dummy variable describing nucleus family (parent, child) *versus* non-nucleus (other) relationship
- Dummy variable indicating whether receiver and sender are genetic related

In addition to the relatedness indicator, there are Supply side (sender) pertaining to the sender. These are sender's age, gender, and educational attainment. To test remittance motives, and guided by theoretical considerations, I include a variable that captures every respondent's self-evaluation of health status. As defined in the data, this variable takes values of 1 to 5 as follows: 1=excellent; 2=very good; 3=good; 4=fair; 5=poor.

The variable capturing number of other remitters is also a test for insurance motive (see Agarwal and Horowitz, 2002). To be clear, they use the variable to discriminate insurance from pure altruism. Under pure insurance, the number of other migrants should not affect other remittances. In contrast, under altruism where migrant remitters are concerned with the welfare of non-migrating household members, the presence of multiple remitting migrants will affect average level remittance level.

Table 4.6 below presents the summary statistics of the variables defined above and used in the regression analysis in the next section. Information is sourced from about 1247 survey respondents who reported that they had received remittances. In addition to their own personal characteristics, all respondents also supplied information about their relationship with and location of the sender. However, further information about the sender is only available in the household roster, which implies that only those remitters, who were members of the same household as the receiver, albeit non-resident, can be linked with the receiver.

In the survey, only about 20 percent of the senders are non-resident household members. Therefore, in Table 4.6 below, I summarise sample characteristics of 1230 receivers and only

278 linked senders. In turn, I estimate separate regressions for the sub sample with complete linked characteristics and the sample with only partially complete characteristics.

Table 4.6 : Summary statistics

Variable	Observations	Mean	Std. dev.	Min	Max
Ln(remittance+1)	1230	6.07	3.27	0	11.91
<i>Receiver characteristics</i>					
Age in years	1230	33.01	15.00	16	101
Male	1230	0.36	0.48	0	1
No education	1230	0.08	0.27	0	1
Primary school education	1230	0.17	0.38	0	1
Secondary school education	1230	0.63	0.48	0	1
Post-secondary school/skills training	1230	0.12	0.32	0	1
Married	1228	0.20	0.40	0	1
Children	1230	0.81	1.29	0	9
State old age pension (OAP)	1228	0.06	0.23	0	1
Household size	1230	4.27	2.88	1	25
Household income (average monthly)	1230	7.10	0.97	1.79	10.81
Life satisfaction	1115	4.75	2.59	1	10
Health status	1222	2.33	1.27	1	5
Rural	1230	0.43	0.50	0	1
Nucleus family (relatedness)	1196	0.50	0.50	0	1
Genetic relatedness	1196	0.67	0.47	0	1
Number of other remitters	1230	0.101	0.39	0	4
<i>Remitter characteristics</i>					
Age	278	40.05	11.63	14	75
Male	278	0.65	0.48	0	1
No education	262	0.10	0.30	0	1
Primary education	262	0.32	0.47	0	1
Secondary education	262	0.55	0.50	0	1
Post-secondary education	262	0.03	0.18	0	1

Notes:

1. Source: author's calculation using NIDS wave one data (SALDRU, 2008).
2. Figures in parentheses are standard deviations.
3. Survey design weights (SALDRU, 2008) were used in calculating these statistics

## 4.9 Discussion of results

Table 4.7 below presents remittance equations based on two estimators: ordinary least squares (OLS) and Tobit. The sample used in these estimations comprises remitters only and hence are determinants of remittance income conditional on the respondent receiving remittances<sup>29</sup>. The fitting of a censored regression model is appropriate because some of the reported remittances are small in value, or indeed zeros, to the extent that they tend to zero when their natural log form is adopted in the equations.

As expected, the parameters in the OLS model are smaller than those in the censored regression model. Conditional on receiving remittances, the results in columns (1) and (2) of Table 4.7 indicate that being married and having a relationship (genetic or nucleus family) with a remittance sender is associated with higher remittances. The negative coefficient on the health status variable however suggests that poorer health on the part of potential receivers attracts lower remittances. Further, the receivers' household size, as it grows, will push down remittance levels.

According to the estimators, there appears to be not enough evidence to statistically show a causal relationship between age, gender, number of children, presence of other remitters and household income, on the one hand, and remittances on the other. Further, the receipt of old age pension does not have any relationship with the amount of remittances one receives. Indeed, although only 6 percent of the sample receives old age pension from the state, this lack

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<sup>29</sup> While it would be ideal to fit the models on a sample comprising all potential remitters, the fact that remitters are not specifically attached to one household into which they may or may not send remittances makes the task challenging.

of evidence of the crowding out hypothesis between pensions and transfers is a surprising result.

In columns 3 and 4 of table 4.7, additional predictors pertaining to the sender are included. However, since only those who were enumerated as (non-resident) household members can be identified, the sample is trimmed to about 20 percent of the full sample of remittance receivers. As noted in the descriptive summary of section 4.8, many of those who send remittances are related to the receivers but are not members of the same household.

Table 4.7 : Determinants of remittance income [conditional on receiving remittances]

Dependent variable: natural log of remittances sent by remitter

VARIABLES	(1) OLS	(2) TOBIT	(3) OLS	(4) TOBIT
Age	-0.007 (0.010)	-0.013 (0.012)	0.004 (0.022)	-0.003 (0.027)
Male	-0.206 (0.220)	-0.177 (0.270)	-0.764 (0.589)	-0.880 (0.725)
Married	1.217*** (0.269)	1.426*** (0.329)	-0.235 (0.601)	-0.344 (0.734)
Children	0.025 (0.094)	0.064 (0.116)	0.143 (0.153)	0.202 (0.188)
Old age state pension	0.632 (0.499)	0.801 (0.614)	-0.231 (0.979)	-0.192 (1.214)
hh_size	-0.093** (0.037)	-0.108** (0.046)	-0.100 (0.074)	-0.111 (0.091)
hh_income	0.121 (0.099)	0.122 (0.121)	-0.172 (0.204)	-0.206 (0.248)
Health	-0.385*** (0.081)	-0.442*** (0.099)	-0.370** (0.169)	-0.414** (0.209)
Otherremitters	0.302 (0.237)	0.423 (0.289)	0.836 (0.577)	1.027 (0.708)
Rural	0.213 (0.201)	0.101 (0.247)	0.551 (0.465)	0.545 (0.572)
core_rel	0.969*** (0.206)	1.060*** (0.253)	1.186* (0.641)	1.472* (0.793)

genetic_rel	0.429** (0.214)	0.565** (0.263)	-0.815 (0.603)	-0.779 (0.740)
age_remitter			0.024 (0.102)	0.021 (0.125)
agesqrd_remitter			-0.000 (0.001)	-0.000 (0.001)
male_remitter			0.844* (0.456)	1.171** (0.560)
m_education2			0.523 (0.614)	0.663 (0.758)
m_education3			0.085 (0.590)	0.249 (0.729)
Constant	5.673*** (0.844)	5.573*** (1.035)	7.256*** (2.722)	7.056** (3.343)
Sigma				3.533*** (0.189)
Loglikelihood		-3037.15		-627.17
R-squared	0.082		0.217	
Pseudo R-squared		0.0143		0.0415
Observations	1,184	1,184	259	259

Notes:

1. \*\*\* (significant at 1%); \*\* (significant at 5%) ; \* (significant at 10%)
2. Standard errors are reported in parentheses
3. Design weights are used in all estimations.

The results provided in columns 3 and 4 may be understood as intra-household remittance determinants, conditional on remittances being sent/received. In these, relatedness of remitter and receiver is still significant, albeit weakly, but in the same direction of effect as in the first two columns. The health status variable is also significant and negative, again indicating that poorer health is associated with receiving lower remittances.

According to the results in table 4.7, there is not enough statistical evidence to show that the receivers' human capital characteristics (age, gender, education attainment) have any association with remittance income levels. Interestingly, neither the presence of other remitters

nor the fact that a receiver also receives old age pension does not statistically affect the level of remittances that they get.

The absence of a relationship between remittance level and the presence of other remitters could be interpreted using the model developed by Agarwal and Horowitz (2002). Under pure insurance (or other self-interest motives), the number of other migrants would not affect own-remittance. On the other hand, under altruism, average remittance level will be affected as remitters are concerned about the welfare of the non-migrating household members. This result could also corroborate the findings by Posel (2001) that there seems to be no income pooling in the household as various remitters do not behave any differently from single remitter .

If the health status of the receiver matters, and relates positively with remittances, this could suggest that remittances are not a form of insurance for the remittance recipient. The statistically significant result on relatedness is not surprising as it is consistent with previous work (Posel, 2001; Bowles and Posel, 2005).

Turning to the sub sample with more complete information, some characteristics remain statistically significant while other do not. Specifically, marital status and household size (on the part of the receiver) do not matter anymore for the level of remittances received. Instead, the receiver's health status and whether they consider themselves as nucleus family with the sender do matter. On the part of the sender, only gender seems to matter.

In a nutshell, a key result from this analysis is that there appears to be a strong linkage between the physical wellbeing of those who receive remittances and the amount that they receive. By extension, this could support the hypothesis that migration has elements of a co-insurance strategy among black South Africans. Further, gender matters for remittance levels, but only to the extent that the results suggest that men send more than their female counterparts. The gender of the person receiving the remittance is not statistically important.

#### **4.10 Conclusion**

The motivation for remittances has been a subject of much debate in the development literature. In this chapter, I examine the determinants of remittances by testing the risk-sharing motive. If remittances are motivated by insurance motives, the presence or absence of other remitters should not significantly affect per migrant remittance levels.

Employing data from the National Income Dynamics Survey, I find no evidence of remittances being affected by number of other migrants. In contrast, remittance levels seem to respond to the health status, which I use as a proxy for the state of the recipient.

This result is consistent with the findings of Posel (2001), who suggested that the appropriate level of analysis for remittance behaviour is that of the individual rather than the household.

However, an important *caveat* is that the regression results should only be understood as being conditional on the fact that the data sample included only those that responded positively to the question of whether they had received remittances or not. Ideally, as we saw in the literature, remittance behaviour is best deciphered from the full sample of potential remitters

and, in the present case, receivers of remittances. Further, the issue of self-selection on the part of migrants could have some bias on the regression results.

## 5 Conclusion

Recognising the important role that internal migration plays in the livelihoods of many poor people in developing countries, this thesis has attempted to empirically assess whether these economically induced movements of people can reduce income and wealth disparities between households in migrant sending communities. Broadly, the thesis is couched in the new economics of labour migration theory, which views labour migration as a diversification strategy which and therefore potentially beneficial to both migrants as well as for those who do not migrate but remain economically connected to the migrants. The South African context, with a focus on the black population offers an interesting case study.

### 5.1 Main findings

The thesis purposely makes contributions to the empirical literature on the interface between migration and remittances, on the one hand, and poverty and inequality on the other. Specifically, it has attempted to address the question of whether migration and remittances affect intra and inter household welfare as well as what factors drive remittances.

To assess the contribution of various household income sources to measures of poverty and inequality, I use decomposition techniques to unbundle the FGT Poverty index and Gini coefficient of inequality. Using South African income and expenditure data (IES), results show that remittances are relatively small in the aggregate income vector, but offer a non-negligible potential to poor households in mitigating both household poverty and inequality.

Although remittances form a significant portion of the incomes of those who receive, and hence could appear to make a dent on poverty, regression analysis in the third chapter does seem to suggest otherwise. That is, remittances do not necessarily reduce aggregate poverty. One possibility is that migration costs can be a serious barrier to some who would have wanted to migrate. Indeed, there is a suggestion that it is not always the poor that will migrate and find economic opportunities elsewhere. The literature on migrants' selection also seems to support the view that migrants will self-select on the basis of characteristics such as entrepreneurial ability. In turn, if the migrant is successful, remittances would accrue to people who are not living below the poverty line. Furthermore, migration cannot be a panacea to poverty issues. Indeed, the process of migration can be a gamble and many end up unsuccessful in their search for better life.

In attempting to further understand why migration may not always be a weapon against poverty, the thesis interrogates recent data on what determines remittances incomes. An effort is made to estimate a model that accounts for both sender and remitter attributes, as well as the motivational aspect. Following earlier literature on South African remittances, which suggest that the appropriate platform for the study of remittance determinants is not the household but the individual sender and receiver, chapter four purposely focuses on the individual characteristics of receivers and reported characteristics of sender to assess the insurance motive for remittances. There seems to be strong suggestion, going against the grain of coinsurance theory, that migration and remittance behaviour do not reflect a co-insurance strategy on the part of black South Africans. Instead, people who are better off in terms of their self-assessed health status seem to attract higher remittances. Further, the amount that people send as remittances does appear to depend on whether the receiver is male or female.

However, the gender of the remitter appears to matter to the extent that men send more than women. In a nutshell, the message of this thesis is that while remittances evidently contribute to reduction in poverty and equality, causal relationships between the two are more complex. It is therefore important to understand the specific drivers and purposes of remittances in order to appropriately link migration and the well-being of migrant linked households.

## **5.2 Directions for further research**

On the basis of the findings of this study, there are a number of prospects for future study. To begin with, the availability of household survey data with specific customisation for migration research would go a long way in contributing to innovative research. At present, specialised surveys and data sets are largely unavailable in South Africa and in most of the sub-Saharan Africa region. Importantly, such data would be useful in understanding the dynamic relationship between migration and household welfare, whose empirical research has hugely relied on cross-sectional data. Indeed, future research will make useful contributions by designing surveys and collecting data that uncovers such dynamics.

In the absence of panel data, the question of dynamic relationships between migration and household welfare could also be fruitfully pursued by using decomposition techniques that a series of cross-sectional survey data. Semi-parametric methods<sup>30</sup> could be used to build counterfactuals and hence compare scenarios were migration happened against what would have obtained if out-migration had not happened.

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<sup>30</sup> For example, the semi parametric methods of Dinardo, Fortin and Lemieux (1996)

One aspect of remittance transfers that could be delved into is the costs of transmitting money. There is scope in researching whether costs could be an impediment to regular remittances and how policy changes could alleviate such a challenge if it exists. Drawing on the experience of countries like Kenya, which leads in money transfer technologies and participation by low income population, it would be illuminating to follow migrants and understanding how these new innovations and technologies have affected their remittance behaviour. Indeed, in recent years, the developing world has experienced rapid innovation in the use of money transfer products, both within and, most recently, between countries. It would be interesting for the research agenda to include investigations of how and whether these innovations have impacted on remittance flows and how these transfers are used.

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**A3: Appendix to Chapter 3**

Table A3.1 Instrumental Variable Regression

Dependent variable: **expenditure**

	(1)	(2)	(3)	(4)	(5)	(6)
remittance	-0.825*** (0.046)	-0.824*** (0.046)	-0.811*** (0.046)	-0.689*** (0.046)	-0.692*** (0.045)	-0.679*** (0.046)
age	0.004 (0.003)	0.006* (0.003)	0.000 (0.003)	0.008*** (0.003)	0.009*** (0.003)	0.003 (0.003)
age_sqrd	-0.001 (0.003)	-0.003 (0.003)	-0.001 (0.003)	-0.004 (0.003)	-0.005* (0.003)	-0.003 (0.003)
female_head	-0.079*** (0.023)	-0.121*** (0.022)	-0.105*** (0.023)	-0.065*** (0.022)	-0.108*** (0.022)	-0.093*** (0.022)
married	0.195*** (0.020)	0.201*** (0.020)	0.198*** (0.020)	0.182*** (0.019)	0.191*** (0.019)	0.188*** (0.019)
educ_primary	0.272*** (0.025)			0.287*** (0.025)		
educ_secondary	0.380*** (0.030)			0.418*** (0.029)		
educ_postsec	0.927*** (0.039)			0.960*** (0.040)		
n_infants	-0.050*** (0.012)	-0.050*** (0.012)	-0.033*** (0.012)	-0.043*** (0.012)	-0.044*** (0.012)	-0.027** (0.012)
hhsiz	-0.148***	-0.151***	-0.174***	-0.147***	-0.151***	-0.173***

	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
adults_primaryedu	-0.109***	-0.111***	-0.112***	-0.099***	-0.103***	-0.106***
	(0.014)	(0.011)	(0.011)	(0.014)	(0.011)	(0.011)
adults_secondaryedu	0.031**	-0.085***	-0.059***	0.027**	-0.082***	-0.054***
	(0.013)	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)
educ_average		0.077***			0.077***	
		(0.003)			(0.003)	
educ_maximum			0.056***			0.055***
			(0.002)			(0.002)
Province dummies	no	no	no	yes	yes	yes
Constant	8.578***	8.355***	8.681***	8.535***	8.379***	8.699***
	(0.079)	(0.077)	(0.075)	(0.093)	(0.091)	(0.090)
Observations	9,822	9,813	9,813	9,822	9,813	9,813
R-squared	0.351	0.373	0.357	0.397	0.414	0.395

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Notes:

1. Standard errors in parentheses
2. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1
3. Variable definitions are provided in table 3.1

## A4: Appendix to Chapter 4

Table A4: Censored Least Absolute Deviation Estimation

<b>Dependent variable: remittance income</b>		
Age	-0.000 (0.003)	-0.012*** (0.000)
Male	-0.276*** (0.096)	-0.353*** (0.000)
Married	0.607*** (0.097)	-0.228*** (0.000)
Children	0.128*** (0.034)	0.249*** (0.000)
hh_size	-0.126*** (0.016)	-0.140*** (0.000)
hh_income	0.130*** (0.047)	0.205*** (0.000)
Health	-0.162*** (0.031)	-0.309*** (0.000)
Otherremitters	0.078 (0.103)	0.292*** (0.000)
Rural	0.524*** (0.080)	1.287*** (0.000)
core_rel	0.622*** (0.086)	0.094*** (0.000)
genetic_rel	-0.172** (0.086)	-1.041*** (0.000)
age_remitter		0.033*** (0.000)
agesqrd_remitter		0.000*** (0.000)
male_remitter		1.119*** (0.000)
m_education2		-0.126*** (0.000)
m_education3		0.392*** (0.000)
OAP	-0.697*** (0.168)	
Constant	6.676*** (0.372)	4.591*** (0.000)
Observations	1,152	314

1. \*\*\* (significant at 1%); \*\* (significant at 5%) ; \* (significant at 10%)
2. Standard errors are reported in parentheses
3. Design weights are used in all estimations.

