A MODEL OF GEOGRAPHICALLY STRETCHED HOUSEHOLDS APPLIED TO THE SECOND LARGEST CITY OF ZIMBABWE*

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Abstract

This article evaluates households with migrants who maintain close relations and economic ties with members left behind. Referring to these households as geographically stretched, this article first presents a model to generalise this phenomenon and then apply it to Bulawayo, the second largest city of Zimbabwe. This model extends the standard household model by including migrant altruism and remittances into the income constraint of the household at origin. The data used to test the implications of the model is drawn from a household survey conducted by the author in three high-density suburbs of Bulawayo between March and July 2014. Almost each household has a migrant who remits cash, goods, or both in Bulawayo. The analysis first implement logit regressions to determine the characteristics of migrants who remit either cash or goods and then employs data on cash remittances and the total income at household of origin to test if remittances are pooled with total income at household of origin. The first analysis shows that the probability of remitting goods is high the larger the household size, but low for cash remittances. The second analysis demonstrate that the pooling of migrant remittances and total income at the household of origin depends on the nature of expenditures and the migrant demographic characteristics, but largely support the model. The findings challenge the idea that a household is a separate and independent unit composed of co-residents and suggest that social policy that excludes migrant household from development assistance and social relief may be prejudiced.

Keywords: Geographically stretched household, altruist migrant; remittances, household income, income pooling

Jel-Classification: D13, D64, F24

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1 Introduction

Research studies suggest that coping strategies are varied and range from skipping meals on the one hand to migration on the other hand (Devereux 1999; Krishna 2003; Mosley and Suleiman 2006). When migration takes place, it is not all members of the household that migrate. Those that remain behind may receive remittances to cope with income shortages. Household models developed to date, as far as this research can find, do not factor in migrant remittances in the income constraint of the family left behind. Becker (1965) developed the original version of the household model, which had income emanating from marketed labour only. Singh et al (1986) extended this model by including profits from self-produced commodities into the household budget constraint. However, both models under-estimate the total income of migrant households at the level of the household of origin and do not provide an accurate reflection of the income constraint that has a component of migrants' cash remittances. A more accurate estimation is needed for geographically stretched households; that is, of migrant households where one or more migrants maintain close relations and economic ties with the remaining household members, and are using migration as a coping strategy to respond to economic shocks in their country of origin. This is particularly important in Zimbabwe given that over the past decade more than 3 million Zimbabweans have migrated to mainly South Africa and other parts of the world such as the United Kingdom (Centre for Development and Enterprise 2008).

This paper seeks to rectify weaknesses in the previous household models by designing and testing a model that captures remittances in the income constraint of migrant households stretched especially across South Africa and Zimbabwe. This approach encompasses both Becker and Singh et al's models to provide a more accurate description in economic models of migrant households. Ideally, altruism on the part of the migrant should exist if part of his or her income is to be remitted for the benefit of the family left behind (Stark and Lucas 1988; Sana and Massey 2005). Empirically testing if indeed the remittances are used to maximise utility at household of origin, and not for other reasons is important. This paper opts for the more stringent method of income pooling to perform this test. Income pooling treats household members as if they are one in terms of making household decisions and is referred to by Becker (1973 and 1974) as a unitary household setting.

The data to empirically test the implications and conditions emanating from the model are derived from a household survey conducted in 2014 in three urban areas of Bulawayo, Zimbabwe. Analysis of this data indicate that migrant households are poorer compared to non-migrant households. This result is relevant to the targeting of social protection policies in that social assistance, social relief and development assistance exclude migrant households from being eligible for social benefits (Ellis, Devereux and White 2009) and could lead to greater equity. Furthermore, the results indicate that female migrants' income is pooled for frequent consumptions expenditure but not for male migrants. However, for infrequent expenditures such as clothing and education, all migrants' income is pooled. This finding challenge the idea that households are clearly separate and independent units.

This paper is structured in the following fashion. Section 2 outlines the theoretical framework first by situating it from the existing literature, followed by the geographically stretched model description and its testable implications. Section 3 provides a brief statistical description of the data used and the estimation strategies while section 4 provides the econometric results. The paper concludes with some pointers for further research and for more equitable social protection policies to mitigate poverty and household stress.

2 Theoretical Framework

2.1 Literature[1]

Migration has received a lot of attention in development economics literature. The bulk of the literature has concentrated on why migration takes place (for example Todaro 1969 and Harris and Todaro 1970), what processes are involved in migration (Carrington et al 1996) and the shifts from theorising migration as a result from individual utility maximisation to collective utility maximisation (Stark and Levhari 1982). The latter strand of literature has led to the rise in the role of migrant remittances at the household of origin as observed from work by Rosenzweig and Stark (1989), Lucas and Stark (1985) and Stark (1991). This role has led to the recognition of the social and economic interdependence between the migrant and those left behind especially by sociologists as shown by the following:

> For example, one of the most striking expressions of transnationalism is the dispersion of both family and household members. Although spatially dispersed, such members maintain close relations that decisions and domestic activities are shared across borders almost on daily basis (Maphosa 2011, p. 12).

Sociologists often use the term 'transnational families' to define "families that live some or most of the time separated from each other, yet hold together and create …collective welfare and unity" (Goulbourne et al 2010, p. 3). This is possible because of globalisation and advances in technology as expressed by Goulbourne et al:

> Globalisation enables families to maintain links across national boundaries, across cultural divides, and across spatial distances. It is obvious that with mass migration across national boundaries, the transnational experience is becoming common and open to families almost everywhere. Advances in communication technology – particularly the mobile phone, the internet, inexpensive or affordable flights and digital cameras – have provided families with means for keeping in close touch across vast spaces (pp. 9).

These descriptions that suggest the interconnected or dependence of seemingly two independent family or household units are fundamentally at odds with conventional ways in which economists describe a household unit, where each unit is treated separately and independently.

[1] This section is not intended to be exhaustive of migration, household and income pooling literature, which is quite voluminous. Rather it provides a background framework and positions the model developed in the next section.

Fafchamps and Quisumbing (2008, p. 3189) define a household as a group of individuals living together. These individuals need not be related. As such Fafchamps and Quisumbing stress that the term "household" is a distinct term from the "family":

> Family … designates a group of individuals related by marriage and consanguinity. In general, households are composed of family members. But they can also include unrelated individuals (servants, visitors, fostered children). Families typically consist of multiple households forming a network of kith and kin, related by blood or marriage but not necessarily living together (p. 3189-3190).

Fafchamps and Quisumbing (p. 3192) go on to qualify that "co-residence is usually regarded as a necessary condition for a group of people to be regarded as a household". This description restricts the definition of a household to living under one roof. The definition by Grosh and Glewwee (2000) and Deaton (2000), where a household is understood to be a group of people sharing the same food budget or eating from the same pot allows for flexibility that could be in line with literature from sociology. Sharing a food budget can be done by people who are geographically separated in as much as it can be done under one roof.

Literature on how food budget and income is used within a household to maximise common welfare follows mainly two strands. One strand (led by Becker 1965; 1973; 1974) views 'a many person household' in unitary agreement in terms of decision making. Here, the main assumption is that income will not be used differently in a household if it were earned and provided for by a different person than the one currently earning, hence the term income pooling. This theoretical foundation is however too restrictive and as such it has been refuted by a number of empirical tests on income pooling. Consequently the second strand of literature challenges Becker's views and has seen an increase in a number of alternatives to the 'unitary model'. These include bargaining models (Manser and Brown 1980; McElroy and Horney 1981), non-cooperative models (Lundberg and Pollak 1983) and collective models (Chiappori 1992; Browning and Chiapporri 1998).

A number of studies that have empirically investigated income pooling within conventional households do this by testing whether the earner's gender affects consumption decisions (for example, Lundberg et al 1997; Phipps and Burton 1998; Lee 2007). This is done by running the regression equation for some dependent outcome such as consumption on female and male income and other control variables (see Thomas 1990; Hoddinott and Haddad 1995). The coefficients of female and male incomes are then compared to determine if they are different. If they are the same, income pooling holds and household decision making is considered unitary.

2.2 A Model of Geographically Stretched Households

The framework developed here seeks to model geographically stretched households. This is basically an extension of household models by Becker (1965) and Singh et al (1986) necessitated first by the need to capture remittances in the income constraint at the household of origin and second, to account for the synchronised decision making across spatially dispersed households insisted by sociologists. For analytical

purposes we shall distinguish two periods from the point of view of the household based on migration. The *ex-ante* migration period depicts the household before migration. Here, the model follows Singh et al with slight deviations. The *ex-post* migration period depicts the household after migration has taken place. Theoretically framing the budget constraint of the household left by the migrant is the main contribution of this model to existing theories.

The crucial assumption made is that the migrant remits to those left behind so that they overcome income shortages and cope in the face of economic stressors. This assumption is rational given the growing size of migrants and remittances, and evidence from empirical studies that support this view (see Bertoli and Marchetta 2014). Conventional household models are hard put to provide explanations for this and have, as a result, sustained an economic view of separate and independent households, which is also at odds with sociological views.

I now consider the following formulations of the model.

Household utility function[2]*:*

The household of origin *ex-ante* and *ex-post* migration has the following utility function:

$$U = u(\boldsymbol{c})$$

where $\boldsymbol{c}$ represents household consumption that emanates from

(i) commodities purchased from the market and I represent this in the model by C_d
(ii) commodity from self-production and I represent this by C_s
(iii) time spent living together as a household and I represent this by C_h

The foregoing breakdown of the household consumption into three components follows from Singh et al (1986). Typically in agricultural households, subsistence farming does provide households with food, in addition to that which is purchased from the markets. In poor urban areas, households also have entrepreneurial activities in their backyards that result in self-produced commodities (Mudimu 1996). As such, it is logical to include consumption of self-produced commodities in the utility function of poor urban households in developing countries. The slight deviation made on Singh et al's model at this stage is replacing leisure with time spent together by household members. The main reason for doing this is that time spent together has some value in the migration context and is preferred to living apart.

[2] The standard bases for analysis of households in development economics is to start with the utility function. The utility represents household's preferences over a commodity bundle. In much of the analysis of utility, preferences of households are assumed to be rational. Questions can be raised on whether assuming households in developing countries are rational. If they are not, then utility maximisation could be an unfitting model. The utility function is unusual in the sense that the value it takes is unimportant; all that matters is the utility value of a bundle of commodities consumed by the household relative to the utility value of another bundle. Developing utility functions as a way to represent preferences of households is very useful for analytical purposes because mathematical programming techniques can then be used to solve the household optimisation problem. The actual purchases of commodities for household consumption are captured in the cash income constraint (where purchases of goods by the household are not expected to be more than income received).

The household utility function can therefore be formally represented as:

$$U = u(C_d, C_s, C_h) \quad (1)$$

where the following restrictions apply, $u' > 0,\ \ u'' < 0$.[3]

This household utility is maximised subject to three constraints explained below.

Cash Income Constraint:

$$p_d C_d \leq\ p_s(Q_s - C_s) + p_h H - p_l L -\ p_v V$$

where,

p_d	is the price of the bundle of commodities purchased from the market,
$p_d C_d$	is the expenditure on the market-purchased bundle of commodities,
p_s	is the price of the self-produced commodity,
Q_s	is the quantity of the self-produced commodity,
$Q_s - C_s$	is the surplus of the self-produced good supplied to the market,
$p_s(Q_s - C_s)$	is the revenue received from the marketed self-produced commodity,
p_h	is the market wage,
H	is the household labour hours supplied to conventional labour markets,
$p_h H$	is the total wage received from household labour supplied in the market,
p_l	is the wage paid to hired labour in self-produced commodity,
L	is the hired labour hours in self-produced commodity,
$p_l L$	is the total wage paid to hired labour in self-produced commodity,
p_v	is the price of the variable inputs,
V	is the variable input needed in the self-produced commodity,
$p_v V$	is the cost of the variable input,

In the version of Singh et al, the wages for labour supplied in conventional markets (H) and for self-production (L) are assumed to be equal. Here, the two wages are differentiated since they are hardly equal in practice.[4] The complication that arises from doing this is that it becomes difficult to mathematically show that L can emanate from the household, or from hired labour, or both. The assumption made by including a negative sign before $p_l L$ is that L hired from outside the household, hence it reduces

[3] The restrictions are provided to restrict the utility function to increasing at a decreasing rate due to decline in marginal utility until it reaches a maximum, and thereafter it decreases when marginal utility is negative.

[4] However, using differentiated wages for labour supplied in markets and supplied in self-produced activities does not alter the implications of the model.

income available. The wage would not be treated as an expense if paid to labour within the households, but rather a benefit reflected in $p_s(Q_s - C_s)$.

Production Constraint:

$$Q_s = Q(K, L, V)$$

where,

K is the fixed stock of capital required in self-produced commodity.

The capital K required for most backyard production is small, and in most cases it is the land required to operate on. Most of the labour L committed to household production would be absorbed in the conventional markets if the formal sector is viable. This is because the market wage p_h is greater than wage from self-produced commodity p_l. Unfortunately the formal sector is not viable and unemployment is high in many developing countries, especially those economies that are struggling economically such as Zimbabwe.

Time Constraint:

$$C_h + H = T$$

where,

T is the total stock of household time.

The time T available to the household is split between members spending time together C_h and supplying labour to the market. Members employed in the household's self-production activities fit in C_h as they will work from home while deriving benefits of spending time with other members.

Household Single Income Constraint:

The three constraints yield the following single constraint:

$$p_d C_d + p_s C_s + p_h C_h = p_h T + p_s Q(K, L, V) - p_l L - p_v V$$

where:

$p_s C_s$ is the household's purchase of its own output,

$p_h C_h$ is the purchase of quality time spent living together as a household in the form of opportunity cost of supplying labour in the conventional markets.

The single cash income constraint came be shortened as:

$$\sum_{i=d,s,h} p_i C_i = p_h T + \pi \quad (2)$$

where $\pi = p_s Q(K, L, V) - p_l L - p_v V$ and is a measure of profits from self-produced commodity.

In equation (2), the left hand side shows the total expenditure of the household and right hand side shows the full income of the household and is now expressed as

$$p_h T + \pi = Y_h \quad (3)$$

The original version of this single constraint without the profits from self-produced commodity was developed by Becker (1965). The addition of profits from self-produced commodity was done by Singh et al (1986).

Geographically Stretched Household Income Constraint:

If at least one household member migrants and remits cash to those left behind, then the income constraint at origin is expected to be:

$$(1-\delta)\sum_{i=d,s,h} p_i C_i = p_h T(1-m) + p_s Q(K,L,V) - p_l L - p_v V + \gamma p_m m T \quad (4)$$

where:

δ	is the proportion of expenditure accountable to the migrant,
$1-\delta$	captures the reduction in the total household expenditure on the three consumption items C_d, C_s and C_h after migration has taken place,
p_m	is the price of the labour hours supplied in foreign (or distant) labour market by the migrant,
m	is the proportion of household labour in migration,
$1-m$	captures the reduction in total stock of household time after migration has taken place,
γ	is the altruistic parameter of the migrant and has the restriction of $0 \leq \gamma < 1$,[5]
mT	is the number of labour hours supplied in foreign labour market by the migrant,
$\gamma m T p_m$	represent the remittance into the household of origin.

The extension of the standard household model provided in equation (4) accounts for changes that occur to the standard household model when migration takes place. It does this by incorporating the reduction in both expenditures and household time that happen when migration takes place and the resulting remittances from the migrant to the household of origin. The altruistic parameter γ is the theoretical ingredient that retains the inter-connection of the migrant and those left behind. Therefore *ex post* migration, the household is either geographically stretched, $0 < \gamma < 1$ (migrant maintains socio-economic ties through remittances); or cut ties, $\gamma = 0$ (migrant does not remit).

There is a practical possibility that some migrants may not be earning income in destination labour markets, leading to failure to remit. This seemingly confounds failure to remit due to γ being zero. But this need not to be so if households are assumed to

[5] This restriction is provided to account for the fact that the migrant remits part of his or her wage in the foreign country or remits nothing at all.

be rational. Accordingly, the household rational decision in favour of migration is given by

$$\gamma p_m mT + \delta \sum_{i=d,s,h} p_i C_i > m(p_h T + \pi)$$

which means that as long as migration is used as a coping strategy for the household and not the individual, relocation of at least one member will only take place if the contributions of the migrant are sufficiently higher compared to *ex ante* migration. Given this rationality, failure to remit is theoretically attributable only to the lack of altruism, on the part of the migrant. Indeed, reasons for remitting in extant literature demonstrate that if $\gamma = 0$, then remittances would not take place (see for instance Johnson and Whitelaw 1974; Hoddinott 1994; Woodruff and Zenteno 2007; Naiditch and Vranceanu 2011).

The Lagrange associated with the constrained maximisation problem of the geographically stretched household is:

$$Z = U(\boldsymbol{c}) + \boldsymbol{\lambda}[p_h T(1-m) + p_s Q(K,L,V) - p_l L - p_v V + \gamma p_m mT - (1-\delta)\sum_{i=d,s,h} p_i C_i]$$

The solution of the Lagrange consists of the following first-order conditions:

$$U_i' = (1-\delta)\boldsymbol{\lambda} p_i, \qquad i = \{d,s,h\}, \tag{5a}$$

$$p_j Q_j' = p_j, \qquad i = \{l,v\} \tag{5b}$$

$$(1-\delta)\sum_{i=d,s,h} p_i C_i = p_h T(1-m) + p_s Q(K,L,V) - p_l L - p_v V + \gamma p_m mT \tag{5c}$$

Equations (5a) and (5b) are consistent with the economic theories of the consumer and producer respectively. For instance, the consumer theory stipulates that the ratio of the marginal utilities of different goods should equal their price ratios. This is the case with equations (5a).[6] The producer theory stipulates that the standard maximisation for conventional firms equates marginal revenue product of inputs to their price. This is also the case with equations (5b). Equation (5c) provides maximised full income of the geographically stretched household (the right hand side of equation (5c)) and is now expressed as:

$$p_h T(1-m) + p_s Q(K,L,V) - p_l L - p_v V + \gamma p_m mT = Y_{gsh} \tag{6}$$

2.3 Testable Implications of the Model

The intuitive implication of either equation (5c) or equation (6) is that households at origin have higher income *ex-post* migration and can therefore cope better compared to similar households without migrants. This implication is consistent with social policy that excludes migrant households from development assistance and social relief (Ellis,

[6] That is $\frac{U'_{C_d}}{U'_{C_s}} = \frac{p_d}{p_s}$

Devereux and White 2009). However, the model stipulates conditions that, if overlooked, could render this implication and consequently social policy detrimental. These conditions are twofold. One, migrants must be motivated by altruism[7] to remit. Two, the presence of remittances at the household of origin must be used to maximise the welfare of household members at origin. Otherwise these remittances would not be incorporated in the income constraints of those left behind.

Equation (5c) can also be used to derive the optimal number of migrants that maximises income at origin

$$m = \frac{(1-\delta)\sum_{i=d,s,h} p_i C_i - p_h T - \pi}{\gamma T p_m - p_h T} \quad (7)$$

with $\gamma T p_m - p_h T \neq 0$ as a condition necessary for equation (7) to hold.

Note that as both the local wages p_h and marketed-surplus profits increase, the rate of migration will decrease and may reverse out-migration (negative m). Interventions in local labour markets and development assistance directed at improving self-production activities may reduce the number of migrants.

3 Methods and Estimation Strategy

3.1 Data and Descriptive Statistics

The data for this paper is drawn from a household survey conducted by the author in Bulawayo, the second largest city in Zimbabwe, between March and July 2014.[8] The survey covered 300 households from three poor high-density suburbs – Matshobana, Sizinda and Sokusile; although only 298 are usable. The city of Bulawayo has rapidly de-industrialised since the 1990's and as a result migration is not uncommon (Paton 1995). Table 1 below shows that there is an average of at least one migrant per household in Bulawayo. While this is good for proving the potentiality of geographical stretches in each and every household, it introduces bias in econometric work since each observation in the sample will not be independent of all other observations. I correct this using a robust standard error estimation strategy (White, 1980).

The model developed has income from self-produced commodities as part of the household total income. The survey was designed to collect this data. There is at least one in every 15 households with self-produced commodities. Disaggregating the data per suburb shows that households with more migrants seem to have less entrepreneurial activities in their backyards (see table 1). Sokusile, for example, has less migrants but more self-produced commodities compared to other suburbs.

As also seen on table 1, each household has a substantial number of extended family members. These include parents of the head of household (hereafter referred to as the head) or spouse, siblings of the head or spouse, and grandchildren of the head or

[7] Even though the migrants may have elements of self-interest, they are assumed to respond to the plight of other household members.

[8] A thorough description of the survey was provided as a separate paper for the PhD under the heading 'Household Survey Design and Data'.

spouse. The nucleus family is taken as the family made up of the head, spouse and their children. Any other person in the household is grouped under the other category.

Table 1: Structure of the sample

	LOCATION			
	Matshobana	**Sizinda**	**Sokusile**	**Total**
Households	98	100	100	298
Migrants	233	192	120	545
Households with self-production	11	15	24	50
Relation to head: Nucleus family	427	339	375	1141
Relation to head: Extended family	245	167	134	546
Relation to head: Other	18	23	52	93

The attention in the data collected through this survey was focused both on household and individual migrant characteristics. In table 2, the household descriptive statistics are split into migrant and non-migrant households. The average daily income per capital for the migrant and non-migrant households in the sample is US$1.56 and US2.07 respectively. For migrant households, the monthly wage is basically insufficient to cover monthly sustenance consumption expenditures, which compose of items such as food, electricity, water and telephone bills and cleaning materials. In direct comparison, non-migrant households are able to cover their consumption expenditures from their monthly wage. They also have a higher return from entrepreneurial income compared to migrant households. In essence, they are able to save or direct all their entrepreneurial income and the surplus from wages to other uses. This buffer could be a reason why these households do not have migrants.

Table 2: Household Descriptive Statistics

	Migrant household	**Non-migrant household**
Household size (excluding migrated members)	5.18	4.83
Household Age	30	42.6
	(18.53)	(14.63)
Monthly wage	$189.27	$300.55
	($222.32)	($319.39)
Daily income per capita	$1.56	$2.07
Monthly consumption	$250.43	$250
	($52.44)	($91.50)
Entrepreneurial income	$111.90	$113.16
	($91.39)	($96.05)

Note: these are averages, s.d. are in parenthesis

The detailed data needed for migrant characteristics was drawn from household members at origin as shown in table 3. There are more females in migration compared to males, and half of the migrants have a child in the household of origin. There are different destinations for migrants, but South Africa is the most common destination. It absorbs over half of all migrants reported in the survey. These are the migrants that

usually send both cash and non-cash remittances through informal couriers known as *Omalayisha,* which is a common means of transport between South Africa and Zimbabwe. They do not only transport commodities but they also transport illegal migrants (see Maphosa 2012).

Slightly more than 50 per cent of migrants do not remit. This statistic challenges both the theory developed in the previous session and the social policy that assume that migrant households receive remittances and are therefore better off. If migrant households do not receive remittances, it could be that they become worse off than they were *ex-ante* migration. On the contrary though is the almost 50 per cent of those who are remitting. These remitting migrants could support the model and social policy if it can be confirmed that the money sent to those left behind is used for their benefit.

Table 3: Migrant Descriptive Statistics

Send remittances (cash &/or non-cash)		46.5%
Send cash remittances only		40.5%
Send non-cash remittances only		10.5%
Monthly cash remittances		$127.93 ($278.86)
Monthly non-cash remittances		$93.22 ($184.22)
Gender (male/female)		0.807
Child in migrant-sending household (yes/no)		0.504
Education level:	Did not complete secondary	17.26%
	Completed secondary	62.70%
	Completed college/university	20.04%
Type of job:	General	36.75%
	Skilled with accredited certificate	33.33%
	Other	29.91%
Destination of migrants:	Elsewhere in Zimbabwe	39.75%
	South Africa	53.83%
	Other neighbouring countries	3.92%
	West	2.49%

Note: these are averages, s.d. are in parenthesis

3.2 Estimation Issues

I examine two separate conditions necessary for improvements in income on those left behind emanating from the model. The first condition is that the migrant is altruistic enough to remit, that is $0 < \gamma < 1$. The sample has 254 remitting migrants. Examining the characteristics of migrants who remit (or do not remit) is the first objective of the empirical application of the model. The second condition is that remittances should be used to help the household at origin and is the second objective here.

Estimating the Characteristics of Remitting Migrants

The household questionnaire had the questions: one, did the migrant send money in the past year; two, did the migrant send non-cash remittances? The answers to these questions were coded ‘1’ if the migrant sent remittances and ‘0” if they did not. Because of the binary response nature embedded within these questions, a logistic

regression is used to estimate the characteristics of migrants who remit, which is expressed as follows:

$$p(send = 1|migrant\ characteristics) = G(z) = \exp(z)\ /[1 + \exp(z)] \qquad (7)$$

which is between zero and one for all real numbers. In this equation, G is the cumulative distribution function for a standard logistic random variable (Woodridge 2002). The migrant characteristics include gender, relations to household head, place of residence[9], type of job and education level of migrant, and migrant having a child (or not) in the household of origin. Household and suburb-level variables are controlled for.

Estimating the use of remittances at the household of origin

This study uses this stringent requirement of income pooling to test if remittances $\gamma p_m mT$ in equation (5c) are used in the same way (or provide same preferences) as the rest of the income from members in the household of origin is used. If they are, this will be interpreted to mean that remittances are used to maximise the welfare at origin and it could be insinuated that decisions are shared and therefore there is interdependence between seemingly two or more households.

Equations (3) and (6) provide the full income of the household before migration and after. Basing on these equations, changes in income $\Delta Y = Y_{gsh} - Y_h$ as a result of migration must not lead to changes in maximised household utility or preferences if income pooling holds.

Incomes from the household of origin and the migrant in equation (6) can be shortened as:

$$p_h T(1 - m) + p_s Q(K, L, V) - p_l L - p_v V = Y_h, \text{ and}$$

$$\gamma p_m mT = Y_m$$

Therefore equation (6) can be rewritten as

$$Y_h + Y_m = Y_{gsh} \qquad (8)$$

The income from the migrant in equation (8) can further be scrutinised based on the characteristics of the migrant as:

$$Y_h + Y_m^i = Y_{gsh} \qquad (9)$$

$i \in migrant\ member$
$= male, female, has\ child\ or\ does\ not\ have\ a\ child\ in\ the\ household\ of\ origin$

This scrutiny can determine the characteristics of migrants who pool income with the household of origin to maximise utility. But utility is abstract and not easily observable. The observable variables that may provide an estimate of household utility in our

[9] Place of residence is a proxy to distance, which can be influential in determining the frequency of visits of the migrant to the household of origin.

survey are household sustenance consumption, sc, clothing, cl, and education, ed, expenditures. The empirically testable estimation procedure for income pooling becomes

$$\frac{\partial E_z}{\partial Y_m^i} = \frac{\partial E_z}{\partial Y_h}; \quad z = sc, cl, ed \tag{10}$$

Equation (10) postulates that if income pooling holds, the partial derivative of household expenditures, z, with respect to migrant income should be the same as that of the household income. Basically, this is the income pooling hypothesis.

The econometric model consistent with this estimation is specified as follows:

$$H_{zh} = \alpha_{0,zh} + \rho_{1,zh} Y_m^i + \rho_{2,zh} Y_h + \rho_{3,zh} \boldsymbol{D}_h + \boldsymbol{\varepsilon_{ih}} \tag{11}$$

where z indexes the expenditure categories being examined in household h. As such equation (11) estimates regression equations for food consumption, clothing and education expenses. The sustenance consumption expenditure category is at a monthly level while clothing and education expenditure categories are at yearly levels. The coefficients on Y_m^i and Y_h are the marginal propensities to spend on sustenance consumption, clothing and education in the household of origin, and represent the partial derivatives necessary for our empirical technique (equation 9) to be tested. The F Test is used to test the equality of the coefficients of income inflow from migrants and income inflow from the household of origin in making an informed judgement on equation (9). The variable $\boldsymbol{D}$ controls for relevant household and suburb level factors.

4 Results

4.1 Characteristics of Remitting Migrants

Table 4 presents the logit results of equation (7). Columns (1) and (2) estimates if migrants remit cash and remit non-cash respectively. Before moving to the discussion of the type of migrants who remit, several general observations need to be discussed. First, the logit performs quite well in predicting who remits in that most signs of the estimated parameters are consistent with common sense and the altruistic parameter in the model. Second, estimating equation (7) using a probit regression generated comparable results. Third, the chi-squared statistic is significant at the level of one per cent, meaning that we strongly reject the null hypothesis that all of the regression coefficients are simultaneously equal to zero.

With an increase in the household size, the probability of remitting goods increases but declines for cash remittances. An increase of 10 per cent in the household size increases the rate of remitting goods by a percentage point. This finding is logical since a huge household creates more demand for food. Maphosa (2012) provides evidence of how common it is to find *Omalayisha* transporting goods from South Africa to Zimbabwe. Indications from his study are that goods from South Africa are relatively cheaper compared to Zimbabwe. It therefore makes economic sense for migrants with big families to remit food instead of cash.

Table 4: Logit Estimates on the Characteristics of Migrants who Remit

VARIABLES	(1) Remit cash = 1	(2) Remit goods = 1
Household size	-0.0245	0.0955**
	(0.0391)	(0.0416)
Total Income at Household of origin	0.0000639	0.000316
	(0.000504)	(0.000489)
Migrant age	0.244***	0.0497
	(0.0678)	(0.0668)
Migrant age squared	-0.00319***	-0.000480
	(0.000850)	(0.000802)
Relation to head: Nucleus family	-0.600	0.231
	(0.651)	(0.665)
Relation to head: Extended family	-1.164*	-0.136
	(0.660)	(0.718)
Relation to head: Other	-0.471	1.312
	(0.965)	(0.984)
Male (= 1)	-0.227	0.185
	(0.267)	(0.304)
Residence of migrant: South Africa	0.849**	0.673
	(0.332)	(0.427)
Residence of migrant: Other neighbouring countries	1.141*	1.141
	(0.626)	(0.715)
Residence of migrant: West	1.583	-0.860
	(1.051)	(0.988)
Education: Completed Secondary	0.564	1.609***
	(0.423)	(0.593)
Education: Completed College/University	1.799***	2.122***
	(0.526)	(0.675)
Type of job: Skilled with accredited certificate	0.202	0.367
	(0.332)	(0.369)
Type of job: Other	-0.796**	0.0809
	(0.361)	(0.480)
Has a child in household of origin (= 1)	1.529***	1.218***
	(0.275)	(0.323)
Neighbourhood: Sokusile	0.478	1.553***
	(0.356)	(0.391)
Neighbourhood: Sizinda	-0.0453	-0.0351
	(0.293)	(0.397)
Constant	-4.933***	-6.614***
	(1.482)	(1.665)
Observations	431	380

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The age of the migrant is here used as a proxy for maturity and work experience. Altruism may be expected to be high for mature migrants. Earning potential is expected to be high for migrants with work experience. Age squared is included as a variable to capture demographic changes that occur in the nucleus family as the migrant becomes old. With time, the migrant may develop new relations in their place

of residents that may temper with their original altruistic nature when migration had just taken place. This consideration is strongly reflected by the results. The ‘age squared’ variable is negative for both cash remittances and food remittances, although only highly significant for the former. Age is positive and highly significant in increasing the probability to remit cash.

Education and the type of employment also act as a proxy to the earning potential of the migrant. In the logit regression, migrants who did not complete secondary education and below are used as a base category for analysing the education variable. Those who completed both secondary and college or university are highly likely to remit both cash and goods compared to the base category. In relation to the type of job variable, general jobs that do not require any certified skill were used as the base category. Migrants in jobs that require certified skills are likely to remit more than the base category, although this is not significant. Migrants in the other category are highly less likely to remit cash compared to migrants in general jobs. The other category included such type of jobs that have an element of ‘on the job training’, which may not have a certificate but requires a demonstration of knowledge in the field.

The theory of altruistic migrants (Agarwal and Horowitz 2002) argue that migrants act to maximise utility of those remaining behind. The relations within household members may determine the level of altruism amongst them. For instance, parents are unselfish towards their children. Relations to the household head are thus considered in the regressions. The base category is the head and relations are mainly classified into nucleus and extended family. All relatives are less likely to remit compared to the head of household. This is significant for extended family members. The other relation of particular interest is whether a migrant has a child in the household of origin. A dummy variable that equals one if the migrant has at least one child and zero otherwise has been included to capture this relation. Its estimated coefficient is positive and significant at one per cent. A similar finding is reported by Goulbourne at al (2010) through a qualitative approach.

The destination and residence of the migrant also matters. In the theoretical model, it was postulated that living apart is costly to household members. Migrants who are able to visit those remaining behind are expected to be more altruistic and could synchronise decision making with the household of origin better than migrants who cannot. Therefore the destination and place of residence of the migrant has been entered as a regressor. Migrants within Zimbabwe are used as the base category. South Africa has the highest number of Zimbabwean migrants in our sample. As such, it has its own category and in a way the households stretched between South Africa and Zimbabwe are especially relevant both for the model and the empirical application. Neighbouring countries are bunched together and then all countries in the West are also categorised together. All migrants outside the country are more likely to remit compared to internal migrants. Migrants in South Africa have a particularly strong effect. These migrants do visit Zimbabwe frequently as well (Paton 1995) and this probably explains this result.

The final set of regressors are the suburb level factors. Given that this study was conducted in three different suburbs of Bulawayo, one would expect the customs

within these suburbs to influence the behaviour of both migrants and those left behind. Indeed the logistic results indicate this to be the case. Migrants from Sokusile are more likely to remit goods compared to migrants from Matshobana and this is highly significant.

4.2 Income Pooling

The results and discussion now turns to searching for evidence on income pooling between migrants and those left behind. The theoretical model assumes that the presence of remittances in the income constraint at the household improves their wellbeing. But is this the case? Are there no migrants that remit for personal uses, and not necessary to maximise utility at household of origin?

These questions are answered by testing for income pooling. Tables 5 and 6 provide the regression results of equation (11), which is the equation used to estimate if income is pooled. The control variables used are exactly the same as those used in table 4. The only difference is that gender and having a child is not controlled for as they are of particular interest. Table 5 specifically provide results where sustenance consumption is the dependent variable. Sustenance expenditure in our data contains information on detailed grocery items that the household spends cash on. These include huge-food items such maize-meal, bread, sugar, meat and vegetables, minute-food items such as salt and eggs, and non-food items such as cleaning materials and telephone bills.

In column (1) of table 5, remittances from all migrants are tracked and their coefficient is compared to the coefficient of total household income. The equality of the coefficients means that there is failure to reject the hypothesis, income is pooled, stretched household decision making is consistent with the unitary model and migration can be taken as an effective strategy used to overcome income shortages at the household of origin. The discussion of independent variables in the regressions are ignored as they are not of particular interest.

The F test results reject the income pooling hypothesis for sustenance consumption for all migrants. At this aggregated level, remittances have differing preferences from that of members left behind with regard to sustenance consumption expenditures. Columns (2) to (7) provide a disaggregated analysis. The first two of these columns deal with migrants without children in the household of origin and each takes a different gender. For both males and females without children, income pooling is rejected. Assessing migrants with children left behind gives a different result for females but not for males (see F-test results on columns (4) and (5)). On these type of migrants, there is failure to reject the income pooling hypothesis. The last two columns base on gender of the migrants. Again there is failure to reject income pooling on sustenance consumption for females but not for males.

Table 5: Testing for Income Pooling using Sustenance Consumption Expenditure

VARIABLES	(1) All Migrants	Migrant without Children (2) Male	Migrant without Children (3) Female	Migrant with Children (4) Male	Migrant with Children (5) Female	Gendered (6) Male	Gendered (7) Female
Total Income at Household of origin	0.0918***	0.0123	0.124**	0.213***	0.0906*	0.0870*	0.0942***
	(0.0275)	(0.0594)	(0.0525)	(0.0606)	(0.0512)	(0.0465)	(0.0323)
Remittances	0.0196	0.266***	-0.239	-0.00345	0.102*	-0.0102	0.0642
	(0.0310)	(0.0814)	(0.184)	(0.0317)	(0.0565)	(0.0216)	(0.0646)
Household size	4.295**	10.81***	4.027	1.648	6.018	5.647**	4.309
	(2.042)	(3.931)	(3.299)	(5.302)	(4.375)	(2.766)	(2.928)
Migrant age	-0.287	9.165	5.092	-5.577	-2.385	-1.783	-2.227
	(3.558)	(6.245)	(9.290)	(6.915)	(9.103)	(4.754)	(6.266)
Migrant age squared	0.0140	-0.116	-0.0510	0.0682	0.0475	0.0172	0.0482
	(0.0469)	(0.0765)	(0.132)	(0.0810)	(0.121)	(0.0558)	(0.0886)
Relation to head: Nucleus family	13.47	-30.19	13.16	-5.276	13.44	-13.39	30.59
	(20.98)	(27.53)	(42.33)	(32.48)	(43.79)	(32.54)	(26.07)
Relation to head: Extended family	-3.060	-	-21.68	-21.43	-29.25	-18.46	9.385
	(19.73)	-	(53.34)	(29.89)	(43.97)	(31.06)	(36.43)
Relation to head: Other	-126.4***	-55.25	-	-	-120.0*	-128.4***	-119.0**
	(35.48)	(53.52)	-	-	(63.78)	(44.93)	(48.85)
Residence of migrant: South Africa	-32.39**	17.45	-55.80*	-3.421	-47.03***	-3.126	-55.77***
	(13.61)	(19.51)	(27.93)	(26.90)	(17.15)	(18.34)	(16.68)
Residence of migrant: Other neighbouring countries	1.999	76.76**	-118.0***	6.526	135.9	19.85	-22.74
	(38.70)	(31.85)	(37.46)	(30.23)	(183.0)	(24.02)	(84.88)
Residence of migrant: West	76.26**	-	71.94	186.5***	-	230.5***	41.95
	(33.34)	-	(51.03)	(46.15)	-	(34.95)	(32.17)
Education: Completed Secondary	64.10***	-19.92	60.97	101.1***	39.94	71.66***	50.22***
	(11.95)	(43.19)	(43.10)	(27.73)	(24.63)	(22.43)	(17.19)
Education: Completed College/University	70.19***	-51.33	96.09**	96.42***	98.41**	57.19*	81.06***
	(18.98)	(46.13)	(41.11)	(32.53)	(44.67)	(29.15)	(30.12)
Type of job: Skilled with accredited certificate	-42.97**	19.61	-68.36	-85.34***	-69.96*	-29.33	-68.46**
	(18.46)	(32.04)	(54.69)	(30.04)	(39.89)	(20.11)	(34.24)
Type of job: Other	2.226	13.90	22.70	-75.22**	23.34	1.671	-5.843
	(19.09)	(30.90)	(35.52)	(31.79)	(43.17)	(24.88)	(29.91)
Neighbourhood: Sokusile	-67.76***	7.220	-79.09***	-43.95	-102.6***	-57.48***	-79.24***
	(11.12)	(27.05)	(23.76)	(26.85)	(20.54)	(16.27)	(15.40)
Neighbourhood: Sizinda	-18.64	-43.62	14.45	-19.55	-43.55	-43.40*	-14.02
	(17.16)	(28.47)	(36.17)	(27.67)	(35.08)	(24.11)	(23.86)
Constant	120.0	-77.82	41.54	237.8	171.2	155.8	155.0
	(72.69)	(124.1)	(184.2)	(147.7)	(150.1)	(109.7)	(108.2)
Observations	224	49	69	42	64	91	131
R-squared	0.336	0.555	0.481	0.721	0.491	0.448	0.372
Test of income pooling	F(1, 206) = 3.01 Prob > F = 0.0845*	F(1, 33) = 5.07 Prob > F = 0.0311**	F(1, 52) = 3.54 Prob > F = 0.0655*	F(1, 25) = 14.4 Prob > F = 0.0006***	F(1, 47) = 0.03 Prob > F = 0.8740	F(1, 73) = 3.74 Prob > F = 0.0571*	F(1, 113) = 0.16 Prob > F = 0.6893

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

These results are not surprising. For example, income pooling is easily rejected for food consumption because there is likely to be huge variation of preferences between members of the same household. Hoddinott and Haddad (1995) attributes the small and frequent purchases as the major reason for rejecting income pooling for sustenance consumption. However results presented here seem to suggest that female migrants, especially those with children, are able to synchronise decision making for food consumption. This is an argument also suggested by Duflo (2003) where females in South Africa were found to be better at providing consumption welfare to (grand)-children than males.

Table 6: Testing for Income Pooling using Clothing Expenditure

VARIABLES	All Migrants	Migrant without Children		Migrant with Children		Gendered	
		Male	Female	Male	Female	Male	Female
Total Income at Household of origin	0.0343	0.159	0.168*	-0.401	0.0482	-0.0419	0.0911*
	(0.0532)	(0.108)	(0.0898)	(0.355)	(0.0724)	(0.158)	(0.0497)
Remittances	0.0383	0.138	-0.141	-0.0522	0.223**	0.0282	0.0828
	(0.107)	(0.192)	(0.238)	(0.228)	(0.110)	(0.188)	(0.0829)
Household size	9.539**	16.28**	12.41**	3.333	4.921	14.64	6.601*
	(3.741)	(7.393)	(5.458)	(24.37)	(7.227)	(10.46)	(3.966)
Migrant age	-13.45*	-10.03	-12.34	-85.96*	-22.35	-34.52**	-14.02
	(7.924)	(9.363)	(11.30)	(42.12)	(15.67)	(16.92)	(10.21)
Migrant age squared	0.118	0.139	0.156	0.812*	0.248	0.300*	0.156
	(0.104)	(0.108)	(0.140)	(0.449)	(0.187)	(0.179)	(0.128)
Relation to head: Nucleus family	-218.9	4.037	-67.28	-248.1	-0.0717	-409.3	15.51
	(153.4)	(41.24)	(63.41)	(305.8)	(71.58)	(276.5)	(26.68)
Relation to head: Extended family	-203.4	-	-25.45	-256.1	7.257	-396.3	32.17
	(142.3)	-	(78.82)	(280.5)	(78.38)	(241.9)	(42.59)
Relation to head: Other	-337.5**	-6.073	-	-	-157.7	-630.8**	-146.9***
	(140.5)	(42.64)	-	-	(98.28)	(278.0)	(49.21)
Residence of migrant: South Africa	19.97	37.18	-34.39	130.5	66.86*	-13.71	12.53
	(23.11)	(33.38)	(37.53)	(252.6)	(38.12)	(53.46)	(25.98)
Residence of migrant: Other neighbouring countries	54.67	-16.17	-34.39	-75.63	204.5*	-33.14	42.27
	(45.80)	(61.29)	(38.16)	(268.5)	(111.0)	(116.1)	(59.33)
Residence of migrant: West	12.45	0	-19.15	127.6	-	98.51	12.05
	(34.11)	(0)	(58.85)	(326.8)	-	(97.94)	(40.04)
Education: Completed Secondary	113.9***	11.70	-56.46	163.8	128.0*	177.0*	72.11*
	(43.42)	(28.71)	(55.64)	(179.1)	(70.86)	(92.87)	(40.68)
Education: Completed College/University	147.1**	3.028	-47.67	367.0	95.71	295.2*	71.99
	(72.67)	(43.51)	(45.14)	(251.1)	(62.52)	(161.4)	(44.76)
Type of job: Skilled with accredited certificate	-51.87**	8.365	-89.72	14.00	-60.00	-127.4*	-61.44*
	(26.24)	(37.29)	(71.61)	(164.1)	(41.40)	(68.17)	(35.38)
Type of job: Other	-52.60*	-19.04	-107.0*	81.38	28.59	-124.0	-53.61*
	(31.07)	(57.40)	(60.38)	(209.0)	(57.64)	(81.53)	(29.90)
Neighbourhood: Sokusile	-43.71	-87.70	-64.67	48.14	-68.48	-24.24	-85.24*
	(45.40)	(61.74)	(79.57)	(172.7)	(82.78)	(88.05)	(49.88)
Neighbourhood: Sizinda	-144.7***	-176.8***	-169.2***	-83.76	-123.4***	-217.3***	-143.4***
	(20.74)	(33.76)	(35.48)	(214.6)	(41.61)	(76.48)	(25.91)
Constant	518.8***	124.3	470.0*	2,197*	397.9	1,215**	320.3*
	(192.9)	(173.2)	(249.5)	(1,166)	(258.9)	(557.5)	(179.5)
Observations	224	49	69	42	64	91	131
R-squared	0.188	0.561	0.359	0.325	0.356	0.254	0.301
Test of income pooling	F(1, 206) = 0.00 Prob > F = 0.9755	F(1, 33) = 0.01 Prob > F = 0.9202	F(1, 52) = 1.93 Prob > F = 0.1702	F(1, 25) = 0.70 Prob > F = 0.4119	F(1, 47) = 2.16 Prob > F = 0.1485	F(1, 73) = 0.06 Prob > F = 0.8011	F(1, 113) = 0.01 Prob > F = 0.9178

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In table 6, clothing expenditure is used as a dependent. This expenditure is calculated from clothing materials purchased for all household members in the past year. Here, the F test fails to reject the income pooling hypothesis for all migrants (the aggregated level) and for male or female migrants with and without children (at the disaggregated level). Another big and less frequent expenditure was selected to confirm this finding, where education expenditure was used as a dependent variable (see annex). This expenditure is calculated from all expenses related to education such as tuition and books spent on all household members in the past 12 months. The F test also fails to reject the income pooling hypothesis at both the aggregated and disaggregated levels. This finding is corroborated by Browning et al (2006) who show that income pooling and household unitary models are more appropriate for large purchases.

5 Conclusions

The model presented here provides an accurate measure of the income constraint of migrant households who use migration as a coping strategy to respond to economic shocks in the country of origin. Existing models in this area overlook this aspect and therefore under-estimate the income at origin for household migrants. The intuitive implication of the model is that migrant households at origin have higher income due to the remittance component and therefore cope better compared to similar non-migrant households. Evidence from the second largest city, Bulawayo, in Zimbabwe provide a mixed result in relation to this. First, half of the migrants in the sample do not remit and therefore casts doubts as to whether all migrant households cope better compared to similar non-migrant households. A social policy that excludes migrant households from receiving development assistance and social relief may be prejudiced.

For an equitable social protection policy, it becomes imperative to determine the characteristics of migrants who remit and if remittances are used to overcome income shortages at the household of origin. Development assistance cannot justifiably continue to assume that all migrants remit and they do so to maximise welfare for those left behind. Controlling for household and suburb level factors, evidence from Bulawayo show that the age, education, type of work and the destination of the migrant matter for remittances to be realised at the household of origin. Though the gender of the migrant does not determine whether a migrant remits or not, it does matter for income pooling on frequent and small purchases that characterise poor households. Having a child at the household of origin from a male migrant does not change the fact that their income is not pooled for small and frequent purchases. The discussion suggests that female migrants could be better at improving malnutrition levels for those left behind than males. Income pooling for huge and infrequent purchases holds for all migrants regardless of gender and having the child in the country at origin.

Turning to the independence of households as postulated by economists, income pooling especially for huge and infrequent purchases suggest that geographically distant households do synchronise decision making and are therefore not independent. It is also worth noting that failure to prove income pooling does not necessarily mean that the households are not interdepended. It could merely mean that incomes are assigned to different uses between the household at origin and the migrant while maximising collective utility. Nonetheless, evidence of income pooling sheds strong light on unitary decision making in separate households to the extent that it even challenges the concept of a household being composed of co-residents only. Given the geographically stretched households, tracking individuals instead of households as a unit of analysis can be one route that may be explored in carrying censuses.

Though the geographically stretched household model extends the standard households model, it has several assumptions that weaken its applicability in many settings. It was assumed that households are rational and that the migration decision is collectively made basing on the fact that prospective migrants have found better

returns compared to staying at home. Dropping these assumptions and modelling this better to include selfish and irrational reasons to migrate would further increase the generalizability of the model.

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Annex

Table 6A: Testing for Income Pooling using Education Expenditure

VARIABLES	All Migrants	Migrant without Children		Migrant with Children		Gendered	
		Male	Female	Male	Female	Male	Female
Total Income at Household of origin	0.154	0.313	-0.0332	-0.690**	0.601	-0.117	0.146
	(0.202)	(0.604)	(0.398)	(0.328)	(0.410)	(0.324)	(0.238)
Remittances	-0.191	0.208	0.516	-0.414***	0.595	-0.383***	0.404
	(0.168)	(2.751)	(1.184)	(0.0885)	(0.420)	(0.134)	(0.268)
Household size	41.45***	38.96	36.59	47.28**	22.70	55.12***	32.34**
	(10.44)	(34.64)	(26.49)	(21.26)	(22.82)	(16.21)	(14.55)
Migrant age	10.98	-42.54	54.37	47.43	-52.88	-32.99	35.75
	(24.59)	(49.34)	(38.70)	(54.20)	(49.68)	(40.92)	(33.12)
Migrant age squared	-0.175	0.361	-0.748	-0.605	0.568	0.296	-0.451
	(0.308)	(0.641)	(0.475)	(0.644)	(0.586)	(0.501)	(0.405)
Relation to head: Nucleus family	-136.2	48.77	456.2	-306.8	136.5	-366.3**	200.3*
	(98.85)	(410.1)	(360.6)	(200.2)	(213.9)	(148.3)	(110.3)
Relation to head: Extended family	-186.4	38.28	731.2*	-133.8	-77.11	-363.7**	178.0
	(121.7)	(426.2)	(422.0)	(233.8)	(208.5)	(177.0)	(178.9)
Relation to head: Other	0.214	-	-	-	-926.7**	-74.70	-76.21
	(320.6)	-	-	-	(426.4)	(258.8)	(243.2)
Residence of migrant: South Africa	16.90	77.07	-30.94	-175.4	75.23	46.93	-33.04
	(97.19)	(192.2)	(191.4)	(183.3)	(232.8)	(133.0)	(138.0)
Residence of migrant: Other neighbouring countries	107.3	364.3	-220.3	-88.79	256.8	130.7	-54.47
	(149.1)	(475.3)	(249.1)	(337.2)	(374.7)	(198.2)	(225.6)
Residence of migrant: West	100.5	-	36.05	-107.2	-	-82.62	16.85
	(153.9)	-	(243.7)	(231.4)	-	(215.3)	(171.5)
Education: Completed Secondary	159.0*	496.1	255.5	-64.31	320.9***	174.8	197.1
	(94.95)	(319.2)	(240.0)	(147.7)	(116.9)	(178.6)	(154.1)
Education: Completed College/University	165.9	716.2*	11.61	83.99	193.7	316.4	35.26
	(112.7)	(383.8)	(174.3)	(191.2)	(200.3)	(223.3)	(164.3)
Type of job: Skilled with accredited certificate	-43.65	-406.2	304.0	-213.3	-103.9	-118.2	68.39
	(95.59)	(326.3)	(314.9)	(172.6)	(286.8)	(157.6)	(182.0)
Type of job: Other	-107.5	-286.3	190.1	-226.6	-189.7	-59.21	-138.4
	(114.7)	(364.0)	(329.4)	(203.8)	(180.7)	(234.5)	(108.6)
Neighbourhood: Sokusile	-290.5***	-583.1	-317.5	-240.1*	-91.35	-364.4**	-292.2**
	(99.12)	(352.6)	(225.2)	(132.2)	(241.9)	(143.5)	(141.5)
Neighbourhood: Sizinda	-459.7***	-384.8	-656.5***	-447.1*	-207.5	-434.9**	-535.6***
	(79.04)	(299.4)	(168.6)	(229.4)	(173.1)	(165.8)	(104.5)
Constant	212.0	1,037	-1,213	60.99	980.3	1,282	-548.1
	(526.4)	(884.8)	(1,077)	(1,154)	(1,113)	(835.9)	(691.6)
Observations	203	48	59	38	58	86	115
R-squared	0.244	0.347	0.417	0.488	0.370	0.286	0.306
Test of income pooling	F(1, 185) = 1.81	F(1, 32) = 0.00	F(1, 42) = 0.20	F(1, 21) = 0.75	F(1, 41) = 0.00	F(1, 68) = 0.58	F(1, 97) = 0.55
	Prob > F = 0.1805	Prob > F = 0.9708	Prob > F = 0.6572	Prob > F = 0.3954	Prob > F = 0.9909	Prob > F = 0.4491	Prob > F = 0.4591

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1