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Abstract

In this paper we use a behavioural approach to studying household consumption behaviour in Malawi. In particular we are interested to know whether households use mental accounting when consuming different categories of good. It is useful for assessing the impact of remittances on household consumption behaviour. We use 1998 cross-sectional data to find the following key results: (i) mental accounting systems are in operation. Remittance income exhibits a higher marginal propensity to save than other income sources, (ii) household income influences consumption habits, (iii) receipt of remittance income impacts on spending habits. This is in line with the theory of remittances and corresponding mental accounting theory, and, finally, (iv) remittances receipts impact positively on the likelihood of consuming education and low income remittance receiving households consume significantly more education at the margin than other households.

1. Introduction

Remittances are commonplace in Malawi with over 20% of households receiving an average of 43% of their total non-business income from this source[2]. This reflects the importance of such transfers for developing countries in general (Ratha, 2003; Gammeltoft, 2002) for which studies have shown that households do not use remittances in the same way as other income sources (Adams, 1991, 2005). The simple receipt of remittances may also be capable of modifying households' consumption choices (Cox Edwards and Ureta, 2003).

Given that remittances alter household expenditure, studies seek to test and measure the impact of these transfers on household consumption choices despite the fact that this is in conflict with economic theory of consumption such as the lifecycle-permanent income hypothesis (LC-PIH). Adams (2002), for example who shows that households exhibit a higher marginal propensity to save out of more risky income sources.

We propose an alternative explanation for the observed differences in marginal propensities to consume out of remittance income compared to other income sources; that of mental accounting. Under this theory, derived from Shefrin and Thaler (1988), households keep different financial accounts (real or metaphorical) out of which different goods are consumed. Income is allocated to one account or "pot" or another depending partly upon its source, allowing us to observe different marginal propensities to consume different goods out of each income source.

Remittances lend themselves to an analysis in the mental accounting framework. In some cases they come with conditions attached ("use this money to educate my little brother"), in other cases they are used as a form of income pooling, mutually reducing risk and helping to smooth consumption[3] potentially altering consumption behaviour. Remittances may thus be used for or encourage investment in "useful" areas such as education, health, nutrition and savings, or may be seen as "manna from heaven" and encourage non-productive behaviour (Kozel and Alderman, 1990 *in* Chami *et al.,* 2005).

This is the first time that the mental accounting hypothesis has been tested qualitatively for a developing economy. Mental accounting is important for government policy as well as for NGOs and banks trying to mobilise savings and encourage borrowing. If lack of consumption out of illiquid assets is a choice and not forced upon individuals, microfinance institutions need not only to provide liquidity, but also change consumption and savings behaviour. It is important to understand whether remittances are combined with other sources of income or spent in a particular way. If they are used for different

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[2] Authors' calculations using Malawian Integrated Household Survey (1998). Chipeta and Kachaka (2005) calculate that remittances accounted for 6.3% of total daily per capita consumption in Malawi in 1998. Thus, even including business expenditure, this flow of income represents an important flow of income for Malawian households.
[3] See Alderman and Paxson (1992) for a synthesis of the literature on risk and consumption in developing countries.

purposes to money from other sources, do these purposes tend to be constructive (such as education) or destructive (conspicuous consumption)?

This paper focuses on three key questions: Do households' spending choices conform to traditional consumption models in which source of income plays no role, or do households keep "mental accounts" consuming differently out of different money pots? What is the role of remittances in consumption choices and can their receipt alter behaviour?

Levin (1998) uses American longitudinal data to find marginal propensities to consume (MPC) for different categories of goods out of different assets. He finds that the MPC out of current income is around 0.42 with a MPC out of changes in housing value of zero. This is a common empirical result which is seen as an anomaly of the lifecycle consumption model. Credit market constraints are often cited as an explanation[4], but Levin suggests that individuals are not credit constrained but rather *choose* not to consume out of these assets. He uses testable differences between the models which allow him to discriminate between lifecycle consumption models with liquidity constraints and behavioural models of consumption and finds in favour of the latter. Furthermore households use different wealth categories to purchase different goods; for example, they are more likely to use liquid wealth such as savings than current income to pay for occasional purchases such as vacations. Although Levin's findings support the fact that individuals choose and are not forced to consume differently out of assets with different levels of "temptation", he does not break down current income into different categories. Thus, he is unable to test whether equally liquid income is used for different purposes.

Adams (2002) uses panel data from a sample of 469 rural Pakistani households to measure marginal propensities to save and consume out of income from different sources. He finds that the marginal propensity to save out of remittances is higher (at 0.711 for external remittances and 0.589 for internal remittances) than that for any other source of income. Although he notes that these results do not conform to unmodified lifecycle consumption models, Adams suggests that is due to income volatility and risk aversion, noting that income sources with greater variability exhibit greater marginal propensities to save. While Adams is able to distinguish between different MPC (or save) out of sources of equally liquid income, he does not look at how this income might be spent.

This paper combines these two approaches, testing traditional lifecycle models against behavioural consumption models of mental accounting. It goes on to look at how different sources of income are spent with a particular focus on remittances. The results show that, as in Adams (2002), remittances are more likely to be saved than income from other sources. Furthermore, they are most likely to be used to finance necessities such as food and essential household products. Households do choose to

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[4] See Hayashi (1987) or Zeldes (1989).

consume out of fixed assets; in particular they use these assets to finance health, education and investment. Both remittances and credit are used to smooth consumption[5] and for investment purposes and there is some degree of substitutability between the two. Non-remittance receiving households turn to credit to fund basic consumption during difficult periods. Whilst credit is also used for productive investment, the receipt of remittances encourages lower-income households to invest in education.

The paper is organised as follows: Section 2 briefly outlines the theoretical framework. Section 3 discusses the data before proceeding with the empirical analysis and discussion of the results. Finally, the summary and concluding remarks are drawn in Section 4.

2. Theoretical Framework

The behavioural lifecycle model from which this hypothesis is drawn is proposed in Shefrin and Thaler (1988). Here, we outline the main results of their model and offer supporting evidence. Since the main contribution of this paper is empirical, we briefly elucidate our extensions to the model, but refer the reader to the seminal Shefrin and Thaler (1988) paper for more details.

Shefrin and Thaler (1988) divide assets into different categories associated with different levels of temptation to consume. Unlike in the traditional lifecycle model, consumption is not only a function of total lifetime wealth, but also of the composition of that wealth.

$$C = C\,(Y, A, F) \tag{1}$$

Specifically, they divide wealth into three mental accounts with different temptation levels: current spendable income (Y), current assets (A) and future income (F). Marginal Propensities to Consume (MPCs) differ across the categories.

$$\frac{\partial \ln(C)}{\partial \ln(Y)} \neq \frac{\partial \ln(C)}{\partial \ln(A)} \neq \frac{\partial \ln(C)}{\partial \ln(F)} \tag{2}$$

where elasticities are given by the partially differentiating (1) with wealth and consumption values in their natural log form.

Shefrin and Thaler (1988) and Lewis and Winnett (1995) use surveys[6] to show that the source of the income and the amount of income are both important in placing income in one account or another. A windfall gain is likely to be placed in the asset account (perhaps savings) while several small gains adding

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[5] Udry (1990) finds that credit is used for consumption smoothing purposes in northern Nigeria.
[6] In the United States and Netherlands respectively.

up to the same value tend to be placed in the current income account, even when both of these income gains are anticipated. Analysing the claim that the large bi-annual bonuses which are the norm in Japan contribute to the comparatively high savings rate, Ishikawa and Ueda (1984) estimate MPC from regular and bonus income for Japanese workers. They find that for non-recession years, MPC is significantly higher for regular income than for bonus income (0.685 versus 0.437); Japanese households habitually save over half of their bonus income and these authors conclude that, at least in the short run, habits govern household consumption patterns, while Friedman's Permanent Income Hypothesis (PIH) may be more relevant in the longer run.

This model is extended by Levin (1998), who allows for separable assets. In Shefrin and Thaler (1988) all assets are combined – an increase in the value of one's home has the same impact on consumption as a stock market gain. Levin (1998) shows that the marginal propensity to consume out of different assets differs. Consumption of good g is thus a function of income, Y and the different assets held:

$$C_g = C_g (Y, A_1, A_2, \ldots , A_K) \tag{3}$$

Marginal propensities to consume out of different assets varies according to their temptation level:

$$\frac{\partial \ln(C)}{\partial \ln(A_1)} \neq \frac{\partial \ln(C)}{\partial \ln(A_2)} \neq \ldots \neq \frac{\partial \ln(C)}{\partial \ln(A_K)} \qquad \text{and} \qquad \frac{\partial \ln(C)}{\partial \ln(Y)} \neq \frac{\partial \ln(C)}{\partial \ln(W)} \tag{4}$$

where W is total wealth. Furthermore, each asset is used to fund different expenditure, so that the marginal propensity to consume different goods out of the same asset is not equal:

$$\frac{\partial \ln(C_1)}{\partial \ln(A_k)} \neq \frac{\partial \ln(C_2)}{\partial \ln(A_k)} \neq \ldots \neq \frac{\partial \ln(C_G)}{\partial \ln(A_k)} \tag{5}$$

Levin (1998) postulates that the MPC out of liquid assets will be higher than for housing assets since income has a high temptation level. Put another way, there are "psychological as well as financial transaction costs associated with spending from different types of assets"[7]. In mental accounting terminology, liquid and illiquid assets are placed in separate mental accounts (used to purchase different goods, or goods at different times) and there is a psychological cost to transferring purchase power between accounts[8]. Levin (1998) also tests the hypothesis that liquidity constraints are responsible for the differing MPC rather than behavioural mental accounting reasons but concludes in favour of a behavioural explanation.

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[7] Levin (1998)
[8] Various papers have analysed different psychological aspects of mental accounting theory. Shefrin and Thaler (1988) explains the basic concepts. Ainslie (1975) discusses impulse control and Brocas, Carrillo and Dewatripont (2004) review commitment devices. Karlsson (2003) discusses practical strategies to commit to spending patterns, and Anderson and Nevitte (2006) find that saving behaviour is largely a matter of habit, learnt at home as a child.

This paper extends Levin's (1998) analysis to include equally liquid income from a variety of sources and tests the mental accounting hypothesis for a developing country, Malawi. Formally, a household has J income sources and owns K categories of assets:

$$C_g = C_g (Y_1, Y_2, ..., Y_J ; A_1, A_2, ... , A_K) \qquad (6)$$

In addition to allowing MPC out of different wealth categories to differ as in Levin (1998), the MPC out of different, equally liquid income sources are not equal. As required by the behavioural lifecycle model, the different MPC results, at least in part, from internally (not externally) imposed constraints. The varying MPC are due to behavioural reasons such as mental accounting. More specifically agents voluntarily choose to spend differently out of different income sources so that a one-unit increase in current wages is not treated in the same way as the same increase in current remittance income[9].

$$\frac{\partial \ln(C)}{\partial \ln(Y_1)} \neq \frac{\partial \ln(C)}{\partial \ln(Y_2)} \neq ... \neq \frac{\partial \ln(C)}{\partial \ln(Y_J)} \qquad (7)$$

This paper seeks to analyse remittance income in the mental accounting framework. It does not seek to explain remittances[10] and does not test different mental accounting models against each other. Rather, this paper shows that mental accounts exist as a means of controlling behaviour in a developing country, Malawi. Sources of income are credited to different mental accounts[11] and remittance income in particularly is likely be allocated to its own mental account for a number of reasons. Firstly remittances may come with specific conditions attached. Information asymmetry problems aside, the remitter may require the receiving household to use their income for purposes such as education or else risk losing this income. Secondly, remittances may be considered as either manna from heaven or else the product of someone else's hard work. How remittances are viewed is influenced by culture[12] and the motivation behind the remittance and impacts on the account into which these transfers are placed. In our first

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[9] Adams (2002) finds that, for Pakistan, remittances exhibit a high marginal investment rate of between 0.59 and 0.91, much higher than for other sources of income.

[10] Unfortunately the data do not allow us to make, the distinction between remittances received by a geographically-split household (such as the husband working away while the wife and children stay at home) and a household which receives remittances from other relatives. Explaining receipt of remittances is beyond the scope of this paper.

[11] This paper focuses on the unitary household model. We look at the choices households make as a unit depending upon the composition of their total spending power, although we recognise the importance of intra-household relations in deciding consumption patterns.

[12] Hart (2005) suggests that culture is a determinant in how people or households view money and their attitudes towards it. Although some forms of mental accounting may be near universal, its exact form is likely to be influenced by cultural and other factors. China for instance has a savings culture, whilst Japanese household finance is traditionally organised by females. Religion may play a role where moral codes or duties (such as zakat in Islam) encourage particular attitudes. Gender and age may also be factors in determining mental account systems (as well as interactions between these two variables and other factors). Financial *savoir faire* will impact on mental accounting systems and can be related to availability of information within a country (institutions and education are important in this aspect as well as the typical financial culture within a home). Similarly, consumption needs and choices will influence the mental accounting structure. These needs and choices will, in turn, be influenced by surroundings, culture, religion, age, etc. (see Colloredo-Mansfeld, (2005), for a good summary of the link between culture and consumption).

example, remittance income is likely to be placed in an account used for general or even luxury consumption. In the second, remittances tend to be used for productive or constructive purposes such as education[13]. Thus, as in Levin (1998), households consume differently out of different mental accounts:

$$\frac{\partial \ln(C_1)}{\partial \ln(Y_1)} \neq \frac{\partial \ln(C_2)}{\partial \ln(Y_1)} \neq \ldots \neq \frac{\partial \ln(C_G)}{\partial \ln(Y_1)} \tag{8}$$

3. Empirical Analysis and Results:

3.1: Data

We use data from the Malawian Integrated Household Survey carried out from November 1997 to October 1998, which, after cleaning contains a representative sample of 6826 households across Malawi. The data include detailed income and consumption variables as well as a wide range of household characteristics.

The average household has 4.3 members or 3.7 members in per adult equivalent terms. 77% of households have an average of 2 children. 25% of household heads are female and the average age is 41 years. 74% of household heads are married and 45% work in agriculture. 16% of households are urban[14].

Average reported non-business household income is Malawian Kwacha (MK) 12,860 annually with average consumption equal to MK14,116. Income sources are varied with many households receiving income from several sources. Furthermore, many households reported significant non-cash consumption. The value of non-cash food consumption was nearly MK8,900 or 68% of non-business income. This should not come as a surprise in an agricultural economy such as Malawi's where more household produce a large proportion of their own food consumption. However, the reader should bear in mind that the analysis that follows focuses on cash income and consumption.

A total of 2,046 households reported receiving remittance income during the month preceding the survey. The mean yearly income from this source was MK4,823 per household. Excluding business income, mean remittances are worth around 43% of the average total income of receiving households. They are thus an important source of income for these households. The mean total income of remittance-receiving households is significantly lower than the income of those which do not receive income (MK11,045 against MK13,638).

Most households reported owning both liquid assets such as livestock or household appliances and illiquid assets such as housing or land. The average value of fixed assets was MK16,761 or 130% of average non-business yearly income.

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[13] See, for example Cox Edwards and Ureta (2003).
[14] NSO Classification of rural means that market towns are considered rural with only inhabitants of the four largest cities classified as urban dwellers.

Consumption is classified into food; farm; clothing; health; fuel; education; general household and investment as well as total consumption. The construction of all variables is described in Appendix I. All households reporting zero income or zero consumption are necessarily dropped from the sample analysed. Mean income, consumption and non-cash consumption and asset ownership as well as information regarding household characteristics is presented in Table 1.

[Table 1 about here]

3.2: Econometric Methods and Empirical Results

Based on (6), estimation of income elasticites are made using the ordinary least squares method, with each category of income and consumption entered separately as required by each test:

$$\ln(C_{ig}) = \beta_0 + \beta_1' \ln(Y_{ij}) + \beta_2' \ln(A_{ik}) + \beta_3' X + \varepsilon \qquad (9)$$

where C_{ig} is the *ith* household's consumption on goods in category g in per adult equivalent terms including total consumption such as shown in (7); Y_{ij} and denotes the household income from the *jth* income sources, and A_{ij} denotes the value of fixed and liquid assets owned by the household. Finally X represents a vector of control variables including household characteristics such as age of the household head, education level of household head and other variables that may influence consumption patterns; a set of regional dummies included to capture systematic differences between regions due to preferences or culture[15] and ε is *i.i.d* $(0, \sigma^2)$ error term.. All other things being equal, a household can choose to consume out of changes in the value of these assets by borrowing against their value.

We regress the log of total consumption against the log of each of the income variables entered separately; the log of fixed (illiquid) and liquid assets; a series of dummies for different sources of income and control variables and regional dummies. Mental accounting theory suggests that the marginal propensity to consume out of different sources of income is not identical even where the income is equally liquid. That is, households choose not to treat income from different sources identically.

$$\frac{\partial \ln(C)}{\partial \ln(Y_i)} \neq \frac{\partial \ln(C)}{\partial \ln(Y_j)}, i \neq j \qquad (10)$$

The results are found in Table 2 below:

[Table 2 about here]

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[15] Regional differences are important in Malawi for historical reasons. Regions differ significantly with respect to tribal, ethnic and religious make-up and voting preferences. There are also important urban-rural divisions.

The coefficients on each income source represent marginal propensities to consume. Thus, in Table 2 (regression 1) the marginal propensity to consume out of total income is equal to 0.234. The MPC out of fixed and variable assets are 0.129 and 0.136 respectively. These marginal propensities to consume may seem low but do not include consumption of durable goods or businesses consumption. Including such expenses, Adams (2005) finds marginal propensities to consume of between 0.54 and 0.59 for Guatemala. The same author finds MPC out of total income of 0.149 for rural Pakistan (Adams, 2002). The loan dummy is positive, as one would expect; all other things being equal, accessing credit increases consumption. Having a business, salary or farming income increases consumption, whilst the remittance dummy indicates that households which receive remittances have lower autonomous consumption levels than the average. The constant is positive and significant, representing households' autonomous consumption.

Regressions 2 to 4 enter income sources separately to verify the hypothesis that MPCs differ across income sources. That is, the marginal propensity to save is higher for some income sources than others. Salary exhibits a MPC of 0.426, whilst the MPC out of remittances is 0.175. The evidence indicates that marginal propensity save out of remittances is higher than that for salary income. A similar, high marginal propensity to save out of remittance income is found by Adams (2002). The marginal propensity to save might more justly be termed the marginal propensity to invest as in Adams (2002) since it includes not only savings but also consumption of durable goods and business consumption which are not included in total consumption.

Table 2b shows formally that the value of income coefficients differ between models. Wald tests for the null of equality of coefficients are rejected in all cases. We thus conclude that MPC out of different sources of income vary, offering support for the mental accounting hypothesis.

The LC-PIH model posits that the marginal propensity to consume any given category of good will be equal for each income source and change in wealth. Income from a given source is not allocated to a particular consumption category. By contrast, behavioural mental accounting models suggest that mental accounts are used for specific purposes. Since income from different sources is assigned into different mental accounts, the MPC for good *(g)* out of one source of income will not equal the marginal MPC good *(h)* out of the same source of income. And the MPC for the specific good *(g)* from source *(i)* will not equal the MPC *(g)* out of *(j)*.

$$\frac{\partial \ln(C_g)}{\partial \ln(Y_i)} \neq \frac{\partial \ln(C_h)}{\partial \ln(Y_i)}, g \neq h \tag{11}$$

$$\frac{\partial \ln(C_g)}{\partial \ln(Y_i)} \neq \frac{\partial \ln(C_g)}{\partial \ln(Y_j)}, i \neq j \qquad (12)$$

The adult equivalent consumption for each of seven categories is regressed against each income source separately, relevant income dummies and control variables as in Table 2a. There is a potential endogeneity problem when regressing farm expenditure against farm income. We thus experimented with instrumenting farm income with acres of land owned; land tends to be inherited and is thus largely exogenous. Our findings are robust to this change, and we therefore omit the IV regressions from the results for consistency.

Since not all households reported consumption in each of the categories analysed, the issue of selection bias is important. We therefore control for this using Inverse Mill's Ratios (IMR) recuperated from initial probit regressions to determine the likelihood of a household spending on each category. Thus, the first stage regression models the probability that a household chooses to consume category g given household characteristics:

$$P(Cons_g = 1 \mid X = x) = \Phi(X\beta) \qquad (13)$$

where g represents the consumption category and is equal to 1 for households that consume g and 0 otherwise and Φ represents the cumulative distribution function of the normal distribution.

The second stage regression will now be given by:

$$\ln(C_{ig}) = \beta_0 + \beta_1' \ln(Y_{ij}) + \beta_2' \ln(A_{ik}) + \beta_3' X + \sigma \frac{\phi_g}{\Phi_g} + \varepsilon \qquad (14)$$

where ε are $iid(0, \sigma^2)$ and ϕ_g / Φ_g is the density function of the normal distribution divided by its cumulative distribution, recuperated from the first step probit estimation on the likelihood of a household exhibiting positive consumption of good g. Coefficients on IMRs are not reported for purposes of clarity, but are significant in around half of all regressions. Our conclusions are not affected however by excluding IMRs, however for rigour and consistency all regressions with potential selection bias include IMR. Additional details and examples of this method can be found in Heckman (1975) or Maddala (1983).

The probit results are of interest insofar as they present the impact of receiving remittances on the probability of spending on each category of consumption. Table 3 therefore presents the estimated coefficients for the remittance dummy[16]. Coefficients are significant and positive only for health and

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[16] Full probit results are available from the authors on request.

education consumption, indicating that households which receive remittances are more likely to consume these categories.

[Table 3 about here]

Table 4 presents coefficients for consumption functions corrected for selectivity bias using the Heckman two-step method. For purposes of clarity only coefficients for income variables are shown, and formal tests of equality between coefficients.

[Table 4 about here]

Results are supportive of the mental accounting hypothesis that different income is used for different purposes with all but two of the coefficient tests significant. Focusing on the use of remittances, one result stands out. Despite the fact that receiving remittances is associated with an increase the likelihood of spending on education, the MPC to consume education out of remittances is not significantly different from zero. This might suggest that remittance receiving households are using other income sources to finance education, but that the receipt of remittances is, in itself, behaviour changing. This proposition is evaluated by slitting the sample into two groups: households that receive remittances and those which do not.

Remittances are spent, at the margin, on all other consumption categories including health, general household items and food. It is interesting to note however, that the MPC is lower for remittances than for total income for all income categories. This can be taken in support of the hypothesis that remittances exhibit a larger marginal propensity to save than total income.

We next investigate the hypothesis that receipt of remittances can serve to alter household consumption habits. This is suggested by previous results, and can be further supported by findings that show that remittances can be used as a form of insurance (e.g. Dercon et al., 2005; Harrower and Hoddinott, 2005). Remittances help households to smooth consumption and reduce risk. The receipt of remittances therefore may change household consumption habits. Thus, households which receive remittances will exhibit different MPC to those which do not. An additional, intuitive reason is that households that benefit from remittance income may also benefit from increased knowledge of the outside world, which contributes to their understanding, for example, the benefits of investment in health, education or nutrition. In order to focus on these differences, each consumption category is regressed against the log of per adult equivalent non-business income (excluding remittances), the values of fixed and liquid assets, income source dummies, controls and relevant Inverse Mill's Ratios. Where differences in consumption patterns can be

observed between the two groups, there is some indication that the receipt of remittances alters household behaviour. For example the MPC education is higher for non remittance-receiving households than for those which do receive remittances (0.246 against 0.080).

[Table 5 about here]

Overall there is little evidence that the two groups differ substantially in consumption behaviour. Indeed, there is only one consumption category – fuel – for which the two groups differ significantly.

These results are disappointing, however, we recognise that the two groups differ in other respects, most notably in income. We thus choose to persevere. Households which receive remittances have lower reported income than non-receivers (MK11,045 against MK13,638) and this is the case even following the inclusion of remittances in total income. It is therefore possible that the differences between remittances receivers and non-receivers include a wealth effect. This hypothesis is tested by further splitting the sample into households of above and below median income of MK3,347[17].

The potential for capturing an income effect rather than a remittance effect is investigated by splitting the sample into households above and below the median income line and all usual regressors including the relevant Inverse Mill's Ratios are included. Results are again reported for total consumption, food, education, health, general household items, clothing, fuel and farm categories. Where remittances have an impact and poverty does not, similar coefficients should be observed for both low and high income groups which receive remittances and similar coefficients for both groups which do not receive remittances. Similarly, if income level has an impact and remittances do not, similar coefficients should be seen for both low-income groups regardless of whether or not they receive remittances. If both poverty and remittances matter, we should see differing coefficients amongst all four sub-groups. The results indicate that both the receipt of remittances and the income-level of a household influence its consumption choices. This is in line with theories of remittances as well as standard economic theories such as Engel's law. Furthermore, there appears to be considerable interaction between income and receipt of remittances.

Analysing total consumption, it can be observed that remittance-receiving households have a higher marginal propensity to save than households of a similar income-level which do not receive remittances. Remittances may act as a "disciplining device" encouraging prudence and the result is in line with research which suggests remitters often attach conditions to the usage of their money.

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[17] This method results in classifying as "low income" largely the same households deemed to be "poor" as the Malawian National Statistical Office in their generation of a poverty threshold using daily consumption. See NSO (2000), "Poverty Profile in Malawi".

It is interesting to note that education is one of only two consumption categories for which all coefficients differ significantly. In particular, those in the low income category which receive remittances spend significantly more, at the margin, on education, than their non-receiving low-income counterparts. This is in line with the theory that remittance receiving households may understand the benefits of education better than other households, perhaps because they have family members who have migrated and are taking advantage of their education. Unfortunately, the data do not permit us to examine this hypothesis.

The poor do not differ in their food consumption at the margin. This is perhaps unsurprising since poorer households are likely to eat similar, basic diets and have similar food consumption habits. There is little room to adjust food consumption habits in Malawi, except at high levels of income. The results are supportive of this observation; upper and lower income households which do not receive remittances differ significantly in this category of consumption.

Health consumption habits differ between remittance and non-remittances receiving households at both income levels. However, in both cases, it is non-receivers which consume more health at the margin.

Low-income households which receive remittance income tend not consume out of their fixed assets; all other groups do. This is particularly evident with respect to food, clothing and general household items. Below-median income households which do not receive remittances do consume out of fixed assets (perhaps borrowing against them) whilst those that do receive remittances choose not to consume out of their fixed assets.

All groups analysed consume out of liquid assets: this is unsurprising since the point of these assets is to turn them into cash for consumption (or savings/investment). Income appears to influence the use of this form of income more than the receipt of remittances. For example, above-median income households use these assets to help fund education and health, whilst below-median income households tend not to. Business income is used to increase consumption of most categories analysed.

[Table 6 about here]

Levin (1998) tests MPC out of different wealth categories; he groups together all income sources into one current income variable, and finds that the MPC out of current income is higher than it is for changes in housing wealth. He then tests the theory that external liquidity constraints can explain the low MPC out of these illiquid assets, concluding that they can not.

This paper tests for MPC different categories of good out of different income and wealth sources. The different MPCs for each current income source means that no such test is necessary – all cash income is equally liquid, so any constraints are necessarily internally imposed.

4. Summary and Concluding Remarks

The results offer support for the use of mental accounting models in Malawi. Households do not, in general, lump all income together, but choose to allocate income differently. Both income level and receipt of remittances have a role in determining consumption patterns.

This paper has extended the theoretical work of Shefrin and Thaler (1988) and Levin (1998) in order to show that households in a developing country choose to consume differently out of equally liquid forms of income. The findings support the implicit assumption in many studies of remittances that households regard this flow of income as distinct from others and thus choose to use it differently. Furthermore it offers evidence that the reason for this lies, at least in part, in mental accounting. The results are consistent with Adams (2002) who finds that households are more likely to save out of remittance income than other sources, but offers an alternative explanation. In addition to simply analysing the consumption/savings trade-off, we extend Adams (2002) work by looking at how remittances are spent and how their receipt may alter behaviour.

Remitters may require receiving households to use this income in order to fund education, increasing the total share of education in total household consumption. Furthermore, remittances are more likely to be saved than some other forms of income.

Policy formulation by governments, NGOs and credit or savings institutions need to take account of mental accounting models since these influence consumption and savings habits. Remittances should be encouraged in Malawi since they encourage savings and consumption of education. Furthermore, remittances are often used to fund necessary consumption such as food and household goods. Current projects to help reduce the costs of remittances are a step in the right direction.

Banks are more likely to be successful in attracting household funds if they encourage the saving of particular forms of income, notably remittances. On the lending side, micro-finance organisations must not only improve access to credit, but must ensure that mental accounting models encourage the "constructive" use of credit; targeted publicity may help to support this aim. Lending institutions requiring collateral may be unsuccessful if mental accounting does not permit households to consume out of these assets.

Appendix 1: Description of Variables

The data from IHS98 comes in a rather raw format. Some information was collected on an individual basis and other information for the household, and there is much scope for duplication of information. Where necessary, checks for duplication were made and duplicates dropped

Inflation Adjustment Issues

The survey was carried out from November 1997 to October 1998 during which time the country experienced a relatively high inflation rate: International Financial Statistics[18] show an inflation rate of 29.75% during 1998. Furthermore prices vary considerable around the country and in particular between urban and rural areas[19]. During the survey, information was collected on local prices in each of the 29 regions where the survey was carried out. This information was then used to construct monthly food, non-food and total price indexes for each region. These price indexes correspond more closely to the purchases of the households surveyed and are more detailed than the inflation data collected by the Reserve Bank of Malawi. All monetary values are adjusted according to the time the household was surveyed and the region in which they are situated.

This adjustment presents no difficulties where the data were collected at a specific point in time or where the recall period was relatively short, but posed problems where the recall period was longer or where there was missing information as to the month in which the household completed the survey.

Consumption Variables

Variable	Description
Food	This information is gathered from a diary which each household kept for an average of 26 days. The data was annualised, placed in per adult equivalent and then adjusted for inflation.
Farm	This consists of food crops and livestock expenditure. Since most farms are small holdings, this forms part of the household consumption. The recall period for this consumption was 12 months. Data in yearly, inflation-adjusted PAE terms.
Clothing	This includes all clothing consumption for the household. The recall period was 3 months, and consumption is annualised, adjusted for inflation and placed in PAE terms.
Health	Household health consumption. The recall period was 12 months, and consumption is annualised, adjusted for inflation and placed in PAE terms.
General Household	This includes consumption of utensils, personal and household hygiene, linen, communication (stamps, newspapers, telephone,…) and basic house repair and transport costs. Consumption is annualised, adjusted for inflation and placed in PAE terms.
Investment	This includes productive investment – for example in industry, and investment in pensions/life insurance. The recall period was 12 months, and consumption is annualised, adjusted for inflation and placed in PAE terms.
Fuel	Household fuel consumption. The recall period was approximately 1 month, and consumption is annualised, adjusted for inflation and placed in PAE terms.

Income Variables

Variable	Description
Inc(salary)	Wage or salary income earned by members of the household. The recall period was one month. The data was annualised, placed in per adult equivalent and then adjusted for inflation.
Inc(farm)	This consists of food crops and livestock income. Since most farms are small holdings, this forms part of the household income. The recall period for this income was 12 months. Data in yearly, inflation-adjusted PAE terms.

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[18] Accessed through www.esds.ac.uk.
[19] This is discussed in the National Statistical Office's own series of studies through the Poverty Monitoring System of the Government of Malawi. See "Deriving a household welfare indicator for households surveyed in the Malawi IHS98", June 2000.

Variable	Description
Inc(remittances)	Remittance income for the household The recall period was 1 month, and income is annualised, adjusted for inflation and placed in PAE terms.

Asset Variables

Variable	Description
Assets(fixed)	This is the inflation adjusted value of illiquid assets owned by the household. This includes housing and land. The survey recorded the current value of such assets as indicated by the head of the household. The value is adjusted for inflation.
Assets(liquid)	This is the inflation adjusted value of liquid assets owned by the household. This includes livestock ownership and items such as cars or household appliances. The survey recorded the current value of such assets as indicated by the head of the household. The value is adjusted for inflation.

Appendix 2: Means and Regressions

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Household Characteristics					
Age of Household Head	6826	41.20	15.37	14	99
Dummy (Female Head)	6826	0.25		0	1
Household Size	6826	4.32	2.36	1	18
Head's Education	6826	2.23	1.53	0	6
Dummy (Children)	6826	0.77		0	1
Number of Children	6826	2.00	1.73	0	12
Dummy (Married)	6826	0.74		0	1
Dummy (Agriculture Industry)	6826	0.45		0	1
Dummy (Urban)	6826	0.16		0	1
Income					
Total Income	6826	12860.84	45019.18	6	1202400
Salary/Wage Income	2548	21693.32	54417.33	24	1128000
Farming Income	3674	1382.86	2661.67	6	52345
Remittance Income	2046	4823.40	13471.10	12	308520
Consumption					
Total	6826	14115.90	37410.76	5	960000
Food	6186	5765.59	9956.30	8	247890
Education	931	3456.99	8734.08	3	108608
Health	3970	568.91	2689.44	1	82420
General Household	6217	11418.07	26643.13	14	860561
Investment	247	5250.80	11845.24	5	99362
Clothing	4630	2172.53	5271.71	4	189298
Fuel	5556	926.49	2968.60	9	102254
Farm	3592	906.60	1709.32	4	43424
Asset Values					
Fixed	5933	16761.31	101536.60	24	4900000
Liquid	6727	9923.32	81485.23	2	4435950

Table 2a: Total Consumption from Different Income Sources

OLS Regression. Dependent Variable: Total Consumption (excl. durables)				
	1	2	3	4
Total Income	0.234***			
	(21.172)			
Salary Income		0.426***		
		(16.987)		
Remittance Income			0.175***	
			(9.868)	
Farm Income				0.213***
				(15.247)
Fixed Assets	0.129***	0.057***	0.128***	0.184***
	(11.117)	(3.179)	(6.006)	(11.872)
Liquid Assets	0.136***	0.162***	0.147***	0.103***
	(14.038)	(9.488)	(8.224)	(8.236)
Loan Dummy	0.189***	0.149**	0.162***	0.200***
	(5.700)	(2.570)	(2.705)	(4.962)
Business Dummy	0.315***	0.182***	0.337***	0.347***
	(9.903)	(3.079)	(5.797)	(9.032)
Farm Dummy	0.187***	0.105*	0.112**	
	(5.933)	(1.939)	(2.229)	
Salary Dummy	0.134***		0.491***	0.529***
	(3.444)		(7.257)	(11.279)
Remittance Dummy	-0.107***	0.059		0.060
	(-3.449)	(0.955)		(1.610)
Age of Household Head	0.001	0.011	-0.001	-0.000
	(0.271)	(1.234)	(-0.067)	(-0.022)
Age Square	-0.000	-0.000	0.000	-0.000
	(-0.221)	(-1.302)	(0.295)	(-0.131)
Female Head	-0.042	-0.078	0.001	-0.018
	(-1.111)	(-1.124)	(0.012)	(-0.376)
Agriculture	0.012	0.030	0.038	-0.023
	(0.473)	(0.660)	(0.818)	(-0.728)
Married Head	-0.036	-0.060	0.067	-0.022
	(-0.923)	(-0.864)	(0.950)	(-0.455)
Number Children	-0.014	-0.032	0.010	-0.010
	(-0.838)	(-1.150)	(0.340)	(-0.492)
Size	0.006	0.004	-0.004	0.001
	(0.474)	(0.174)	(-0.182)	(0.078)
Education	0.012	0.026*	0.012	-0.004
	(1.414)	(1.752)	(0.788)	(-0.416)
Hungry Season Dummy	0.277***	0.254***	0.322***	0.214***
	(9.258)	(4.938)	(5.879)	(5.738)
Constant	4.676***	3.369***	5.179***	5.316***
	(25.207)	(10.943)	(13.610)	(11.688)
Regional Dummies	Yes	Yes	Yes	Yes
N	5863	1747	1830	3572
r2	0.491	0.578	0.440	0.408
F	124.586	52.962	31.921	55.289

t-ratios in parenthesis, coefficients significant at * 10%, ** 5% and ***1%. All Wald tests are based on White corrected errors for heteroskedasticity.

Table 2b: Wald Test for equality of Total Income Coefficients between remittance receiving households and others

Coefficients Tested	Chi2(1) Value
Total=Remittances	262.21***
Salary=Remittances	120.977***
Farm=Remittances	89.31***
Total=Salary	1084.99***
Total=Farm	105.88***
Salary=Farm	1122.90***

Table 3 : Probit results for Consumption of Different Categories – Remittance Dummy Coefficients

Probit Model estimating likelihood of consuming different consumption categories							
	Food	Education	Health	General Household	Farm	Clothing	Fuel
Remittance Dummy	-0.044	0.250***	0.118***	-0.075	0.025	0.025	0.004
	(-0.654)	(4.339)	(2.725)	(-1.088)	(0.563)	(0.563)	(0.085)

t-ratios in parenthesis, coefficients significant at * 10%, ** 5% and ***1%

Table 4: Consumption of Different Goods from Different Income

Income variables	Total	Food	Education	Health	General Household	Farm	Clothing	Fuel
Total Income	0.234***	0.178***	0.165***	0.205***	0.202***	0.220***	0.285***	0.195***
	(21.172)	(13.351)	(3.047)	(8.404)	(14.332)	(8.210)	(9.407)	(13.014)
Salary Income	0.426***	0.367***	0.442***	0.288***	0.368***	0.296***	0.416***	0.394***
	(16.987)	(13.985)	(4.635)	(6.144)	(13.574)	(5.915)	(8.378)	(12.893)
Remittance Income	0.175***	0.160***	0.025	0.144***	0.192***	0.119***	0.182***	0.144***
	(9.868)	(7.606)	(0.319)	(4.579)	(8.793)	(3.653)	(5.013)	(6.643)
Farm Income	0.213***	0.124***	-0.009	0.151***	0.116***	0.246***	0.088***	0.095***
	(15.247)	(7.117)	(-0.116)	(6.167)	(6.585)	(10.713)	(3.329)	(5.338)
Chi2 values for Wald Test of Equality Hypotheses								
Total=Remittances	262.21***	12.15***	128.76***	45.33***	1.79	112.68***	72.47***	36.81***
Salary=Remittances	120.977***	535.86***	136.43***	68.90***	233.34***	52.93***	113.20***	434.94***
Farm=Remittances	89.31***	30.64***	3.35*	0.36	97.22***	177.41***	53.70***	31.60***
Total=Salary	1084.99***	782.40***	85.50***	45.11***	402.44***	17.5***	71.16***	691.10***
Total=Farm	105.88***	262.83***	97.61***	99.67***	488.86***	13.49***	963.78***	801.44***
Salary=Farm	1122.90***	887.82***	137.77***	78.87***	649.63***	4.64**	310.98***	1145.13

t-ratios in parenthesis, coefficients significant at * 10%, ** 5% and ***1%. All Wald tests are based on White corrected errors for heteroskedasticity.

Table 5: Comparing Remittance-Receiving Households with non-Remittance Households

Receive Remittances	Food		Education		Health		General Household		Farm		Clothing		Fuel	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Total Income	0.186***	0.177***	0.080	0.246***	0.142***	0.204***	0.181***	0.179***	0.175***	0.191***	0.164***	0.253***	0.117***	0.192***
	(6.294)	(10.846)	(0.707)	(3.461)	(3.589)	(6.666)	(6.112)	(10.550)	(4.439)	(5.791)	(3.907)	(6.824)	(4.116)	(10.353)
Fixed Assets	0.113***	0.136***	0.003	0.059	0.019	0.187***	0.139***	0.140***	0.223***	0.213***	0.166***	0.114***	0.189***	0.148***
	(3.484)	(8.502)	(0.024)	(0.877)	(0.435)	(7.411)	(4.110)	(8.335)	(5.545)	(9.373)	(4.155)	(4.953)	(5.972)	(8.363)
Liquid Assets	0.052*	0.092***	1.871***	0.939***	0.082**	0.133***	0.189***	0.166***	0.125***	0.209***	0.118***	0.180***	0.080***	0.115***
	(1.795)	(6.695)	(3.610)	(2.750)	(2.398)	(6.759)	(6.182)	(10.693)	(3.391)	(10.721)	(3.105)	(8.794)	(3.125)	(8.623)
N	984	3489	182	469	731	2334	735	2545	782	2336	820	2737	939	3271
r2	0.403	0.441	0.690	0.548	0.417	0.350	0.515	0.563	0.385	0.381	0.363	0.256	0.494	0.501
F	15.155	64.743	7.375	12.002	11.139	27.966	17.956	78.666	10.475	32.003	10.054	21.071	19.804	73.525

Chi2 values for Wald Test of Equality Hypotheses on Income Coefficients														
0.10		2.09		2.54		0.00		0.09		2.60		4.83**		

t-ratios in parenthesis, coefficients significant at * 10%, ** 5% and ***1%; Yes indicates remittance-receiving group, No indicates households n this group do not receive remittances. . All Wald tests are based on White corrected errors for heteroskedasticity.

Table 6 : Sample Split by Income Level and Remittance Receiving Status

	Coefficients on Total Income				Chi2 values for Wald Test of Equality Hypotheses			
Receive Remittances	Yes		No					
Income Level	Low	High	Low	High	Remittances=No Remittances (Poor)	Remittances=No Remittances (Non-Poor)	Poor=Non-Poor (with Remittances)	Poor=Non-Poor (No Remittances)
Total Consumption	0.187*** (4.799)	0.295*** (8.159)	0.236*** (12.378)	0.488*** (16.268)	1.33	15.79***	4.48**	40.09***
Food Consumption	0.141*** (2.752)	0.229*** (5.505)	0.161*** (6.598)	0.406*** (12.627)	0.13	10.62***	1.95	31.86***
Education Consumption	0.707 (1.383)	0.150 (0.959)	0.123 (0.549)	0.550*** (5.249)	3.79*	5.40**	5.60**	2.84*
Health Consumption	0.092 (1.458)	0.164*** (2.791)	0.255*** (5.241)	0.345*** (6.205)	4.83**	5.32**	0.76	1.59
General Household Consumption	0.154*** (3.126)	0.218*** (5.121)	0.153*** (6.008)	0.474*** (14.220)	0.00	23.25***	1.15	51.35***
Clothing Consumption	0.118* (1.673)	0.223*** (3.853)	0.201*** (2.925)	0.592*** (9.869)	0.68	20.33***	1.58	15.67***
Farm Consumption	0.132** (2.056)	0.213*** (3.782)	0.198*** (3.308)	0.349*** (6.172)	0.51	2.81*	0.83	3.25*
Fuel Consumption	0.063 (1.490)	0.240*** (5.677)	0.134*** (5.030)	0.495*** (13.334)	4.46**	18.42***	9.39***	54.16***

t-ratios in parenthesis, coefficients significant at * 10%, ** 5% and ***1%; Yes indicates remittance-receiving group, No indicates households n this group do not receive remittances. All Wald tests are based on White corrected errors for heteroskedasticity. Number of observations, F-stats and R2 note reported for clarity and brevity but are available from authors. Full regression results available from authors on request.

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