



An Analysis of Remittance Recipient Behaviour

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Parallel Session on Familiar Themes, Fresh Perspectives
44th Philippine Economic Society Annual Meeting
21-22 November 2006
Bangko Sentral ng Pilipinas Assembly Hall

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Abstract

Current practice in economic literature treats remittance income just like any other income transfer, implying that substituting remittances with the same amount of government transfers will yield exactly the same results. This paper argues that remittances are not like any other anonymous transfer because of the nature of intra-familial relationships. Remittance senders, if they make their preferences known, can influence the expenditure patterns of the recipient. Unlike other income, remittance income is not fully fungible in the sense that the recipient has to internalise the sender's preferences even if there is no altruism on the part of the recipient.

JEL classification: C70; D10; D13; F22; F24; J24

1. Introduction

The social phenomenon of migrant labour is an accepted fact of life in the Philippines today. Almost everyone has a relative or friend who is working or living abroad, either as a temporary worker or a permanent migrant. As of 2004, the Philippine Overseas Employment Agency estimates that there are 8.1 million Filipinos working or living abroad—that is around 10% of the country's total population. According to Yang (2006), up to 6% of Filipino households have members working overseas.

Intimately tied with the migration issue is remittances—money or goods sent by migrant workers to households back home. In 2005, OFW cash remittances reached USD 12.3 billion, or 23% of total imports (USD 53.9 billion) and more than enough to cover the trade deficit of USD 9.19 billion. Moreover, remittances in 2005 were more than double of gross foreign portfolio investment inflows (USD 5.50 billion) and almost 10-fold of foreign direct investment (USD 1.38 billion).

As if any more convincing is needed, the data show that remittances are a significant source of foreign currency and liquidity for the country. Lost in all the statistics, however, is the non-market nature of these transactions. Remittances are mostly transfers between family members or relatives, so intra-familial relationships matter in the determination of the amount and uses of remittances. While prices and exchange rates are external to remittance senders and recipients, the amount and uses of remittances are subject to the interplay of strategies between the parties. On one hand,

the sender may have preferences over the way her remittances are used by the receiving household and may use these transfers as an incentive mechanism; on the other, the recipients may have their own consumption preferences, but are influenced by the preferences of the sender possibly due to altruism, social constraints (*hiya*), or incentive mechanisms.

While the literature is abundant with theories and models on why senders remit money (some of which will be discussed later), there is a relative dearth of theories on the behaviour of the recipient. In many papers focusing on the effects of remittances on the receiving household, the econometric models imply that remittance income is treated as any other additional source of income (see Barham and Boucher, 1998; De Brauw, Taylor and Rozelle, 1999; Edward and Ureta, 2001; Quartey, 2006; and Yang, 2003, among others). While these papers adequately describe the welfare-improving effects of these transfers on receiving households, they do not shine any light on the processes that lead to the use of remittance income. Why are (or aren't) remittances used to finance child schooling or business investments? If remittances were eliminated and replaced with the same amount in government cash transfers, will we see the same allocation of income?

This paper, which is a work in progress, will argue that remittances are not like any other source of income because of the nature of intra-familial relationships. Remittance senders, if they make their preferences known, can influence the expenditure patterns of the recipient. Unlike other income, remittance income is not fully fungible in the sense that the recipient has to internalise the sender's preferences even if there is no altruism on the part of the recipient. Remittances, then, are more akin to Becker's (1991) "merit goods", and should be subject to the same type of intra-household analysis. It can then be argued that remittance income will not be utilised the same way as other transfers from anonymous patrons (say, the government) precisely because of this internalisation of the sender's preferences.

The next section will present some of the theories regarding the sender's determinants of remittances. The third section will present a preliminary theoretical model on remittance recipient behaviour divided into two cases—the first is on the effect of exogenous remittances on human capital investment and work effort; the second is on the merit good property of remittances. This paper concludes with possible avenues for empirical testing and research.

2. Determinants of Remittance Transfer

A simple model of remittance determination based on the literature is presented below to guide the discussion. A worker i from home country H working in foreign country F sends net remittance amount R_i to H given by

$$R_i = r_i(w_i L_i - p_F X_{iF}) - t_i \quad (1)$$

where w_i is her wage rate, L_i is labour supply, p_F is the vector of prices in the foreign country, X_{iF} is her consumption vector in the foreign country, and t_i is the transaction cost of remitting faced by i which may either be a fixed cost or a proportion of gross remittance. One can think of the first term of (1) as the gross amount that the worker is willing to spend to remit income back home, and R_i is the amount net of transaction costs.

$r_i \in [0, 1]$ is the worker's marginal propensity to remit (mpr); i.e., the proportion of her foreign savings (that is, income less foreign consumption) that she remits back home. The mpr can be functionally expressed as

$$r_i = r_i(F, H, p_H X_{iH}, e) \quad (2)$$

where F and H , respectively, correspond to foreign and home country characteristics, p_H is the vector of home prices, X_{iH} is her vector of home consumption, and e is the nominal exchange rate.

We begin with a discussion of X_{iF} and X_{iH} . Since both consumption vectors are Marshallian demand functions, they incorporate the preferences and characteristics of the worker¹. X_{iF} covers all possible goods associated with living (temporarily or permanently) in the foreign country, including taxes and dues; thus, $p_F X_{iF}$ would be the total cost of living in the foreign country.

On the other hand, X_{iH} covers all of i 's possible consumption in her home country, including business ventures, home savings, and even the consumption of family members. This definition of X_{iH} encompasses the three oft-cited reasons for remitting found in literature; namely, altruism, insurance against risk (consumption smoothing), and investment (business or social). Including the consumption of family members in X_{iH} implies that the worker incorporates the utilities of family members within her utility

¹ Clark and Drinkwater (2001) present a model of remittance behaviour that begins with a sender's utility maximisation problem and incorporates motives for sending money ranging from pure altruism to pure self-interest.

function—a standard Becker-type altruism model². Using X_{iH} to cover investment and consumption smoothing activities follows directly from the worker's utility maximisation problem.

Using this definition of X_{iH} , we can then interpret $p_H X_{iH}$ as the worker's total home expenditure—the amount she is expected to (or wants to) cover at home. Home expenditure is placed within $r_i(\cdot)$ to illustrate that it is of second-order importance for the worker; i.e., she first covers her necessary foreign consumption before considering how much of her savings to send back home. The exchange rate e is also used as an argument of mpr because of its effects in changing relative home and foreign prices. An appreciation of the home currency makes home prices relatively more expensive; thus discouraging home consumption.

Carling (2005) provides some demographic determinants of a migrant worker's preferences. A migrant worker who intends to return will have a higher mpr because she will be investing for her return, while female and married workers have a higher mpr than male and single workers. As a function of time, individual preference for remitting first increases during the adjustment period then decreases as home incomes increase or families join the worker in destination countries³. Educational attainment, on the other hand, is inversely related to mpr , mainly because those with higher education are more likely to bring their families with them to the destination countries.

While most elements of the vectors p_H and p_F are assumed to be given, some elements may be subject to state intervention. For example, many authors suggest bilateral negotiations between home and destination countries to reduce the cost of living among migrant workers. Such measures include lowering taxes or dues faced by workers in the host countries. Regularising the status of underground workers will also help bring down elements of p_F because this will improve access to social services.

F and H are baskets of foreign and home country indicators, respectively, that affect a worker's propensity to remit. The presence of community networks and hometown associations in F increases the flow of remittances for two main reasons—one, they facilitate transfers by pooling resources; and, two, they encourage a sense of nationalism (or sentimentality) among the diaspora. Immigration policies in F can also affect the propensity to remit—if there is a small probability of permanent settlement or family reunification in F , the worker will tend to remit more money back home.

As regards H , home politico-economic conditions, incentives and policies can affect a worker's propensity to remit. It has been observed that migration and

² See Becker (1991)

³ This does not necessarily mean that remittances will decrease over time. Maimbo and Ratha (2005) argue that even if mpr 's decrease, remittances may still increase as incomes ($w_i L_i$) increase over time.

remittances are countercyclical⁴; thus, worsening macroeconomic conditions at home will result in higher remittances to smooth consumption among recipient household members. On the other hand, risk or instability in the home country will likely lead to reductions in remittances as migrant workers hedge against uncertainty. Home incentive programmes and tax shelters are also assumed to affect mpr's, as well as investment climate and financial strength.

The relationship between H and F is also important in determining mpr⁵; in particular, the degree of interaction and integration between the countries. Schrooten (2006), as mentioned above, shows the significance between international integration and remittances in CIS economies. The ability to transfer money across borders efficiently (i.e., cheap, convenient and reliable) is an important consideration for migrant workers. Exchange rates and real wage differentials are also important determinants of mpr; in this model, they work through $p_F X_{iF}$ and $p_H X_{iH}$ and as arguments in determining H and F . Even distance between the home and destination countries can be a determinant of remittance flows. Adams and Page (2005) find a significant negative link between distance and the size of remittances, which they attribute to lower migration levels between distant countries⁶.

Transaction costs, $t_i(\cdot)$, are the constellation of costs faced by the worker when she remits money back home. There are two channels for sending money back home—formal channels or informal channels. Formal channels include banks, money transfer operators and the post office, while informal channels include acquaintances, personally carrying the money, or sending them through other couriers. Informal channels also include institutional transfers systems such as the *hawala* or *hundi* (South and Central Asia), *xawilad* (Somalia), *fei ch'ien* (China), and *padala* (Philippines).

At any remittance decision node, worker i chooses the mode of remitting according to the rule

$$\max\{q_B[r_i(w_i L_i - p_F X_{iF})] - t_{iB}, q_I[r_i(w_i L_i - p_F X_{iF})] - t_{iI}\} \quad (3)$$

where B and I are subscripts denoting formal or informal modes of transfers, respectively. t_{iB} is then the cost of sending money formally, t_{iI} is that for informal channels, and q_j , $j = B, I$ is the probability that the money will reach the recipient safely. The transmission mode that gives the maximum of the elements of (3) will be the mode chosen. Remitting through informal channels costs less than formal ones ($t_{iI} < t_{iB}$); however, informal channels are often accompanied by higher risks ($q_I < q_B$); thus, the worker is faced with a

⁴ See Carling (2005) and Maimbo and Ratha (2005)

⁵ Formally, $\partial^2 r / \partial H \partial F \neq 0$

⁶ For a gravity model on the determinants of migration, see Mazumdar (1987).

trade-off between cost and risk. After choosing mode of transmission, the amount sent (R_i) is then given by (1).

Chimhowu, Piesse and Pinder (2003) and Carling (2005) outline the determinants of the choice between sending money through formal or informal channels. These determinants include legal status of the worker, participation in social networks, costs, speed, reliability and security, size of remittance, destination, limiting requirements (e.g., legal status), number of people remitting, trust, and awareness. These determinants can then form the arguments of $t_i(\cdot)$ and q_j , which in turn determine choice of transmission.

The actual cost of transmitting money includes nominal fees, additional fees, and other transaction costs such as procedural complexity, paper work, convenience or risk of arrest (for underground workers). Thus, regularising the status of underground workers, reducing complexity, and promoting competitive pricing can encourage the use of formal transmission channels.

3. A Model of Remittance Recipient Behaviour

In the previous section, we saw the determinants of the amount of remittances sent by the migrant worker. In a nutshell, the sender's preferences determine the amount of remittances R_i . In this section, we analyse the effect of the functional form of R_i on the allocation behaviour of the recipient.

We consider two cases. In the first case, which is the base model, the amount of remittances is not influenced by the actions of the recipient; i.e., R (we drop the subscript i) is exogenous, so the sender has no preference over the recipient's consumption patterns and R is just like any other transfer. We will see that such exogenous transfers can affect human capital and labour supply decisions, and can partly explain the negative effects of remittances discussed in the literature⁷.

In the second case, which is closer to real-world situations, remittances are a function of the recipient's decisions, here focusing on human capital investment and labour supply decisions. In this case, we have paternalistic senders who have preferences over the recipient's allocation decisions and use remittance transfers as incentive mechanisms.

⁷ These negative effects mainly deal with the reduction in labour supply of remittance-receiving households, confirmed in Lucas (1987) and Rozelle, Taylor and DeBraw (1999) who find reductions in labour productivity among remittance recipients.

Case 1: Human capital investment and labour as a function of remittances

We consider a single-person remittance-receiving household that maximises utility over two time periods. Utility at time t is defined as

$$U(C_t, L_t, e_t), t = 1, 2 \quad (4)$$

where C is consumption, L is leisure, and e is work search effort which is a cost (i.e., reduces utility). We assume that $U(\cdot)$ is twice continuously differentiable, $U_{C_t} > 0$, $U_{L_t} > 0$, and $U_{e_t} < 0$ (variable subscripts denote partial derivatives). Moreover, $U(\cdot)$ is a well-behaved utility (and disutility) function so that $U_{C_t C_t} < 0$, $U_{L_t L_t} < 0$, and $U_{e_t e_t} > 0$. For simplicity, let us assume that $U_{C_t e_t} = U_{L_t e_t} = 0$ so that we can disaggregate the goods (consumption and leisure) from the bads (search effort).

In both time periods, the recipient has two possible sources of income—wages or remittances—and has to exert effort to look for work⁸. In this simplified base model, if the recipient finds work the remittance flows stop (we will relax this in the second case). The probability of finding work (p) is a positive and continuous function of search effort, or $p(e_t)$ with $p'(e_t) > 0$ and $p(0) = 0$.

At $t = 1$, the recipient has three possible uses of her time: labour, leisure, or investment in human capital. Investment in human capital is costly at $t = 1$ and gives no utility, but yields benefits at $t = 2$, which will be discussed later. Throughout this paper, we assume that the recipient can only invest in human capital at $t = 1$, so $H_1 \geq 0$ and $H_0 = H_2 = 0$.

The budget constraint facing the recipient at $t = 1$ is

$$C_1 + fH_1 \leq p(e_1)w_1N_1 + (1 - p(e_1))R_1 \quad (5)$$

where H is investment in human capital, $f > 0$ is the price of H^9 , w_1 is the exogenous wage rate at $t = 1$, N_1 is the amount of labour supplied, and R_1 is the expected amount of

⁸ For this base model, we assume that the recipient loses her job at the end $t = 1$ and has to search again for work at the start of $t = 2$. The situation where finding a job at $t = 1$ increases the probability of finding a job at $t = 2$ is left for a future model.

⁹ The time cost of H will be reflected as the opportunity cost of lost leisure time.

remittance income received if the recipient does not find a job¹⁰. Prices of consumption goods are normalised to unity.

At $t = 2$, the recipient does not invest in human capital ($H_2 = 0$) but can reap the benefits of previous human capital investment through a higher probability of finding work and a higher wage rate if work is found. Thus, we have a wage function $w(H_1)$ with $w' > 0$, and probability function $p(e_2, H_1)$ with $p_{e_2} > 0$ and $p_{H_1} > 0$. We assume that $w(0) = w_l$ and $w(H_1) > w_l$ for any $H_1 > 0$. Her budget constraint at $t = 2$ is

$$C_2 \leq p_2(e_2, H_1)w(H_1)N_2 + (1 - p_2(e_2, H_1))R_2 \quad (6)$$

Assuming away discount rates and normalising total time to unity for simplicity, the remittance receiver's problem is

$$\begin{aligned} & \max_{C_t, e_t, N_t, H_t} \sum_{t=1}^2 U(C_t, L_t, e_t), H_2 = 0 \\ & s.t. \\ & C_1 + fH_1 \leq p(e_1)w_1N_1 + (1 - p(e_1))R_1 \quad (7) \\ & C_2 \leq p_2(e_2, H_1)w(H_1)N_2 + (1 - p_2(e_2, H_1))R_2 \\ & 1 \geq L_t + N_t + H_t, t = 1, 2 \\ & C_t \geq 0, e_t \geq 0, N_t \geq 0, H_t \geq 0 \end{aligned}$$

Note that the third constraint is the time constraint for each period, which gives us two constraints. The Lagrangean is formulated as

$$\begin{aligned} L = & U(C_1, 1 - N_1 - H_1, e_1) + \lambda[p(e_1)w_1N_1 + (1 - p(e_1))R_1 - fH_1 - C_1] + \\ & U(C_2, 1 - N_2, e_2) + \mu[p(e_2, H_1)w(H_1)N_2 + (1 - p(e_2, H_1))R_2 - C_2] \end{aligned} \quad (8)$$

From the first-order conditions, we get $U_{C1} = \lambda > 0$ and $U_{C2} = \mu > 0$; thus, constraints (5) and (6) strictly bind. Further manipulating the first-order conditions (derivations are available upon request), we get

¹⁰ Since R_t is an expected amount, the actual amount of remittance is random. For this base model, the recipient has no influence on the expected value of R_t . In this and the succeeding section, remittance uncertainty will not be explicitly modeled.

$$p_{e_t}(w(H_{t-1})N_t - R_t) = -\frac{U_{e_t}}{U_{C_t}} \quad (9)$$

for each time period $t = 1, 2$. Since $U_{C_t} > 0$ and $U_{e_t} < 0$, then (9) should be positive. The LHS of (9) can be interpreted as the expected marginal benefit from an additional unit of search effort, while the RHS is the marginal cost of this unit.

Applying the Kuhn-Tucker conditions, we can see from (9) that we will have a corner solution for e_t^* whenever $R_t \geq w(H_{t-1})N_t$. This implies that when expected remittance flows are greater than or equal to wage income, the recipient will not exert any effort to find a job, or $e_t^* = 0$. This is an intuitive result since it is rational for the recipient not to look for work if this will mean a possible loss of remittance flows in exchange for less wage income. At $t = 1$, e_1 will depend entirely on condition (9); however, at $t = 2$ the amount of search effort exerted by the recipient, e_2 , will be tied with the human capital investment decision at $t = 1$, which will be discussed later.

Further manipulation of the first-order conditions gives us

$$p(e_t, H_{t-1})w(H_{t-1}) = \frac{U_{L_t}}{U_{C_t}} \quad (10)$$

for each time period $t = 1, 2$. Equation (10) gives us the standard optimal labour supply condition for time t : the recipient will supply N_t^* amount of labour at the point where wage (in this case, expected wage) equals the marginal rate of substitution between leisure and consumption.

For human capital investment decisions, we get

$$p_{H_1}[w(H_1)N_2 - R_2] + w_{H_1}p(e_2, H_1)N_2 = \frac{U_{L_1} + fU_{C_1}}{U_{C_2}} \quad (11)$$

The RHS of (11) is the marginal rate of intertemporal substitution: the dividend is the marginal cost of H_1 in terms of foregone leisure and consumption, while the divisor is the gain from H_1 in terms of added consumption due to higher income. The LHS of (11) is the marginal benefit from the final unit of human capital investment. The first term is the gain from a higher probability of finding a job; the second term is the benefit from higher wages at $t = 2$.

Another way of interpreting (11) is by substituting in (9) for $t = 2$ and rearranging. This gives us

$$\frac{p_{H_1}}{p_{e_2}} - w_{H_1} p(e_2, H_1) N_2 \frac{U_{C_2}}{U_{e_2}} = - \frac{U_{L_1} + f U_{C_1}}{U_{e_2}} \quad (12)$$

Equation (12) illustrates the benefits of human capital investment in terms of less effort needed to be spent in searching for a job (recall that effort reduces utility, or $U_{e_t} < 0$). The first term on the LHS is the benefit from human capital investment due to a higher probability of finding a job. On the other hand, the second term is the benefit from H_1 due to higher wages; i.e., the recipient has to exert less effort for the same expected wage income.

Given our assumption that $U_{C_t} > 0$, $U_{L_t} > 0$, and $U_{e_t} < 0$, the RHS of (11) and (12) are nonnegative. However, we can see from (11) that we will have a corner solution for H_1^* when R_2 is large enough to make the LHS nonpositive, or whenever

$$R_2 \geq w(H_1) N_2 + \frac{p(e_2, H_1)}{p_{H_1}} w_{H_1} N_2 \quad (13)$$

The RHS of (13) is the threshold amount that will encourage investment in human capital at $t = 1$, above which remittances will discourage such investments.

An implication of (13) is that $H_1 = 0$ necessarily means $e_2 = 0$. If (13) holds so that $H_1 = 0$, then $w(0) = w_1$ which is the exogenous base wage. Therefore, we will have $w_{H_1} = 0$ and the second term on the RHS of (13) drops out. This leaves us with $R_2 \geq w(0) N_2$, which is the condition that will yield $e_2^* = 0$ according to (9). Since the benefits of H_1 accrue through its effects on the probability of landing a job and the wage rate, an R_2 that exceeds these benefits implies that remittance income is strictly preferred to wage income at $t = 2$; thus, the recipient will not exert any effort in looking for a job. On the other hand, if expected $R_2 = 0$ (as in the case of seasonal workers) or is small enough so that (13) does not hold, then the recipient will invest in human capital and will exert effort to find a job at $t = 2$.

The equations in (9), (10) and (11) plus the two time constraints give us seven equations with seven unknowns; solving them gives us C_1^* , C_2^* , e_1^* , e_2^* , N_1^* , N_2^* and H_1^* .

Case 2: Remittances as a function of wage income and human capital investment

In the previous case, remittances were treated as an exogenous transfer that acts as a free insurance against joblessness (remittances are sent if the recipient does not find a job). In addition, the transfer is a random amount (recall that R_t is an expected value) that is not influenced by the recipient. In this case, we consider the situation where the amount of remittance flows is partly determined by contingencies or actions of the recipient.

We analyse the case where remittances continue even if the recipient finds a job and are used by the sender as an inducement to invest in human capital. This situation can happen when the remittance sender has paternalistic preferences over the consumption patterns of the recipient, as in the case of a parents or close relatives. The remittance serves two purposes: as a free insurance against a bad outcome (either joblessness or low wage income) and as an inducement towards additional human capital investment.

The remittance flow as observed by the recipient is

$$\begin{aligned} R_t &= R(Y_t, H_t) + \rho_t \\ t &= 1, 2; H_2 = 0 \end{aligned} \tag{14}$$

where $Y_t \equiv w(H_{t-1})N_t$ is the recipient's total wage income at time t , and ρ_t is a random variable with mean of zero and variance of σ_R^2 . Thus, the remittance flow R_t is a random variable with an expected value of $E(R_t) = R(Y_t, H_t)$.

We assume that remittances are used by the sender as an encouragement to invest in human capital at $t = 1$, so we have $E(R_1) = R(Y_1, H_1)$ and $R_{HI} > 0$ unambiguously. At $t = 2$, the expected remittance flow is $E(R_2) = R(Y_2, 0)$ since there is no human capital investment at this period¹¹. As regards the effects of wage income on remittance flows, we consider two possibilities: remittances as a progressive subsidy ($R_{Y_t} < 0$) and as an income-neutral subsidy ($R_{Y_t} = 0$). Although $R_{Y_t} > 0$ is a theoretical possibility, this will not be considered here since this is absurd in actual practice.

$R(\cdot)$ can be thought of as an optimising reaction function for the remittance sender after observing the decisions of the recipient, the determinants of which are discussed in

¹¹ However, H_1 still affects $E(R_2)$ since $Y_2 \equiv w(H_1)N_2$.

the previous section. (While $R(\cdot)$ is a function of other variables other than the recipient's human capital investment or wage income, we will be ignoring these other variables for simplicity.) The recipient, in turn, uses backwards induction to decide on her best response to the sender's reaction function. Thus, the recipient's decisions constitute a Nash equilibrium in this game between the sender and the recipient.

The problem for the recipient is defined as

$$\begin{aligned} & \max_{C_t, e_t, N_t, H_t} \sum_{t=1}^2 U(C_t, L_t, e_t), H_2 = 0 \\ & s.t. \\ & C_1 + fH_1 \leq p(e_1)[w_1N_1 + R(w_1N_1, H_1)] + (1 - p(e_1))R(0, H_1) \\ & C_2 \leq p_2(e_2, H_1)[w(H_1)N_2 + R(w(H_1)N_2, 0)] + (1 - p_2(e_2, H_1))R(0, 0) \\ & 1 \geq L_t + N_t + H_t, t = 1, 2 \\ & C_t \geq 0, e_t \geq 0, N_t \geq 0, H_t \geq 0 \end{aligned} \quad (15)$$

To make the notation consistent with the previous section, let us define $R_1 \equiv R(0, H_1)$ and $R_2 \equiv R(0, 0)$ as the expected remittance flows if the recipient is jobless at period 1 or 2.

Solving (15), it is easy to show that $U_{C1} = \lambda > 0$ and $U_{C2} = \mu > 0$ even for this case.

The first-order conditions with respect to e_t give us the following equation

$$p_{e_t} [w(H_{t-1})N_t + R(Y_t, H_t) - R_t] = -\frac{U_{e_t}}{U_{C_t}} \quad (16)$$

which is analogous to (9) in the previous case. By comparing (9) and (16), it is easily observed that a corner solution (i.e., $e_t^* = 0$) is less likely in (16) due to the addition of the term $R(Y_t, H_t) > 0$. Thus, even if without-work remittances exceed wage income, or $R_t \geq w(H_{t-1})N_t$, the recipient will still expend effort to look for work if the with-work remittance flows $R(Y_t, H_t)$ are large enough to offset this gap. It should be pointed out that this would also be the result in Case 1 if we allow the recipient to receive remittances even if she finds work.

Suppose we have an interior solution in (16) so that $e_t^* > 0$, how does this interior solution compare with that in (9)? It can be shown that given our well-behaved utility function $U(\cdot)$ (so that $U_{Ctet} = 0$ and $U_{etet} > 0$), the interior solution for e_t^* in (16) is greater than that in (9). Thus, *ceteris parabus*, search effort is encouraged by reducing the cost of finding a job in terms of foregone remittance income.

The first-order conditions of (15) with respect to N_t yield the following equation

$$p(e_t, H_{t-1})w(H_{t-1})(1 + R_{Y_t}) = \frac{U_{L_t}}{U_{C_t}} \quad (17)$$

which is similar to (10) in the previous case but with the LHS multiplied by the term $(1 + R_{Y_t})$. Unlike the previous case, we now observe that remittances can affect the labour supply decision. Since $R_{Y_t} \leq 0$, then the resulting N_t^* from (17) can only be less than or equal to the N_t^* from (10), *ceteris parabus*. This implies that the reduction in remittance flows due to increases in wage income can discourage labour supply. In fact, we will get a corner solution to labour supply (i.e., $N_t^* = 0$) whenever

$$R_{Y_t} \geq p(e_t, H_{t-1})w(H_{t-1}) \quad (18)$$

or when the marginal reduction in remittance income due to a unit increase in wage income is greater than the expected wage (i.e., the marginal increase in wage income due to a unit increase in labour supply).

Taken together, equations (16) and (17) imply that including $R(Y_t, H_t)$ in with-work income has two opposing effects—on one hand, it encourages search effort by reducing the “loss” of finding a job; on the other hand, if $R_{Y_t} < 0$, it discourages labour supply by providing a substitute for wage income.

Finally, taking the first-order conditions of (15) with respect to H_t yields the following:

$$p_{H_1}[w(H_1)N_2 + R(Y_2, H_1) - R_2] + w_{H_1}p(e_2, H_1)N_2(1 + R_{Y_2}) + R_{H_1} \frac{U_{C_1}}{U_{C_2}} = \frac{U_{L_1} + fU_{C_1}}{U_{C_2}} \quad (19)$$

To interpret the result, let us derive the expected without-work remittance flow (R_2) that will result in a corner solution of $H_1^* = 0$ for (19). In this case, we will have a corner solution when

$$R_2 \geq w(H_1)N_2 + R(Y_2, 0) + \frac{p(e_2, H_1)}{p_{H_1}} w_{H_1} N_2 (1 + R_{Y_2}) + \frac{R_{H_1}}{p_{H_1}} \frac{U_{C_1}}{U_{C_2}} \quad (20)$$

Comparing (20) with (13), we see two terms that increase the threshold that discourages human capital investment, and one term that may decrease this threshold (recall that $R_{Y_t} \leq 0$). There are thus three effects of endogenising human capital into remittance flows—(1)

the direct effect given by $\frac{R_{H_1}}{p_{H_1}} \frac{U_{C_1}}{U_{C_2}}$ which is the increase in remittance flows at $t = 1$ and

consumption at $t = 2$ due to human capital investment; (2) the no-loss effect given by

$R(Y_2, 0)$; and (3) the indirect effect given by $\frac{p(e_2, H_1)}{p_{H_1}} w_{H_1} N_2 R_{Y_2}$ which is the loss in

remittance income due to higher wage income depending on the sign of $R_{Y_t} \leq 0$. The first two effects tend to encourage human capital investment, while the indirect effect can discourage it. It should be pointed out that the no-loss effect can also be observed in Case 1 if we allow remittances even if the recipient finds a job; however, the direct and indirect effects are driven by making remittances a function of human capital investment and wage income.

Suppose we have an interior solution to (20), will the H_1^* in this case be greater than that in the first case? If $R_{Y_t} = 0$, it can be shown that the answer is unambiguously yes; however, if $R_{Y_t} < 0$, the answer will depend on the magnitudes of the opposing effects.

From the above discussion, we can see that $R_{Y_t} < 0$ has very strong incentive effects on labour supply and human capital investment decisions. In particular, if the remittance sender adopts a very progressive remittance reaction function (i.e., $R_{Y_t} < 0$ is large in absolute value), we can have corner solutions for labour supply and human capital investment. On the other hand, if the sender makes remittances invariant with wage income ($R_{Y_t} = 0$) but a positive function of human capital investment ($R_{H_1} > 0$), she can unambiguously encourage search effort and human capital investment without discouraging labour supply.

The ability of the sender to influence the recipient's behaviour is encapsulated in $R(Y_t, H_t)$. Since $R(Y_t, H_t)$ incorporates the sender's preferences, the recipient is then forced to internalise the sender's preferences even if the latter's preferences are not an argument in the former's utility function. While remittances in the first case are treated

just like any other transfer, the second case is closer to how remittance-receiving households really behave. While few scholarly studies have been done on the impacts of, say, children's grades on remittances sent by parents, anecdotal evidence points to the use of remittances (or allowances, for that matter) as merit goods.

This model can also explain the anecdotal evidence of OFWs having under-achieving children. If $R_{HI} = 0$ and $R_{Y_t} = 0$, so that we are back in Case 1, then large enough remittance transfers from parents (such that we have corner solutions) can lead to dead-beat children back home. This shows that if remittance senders can credibly commit to and enforce a remittance rule $R(\cdot)$, they can significantly influence the recipient's behaviour. Conversely, if the sender cannot commit to the rule then we will revert to the first case scenario and remittances act like transfers from faceless donors. This is where remittances can act as an effective behaviour-altering mechanism. Unlike governments or corporations, remittances senders who are often family members or close relatives have superior enforcement tools at their disposal ranging from the emotional to the coercive.

At this point, we are assuming that Y_t and H_t are observable, so there is yet no principal-agent problem. However, given the physical distance between the sender and the recipient, observability is surely an issue that should be considered. A possible development of this model could explicitly take this issue into account. For example, instead of directly observing H_t , the sender can observe a child's grades and use this to gauge whether or not there is enough expenditure on H_t . We can also argue that the observability problem is less severe for remittances rather than conditional transfers from, say, the government. Unlike the government, remittance senders are in a better position to formulate incentive-compatible mechanisms because she has superior information on the true utility function of the recipient. By virtue of affinity, the sender knows the pressure and pleasure points of the recipient, and can tweak her information-gathering tools as needed.

Another extension of the model is to develop multi-person households instead of the single-person household we have right now. In many cases, the sender remits income to one member of the household for disbursement, say the guardian, but is primarily concerned with the welfare of other members, say the sender's children. In this case, the use of a representative household utility function would not give us robust results if the guardian and the children have different preferences and interests. Moreover, if the sender knows the interplay of home intra-household relationships, the mechanism she can use to attain her objectives is of great interest.

4. Empirical Testing and Conclusion

In the two cases illustrated above, and particularly in the second case, we see that remittances are not a simple relaxation of the budget constraint. Remittances significantly affect decisions on human capital investment, work search effort, and labour supply. In Case 2, we saw that if remittances are a function of home household decisions (i.e., $R_{Y_t} \neq 0$ or $R_{H_t} \neq 0$ or both), the recipient will have to internalise the sender's preferences in making her decisions. Thus, remittances are not just like any other transfers from anonymous donors, but are the result of an interplay of familial and social relationships.

Also illustrated in the model is the ability of remittances to alter not only the recipient's welfare but also her behaviour. Unlike transfers from anonymous donors, additional income from remittances may not be fully fungible because of the need to internalise the sender's preferences. Thus, the expenditure decisions of remittance-receiving households may have been altered or influenced by the sender. For example, if $R_{H_t} > 0$ is large enough in magnitude then the recipient may invest more on human capital than she would have done if $R_{H_t} = 0$.

Empirical testing of changes in behaviour or decisions is very difficult. One way to proceed is to see, using currently available data, whether households that receive remittances have significantly different allocation patterns from households that do not. While this test will not allow us to infer with *modus ponens* certainty that, say, $R_{H_t} > 0$ if we observe higher spending on human capital, this does give us a way to falsify the hypothesis (assuming, of course, the correct dataset and econometric model are used). Future surveys on this topic can include behavioural questions for both remittance senders and recipients, which can then be matched with observable outcomes.

Studies on the impacts of remittances on recipient households give varied results. On one hand, remittances improve access to education and health care; on the other, it reduces labour productivity and can lead to over-reliance on these transfers. The challenge, then, is to unify and clarify the seeming contradictions in the studies. What current studies lack is a consideration of the intra-family dynamics at play, instead treating remittances just like any other anonymous transfer. Any unified theory or study on remittances should take these dynamics into account.

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