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**Economic Models on the Motives
behind Migrant Workers' Remittances**

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Economic Models on the Motives behind Migrant Workers' Remittances

Michael M. Alba

1. Introduction

International migration and its concomitant remittance flows are among the strongest and most massive social forces attending the process of globalization today. United Nations estimates in 2000, cited in Kapur and McHale (2003) and World Bank (2006), set the number of international migrants at between 150 and 175 million, or 3 percent of the world population,¹ with the stock in high-income countries calculated to have been growing at 3 percent per year between 1980 and 2000, from 2.4 percent per year in the previous decade. The outcome has been that the proportion immigrants in the developed world almost doubled in the last 30 years of the previous century. And as may be expected, remittances to developing countries have inexorably risen, from \$17.7 billion in 1980 to \$31.2 billion in 1990 to \$85.6 billion in 2000 and \$301 billion in 2006.²

Perhaps even more significantly, sea changes in the economic and political landscape are being wrought in the wake of these developments. In the rich countries, there is a nagging and steadily spreading suspicion that immigrants are not only keeping wages (and thus incomes) down but also crowding out citizens-at-birth in the job market. On the other hand, because of the insensitivity of public policy to immigrant concerns, there is growing disaffection and alienation, particularly among the immigrant youth. Not only are social tensions rising in consequence, already there is bleeding into xenophobia, intolerance, and acts of violence, if not terror, that threaten to rend the social fabric of these nations. What has received less attention and therefore needs to be underscored all the more is that where successful assimilation has taken place, immigrants have not only profited in terms of wealth accumulation and enhanced social status, they have also contributed tremendously to the improvement of social welfare in their adopted countries.

On the other side of the income divide, remittance inflows have proved to be a mixed blessing. As Kapur and McHale (2003) observe, transfers from migrant workers have become the most reliable source of foreign exchange for developing countries—the primary source of “foreign investments” in family-run microenterprises and the lifeblood of many in failed states such as Afghanistan, Haiti, Liberia, and Somalia, but also the financial pipeline that sustains the internecine strife in Sri Lanka and Rwanda and that shore up the bellicose foreign policies of poor countries like Armenia and Eritrea. For good or ill, this has in turn brought a measure of independence to the remittance-receiving countries, to some extent freeing their governments, economies, and policies from the grant and loan conditionalities of donor countries and multilateral institutions as well as inuring them to economic sanctions that might be imposed by the community of nations.

¹ Since the estimates are drawn from official census figures of destination countries, the World Bank deems even the 150 million estimate to be on the low end, contending that undocumented aliens are not likely to be forthcoming about their legal status.

² These estimates have to be taken with caution because, as the World Bank (2006) points out, there is as yet no consensus on what constitutes remittances, and, as IFAD (2007) observes, a significant proportion of the flows go through informal channels. The estimates cited in the text come from Kapur and McHale (2003) for 1980, World Bank (2006) for 1990 and 2000, and IFAD (2007) for 2006. No attempt was made to determine the comparability of the data.

For all the importance of international migration and remittances, surprisingly, the twin phenomena remain poorly understood. Who in the pool of migrants remit, to whom are the transfers sent, in what amounts (and whether the monetary value remains constant or varies over time), with what regularity, and for how long are questions that still do not have stock answers. Yet the importance of finding out cannot be underscored. As de la Brière et al. (2002) point out, distinguishing the different motives behind remittances affords understanding of the role these transfers play in the strategic behavior of households. Remittances may not merely be an additional source of income for the recipient households. As the next section of the paper suggests, they can be payments for services rendered to the migrant, payoffs of an insurance scheme that shields recipients from income shocks, returns on household investments in migrants' human capital and location, migrants' investment in inheritable assets, or various combinations thereof. Moreover, the policy implications of alternative motives can be very different. An economic shock that causes unemployment rates to rise in a remittance-receiving country, for instance, can be expected to increase both the proportion of migrants remitting and the amounts remitted if remittances are altruistically motivated (i.e., the migrants care for the recipients), but to reduce the amounts remitted without affecting the frequency if the transfers constitute payments for services rendered by the recipients (because their bargaining power diminishes). Thus, safety net schemes in remittance-receiving countries require more government and domestic resources to be mobilized if remittances are service payments than if they represent charitable giving. On the other hand, government subsidies for and the structure of fees in education may need to be reexamined if emigration is seen as an investment and schooling choices form part of the decision chain that culminates in brain drain. Specifically, policy requires that the full costs of training in careers that are pursued outside the country have to be fully borne by would-be emigrants to the extent that the origin country is unable to reap the social returns of such investments in human capital.

An important building block for comprehending the global sweep of international migration and remittances is therefore an inventory of what drives them at the micro level, i.e., with the individual or the household as the unit of analysis. Only with such a catalog can empirical research then be systematically undertaken and public policy formulated that would correctly harness these social forces for the growth and development of the migrants' origin countries.

This paper is intended to provide an exposition—to non-economists—of the various motives underlying migrant workers' remittances that have been identified in the economics literature. Its goal is three-fold: to provide a taxonomy of the "pure" (as opposed to mixed) motives, to present these models in the analytical fashion that is the norm in economics, at a level that a general audience with some diligence can understand,³ and to draw out the data and econometric implications of how these models can be studied empirically. The rest of the paper is organized as follows: In the next section, an exposition of each of the six models on remittance motives is given in turn. The discussion draws heavily and liberally from the excellent but highly technical survey article of Rapoport and Docquier (2007). The models are all theirs, as are an overwhelming preponderance of the ideas, so much so that citations would have gotten in the way of the presentation. The third section then draws out the implications of empirically exploring these models. The last section provides concluding remarks.

³ I have tried to keep the discussion at the level of Varian (2005), which may be a good reference that the non-technical reader can have in hand while reading this piece.

2. Models on the Motives behind Migrant's Remittances

Altruism

Consider an origin household and a migrant worker who care for each other. One way that this mutual concern may be modeled is by specifying that the preference function of each party is (a) defined over own consumption and the consumption of the other party⁴ and (b) a linear combination of the felicity over own consumption and the preference function of the other party, where the preference weight assigned to the other party can be neither negative (i.e., the other party cannot be despised) nor more than 1/2 (i.e., the other party's importance in preferences cannot exceed that of the self).⁵

Under the assumption of full information, both parties are aware of how each regards the other as well as of the forms of the preference functions. Thus, the migrant worker in particular can factor in the origin household's preferences when deciding how much of her income to consume and to remit to the household. In the process, she derives a new expression for her preference function, which is cast as a linear combination of felicities over own consumption of the two parties and where a "reduced-form" preference weight that the worker assigns to the household now factors in the importance given by the household to the worker.⁶

This reduced-form preference weight has interesting implications. First, when the worker does not care for the household, the weight is zero, as may be expected. Second, as both parties care for each other more deeply (so that the original preference weights each approach 1/2), the reduced-form weight approaches 1/3. Third, when the household does not care for the worker but the worker cares deeply for the household—a case of unrequited love—the reduced-form weight is 1/2. Thus, the specification yields the paradoxical result that the worker assigns a higher reduced-form preference weight to the household when it does not care for her than when it does. The reason for this is that the worker, aware that the household is pained when she demonstrates care for it (since this occurs at the cost of some self-sacrifice), accounts for this negative feedback effect.

Given this set-up, the worker uses transfers so that the resulting consumption pair—hers and the household's—maximizes the value of her preference function. The necessary condition for obtaining this optimum is that, at the last currency-unit remitted, (the absolute value of) the rate at which the worker's felicity decreases (due to lower consumption) relative to the rate at which the household's felicity increases (due to higher consumption) is exactly matched by the ratio of the worker's reduced-form preference weights for the household to that for herself. To illustrate: suppose that the worker and the household both care for each other deeply so that the worker's revised preference weight for the household is 1/3 and that for herself is 2/3. At the last currency-

⁴ The assumption here is that consumption is some measure of the material basis of well being or of the standard of living.

⁵ Formally, this may be described as follows: Let $i = h$ (ousehold), m (igrant), and $-i$ be the other agent. Then the preference function of the i th party may be written as $U^i(C^h, C^m) = (1 - \beta^i)V^i(C^i) + \beta^i U^{-i}(C^h, C^m)$, where C^i is the consumption of the i th party, $V^i(\cdot)$ is the felicity function over own consumption, and $\beta^i \in [0, 1/2]$ is the original preference weight that the i th party assigns to the other.

⁶ The migrant worker's revised preference function may be written as $U^m(C^h, C^m) = (1 - \gamma^m)V^m(C^m) + \gamma^m V^h(C^h)$, where

$$0 \leq \gamma^m = \frac{\beta^m(1 - \beta^h)}{1 - \beta^m\beta^h} \leq \frac{1}{2}$$

is the reduced preference weight.

unit remitted by the worker, it must be that the one currency-unit contraction in the worker's consumption causes her felicity to decrease by one unit and the one currency-unit increase in the household's consumption causes its felicity to increase by 2 units. If this were not so, further adjustments can be made to transfers that increase the value of the worker's preference function. For instance, suppose that at a given consumption pair a one currency-unit transfer decreases the worker's felicity by one unit but increases the household's felicity by 3 units. Given that the worker's felicity has a weight of $2/3$ in her preference function, implementing the transfer causes a net increase of $1/3$ in the value of her preference function: a decrease of $2/3$ due to the one currency-unit decline in own consumption ($2/3 \times (-1)$) but which is more than offset by an increase of 1 due to the one currency-unit increase in household consumption ($1/3 \times 3$). Thus, the worker's preference function is not optimized at the consumption pair at which the evaluation was performed.

The altruistic model yields the following predictions: Transfers to the origin household increase with the migrant worker's income, but decrease as the origin household's income increases. Transfers are also higher the more deeply the migrant worker cares for the origin household and the less deeply the origin household cares for the migrant worker. In addition, two particularly strong claims of the model are that (a) a one currency-unit increase in the migrant worker's (pre-transfer) income coupled with a one currency-unit decrease in the origin-household's (pre-transfer) income will cause a one currency-unit increase in transfers to the origin household and (b) because transfers insulate consumption from income shocks, the distribution of consumption is independent of the distribution of incomes for both the origin households and the migrant workers.

Other hypotheses that are inferred from the altruistic model (due to supposed links between the variables in the theoretical model and those found in data sets) include the following: (a) A migrant worker who has a higher earning potential will remit more funds to the origin household. (b) A poorer origin household will receive more remittances. (c) Remittances increase with the closeness of familial ties (or the stronger are the emotional bonds) between the migrant worker and the household. (d) Remittances to the origin household increase the more resolved the migrant worker is about returning home. (e) Remittances from a given migrant worker decrease as the number of other migrant workers from the same household increases.

In empirical studies, altruism is usually considered as the base motive, i.e., the null hypothesis, against which the existence of other motives are tested.

Exchange

To set this model in stark contrast to the previous one, suppose now that the migrant worker and the remittance-receiving household are non-altruistic agents who are bound not necessarily by familial ties but by a contractual arrangement. Thus, the motive for remittance transfers is not concern for the welfare of the recipient household but to pay for services rendered, which may be as varied as managing the migrant's assets, handling his affairs, or taking care of his family.

Two features of the contractual arrangement are noteworthy: First, the engagement is not simply an anonymous market transaction, but (as would be noted in the new institutional economics literature) is rather imbued with issues of mutual trust, credible commitments, and (second-party) enforcement mechanisms. More than the hiring of a financial manager, a personal lawyer, or a household caretaker is involved. Either no market at all exists for these services in the local economy so that special arrangements have to be made or the transaction costs of contracting such

services are much lower than the available market alternatives.⁷ Thus, in empirical validations of the exchange motive, incorporating specific institutional details that provide the backdrop for the contractual arrangements in a given community takes on a heightened importance. Second, the contract must be Pareto-improving, i.e., the arrangement must be mutually beneficial, which implies that the participation constraints are satisfied (i.e., both parties find the provisions of the contract acceptable). Operationally, this means that the transfer payment can neither be greater than the maximum amount that the migrant worker is willing to remit for the services contracted nor less than what the household can receive in an alternative activity.

To account for the pay-for-services exchange, the preference functions of the migrant and the household are now specified to be defined over own consumption and services demanded or supplied. For the migrant, increases in each of these two factors are associated with a higher level of welfare; for the household, increases in consumption mean better well-being, but increases in services to be rendered are a disutility or hardship. There is thus a divergence of interests between the two parties with respect to the second factor, and it is the pay-for-service contract that makes them compatible.⁸

Under the assumption of full information and that the bargaining power rests entirely with the migrant⁹ (as is customary in principal-agent models), the optimal contract that the migrant offers the household on a take-it-or-leave-it basis sets the amount of the transfer payment to be such that the household is just indifferent between accepting the contract and rejecting it for the alternative activity.¹⁰ In effect, the migrant sets the contractual terms to exact the least sacrifice from herself in terms of lower resources for consumption that the transfer amount represents, while at the same time ensuring that they satisfy the household's participation constraint (that the benefit-cost ratio of accepting the contract is just the same as that of the alternative activity).¹¹

⁷ For instance, it may be well nigh impossible to specify, monitor, and enforce the quality and extent of services to be rendered under all possible contingencies, so that it is difficult to draw up a formal contract. In contrast, there may be long-standing norms that dictate what the appropriate conduct is and that prescribe how gains from the exchange may be divided between parties in a service arrangement given a particular set of circumstances. Or quid pro quo or bundled contractual arrangements may be involved to get around weak enforcement of property rights, such as when a caretaker household is allowed to live on the property of the migrant to secure it against encroachment by squatters.

⁸ Formally, the preference functions may be written as $V^i(C^i, X)$, where $i = m$ [migrant] and h [household], C^i is the consumption expenditure of the i th party, and X is the amount of services of a given quality that is contracted. For the migrant, it is assumed that

$$V_{C^m}^m(C^m, X) = \frac{\partial V^m(C^m, X)}{\partial C^m} > 0 \quad \text{and} \quad V_X^m(C^m, X) = \frac{\partial V^m(C^m, X)}{\partial X} > 0.$$

For the household, it is assumed that

$$V_{C^h}^h(C^h, X) = \frac{\partial V^h(C^h, X)}{\partial C^h} > 0 \quad \text{but} \quad V_X^h(C^h, X) = \frac{\partial V^h(C^h, X)}{\partial X} < 0.$$

⁹ This assumption is adopted to simplify the analysis. Its effect is to change the results only marginally to account for the difference in the relative bargaining powers of the parties.

¹⁰ In other words, the contract sets the household at $V^h(I^h + T, X) = V^h(I^h, 0)$, where I^h is the household's pre-transfer income and T is the amount transferred.

¹¹ The greater the bargaining power of the household, the more the contractual terms offered would favor its interests. When bargaining power lies entirely with the household, the migrant offers to remit the maximum amount of funds that she is willing to pay for the given services. This is the amount of transfers that just

The exchange model gives the following predictions: Transfers increase with the diversity or range, quantity, intensity, and quality of services contracted. Moreover, the maximum amount of transfers that the migrant is willing to pay increases with the migrant's income. Unlike in the altruistic model, the recipient household's pre-transfer income has an ambiguous effect on remittances. Specifically, how remitted funds respond to household pre-transfer income depends on whether household consumption and the contracted services are independent of each other or are complements. If independent, increases in pre-transfer income induce larger transfers; if complementary (perhaps because being the migrant's agent lends prestige or opens more income-generating opportunities), increases in pre-transfer income may be associated with smaller transfers.

Based on differences in their predictions, the following distinctions can thus be made between the altruistic and exchange models: First, (actual) transfers are unequivocally positively correlated with the migrant's income in the first model, but are not necessarily so in the second model.¹² This is because what covaries with migrant's income in the exchange model is the maximum transfer amount. This latter variable, however, is observed (i.e., is equal to actual transfers) only when the household's bargaining power is strong. Thus, in general and particularly when households generally have poor bargaining power, observed transfers may not show any covariation with migrant's income.

Second, transfers are unambiguously negatively correlated with the household's income in the altruistic model, whereas the covariation between the variables in the exchange model depends on how household consumption and services are related in the household's preference function. If preferences over consumption and services are independent, then transfers are positively correlated with household income; if the two are complements in household preferences, then transfers and household income may be negatively correlated.

Third, the likelihood and amount of transfers are positively correlated in the altruistic model, but are not necessarily so in the exchange model. In the first model, when the migrant's income rises or when the recipient household's income falls, the likelihood of remitting increases (because of the migrant's concern for the household). Thus, the probability of remitting and the amount remitted both move in the same direction as a result of changes in the circumstances of the migrant and the household. The same cannot be said in the second model. If the household's opportunity costs rise and this prompts the migrant to increase the transfer amount, this change in circumstances need not increase the likelihood of remittances, which may be dictated by other factors (e.g., by contractually set dates on which the payments have to be received by the household).

Fourth, general economic and political conditions that affect the opportunity cost or bargaining power of the household change the amount of transfers in the exchange model, but do not have an impact in the altruistic model. If the unemployment rate rises in the country of origin, for instance, which in turn lowers the opportunity cost of the household and weakens its bargaining power, then transfers should decrease under the exchange model. To the extent that this labor shock does not directly affect the consumption resources of the recipient household, however, it does not have an effect on transfers in the altruistic model.

An upshot of the distinct predictions of the two models is that their policy implications can be very different. For instance, increases in food prices in the country of origin, which boil down to real

satisfies the migrant's participation constraint, i.e., that just makes the migrant indifferent between contracting and not contracting the services, $V^m(I^m - T^{\max}, X) = V^m(I^m, 0)$.

¹² More specifically, the (unobserved) maximum transfer amount may increase with the migrant's income, but whether actual transfer amounts would increase with the migrant's income would also depend on the relative bargaining powers of the parties and the opportunity costs of the recipient household.

income contractions, are predicted to induce higher remittance inflows in the altruistic model, but are expected to have either no effect or a negative effect on remittances in the exchange model. Thus, there may be less need for government intervention in the form of price subsidies or safety nets in the altruistic model than in the exchange model.

Lucas and Stark (1985) discuss the exchange motive under “pure self-interest” models of remittances.

A strategic motive

This model of remittance behavior is distinct from the first two in at least two ways. First, unlike the models discussed earlier, which were formulated and could be applied in contexts other than migration, as pointed out in Rapoport and Docquier (2007), the strategic-motive model was developed specifically with migration in mind. The intent: to explain in an integrated framework how the selection of migrant workers and remittance flows may be interdependent decisions. Second, unlike the first two models where full information was assumed, the motive for remittances underlying this third model depends on information asymmetry (i.e., on one party to a transaction having more information than the other). More specifically, remittances depend on an (initially) unobservable labor productivity attribute that causes employers in the host country to set wages according to the average productivity of the pool of workers.

The story behind the strategic-motive model is as follows: Suppose that some workers are more productive than others and that (at least) over a period right after migration it is difficult for employers in the host country to ascertain individual productivity, so that new workers are paid according to the average productivity of the cohort from their country of origin. Then there is scope for collusive behavior among workers and for the community at large: So as not to depress host country wages, migrant workers could commit to remitting “bribe money” to both the less productive workers to keep them from migrating and the community to police the ranks of migrant applicants and rid them of potential free riders (i.e., low productivity workers who are provided with a strong incentive to emigrate because of the high wage differential between the host and origin countries wrought by the high-productivity workers).

Setting this story in game-theoretic terms, consider two potential migrants, m and h . Let h be only half as productive as m . In their home country, each is paid his or her marginal product, which may be, say, 55 (currency units) for h . In the host country, let m 's marginal product be 300. Suppose, however, that if both m and h emigrate, each at a cost of 100, host-country firms can only offer to pay wages equivalent to their average productivity. Then the game's payoff matrix can be presented as follows:¹³

		Player h	
		Migrate	Stay
Player m	Migrate	125, 125	200, 55
	Stay	110, 50	110, 55

¹³ More generally, the payoffs can be formulated as follows: Let c be the cost of emigrating, $\theta \in (0, 1)$ be the productivity of h relative to that of m , and I^h and I^m be, respectively, h 's marginal product in the home country and m 's marginal product in the host country. Then m 's income would be I^h/θ in the home country and $I^m - c$ in the host country if only high-productivity workers emigrate, and h 's income would be I^h in the home country and $\theta I^m - c$ in the host country if only low-productivity workers emigrate. Because host-country employers cannot discern individual productivity (at least over an initial period), if both m and h emigrate, their income would each be $[(1 + \theta)/2]I^m - c$. The payoff matrix in the text was composed with the following somewhat arbitrary parameter values: $c = 100$, $\theta = 1/2$, $I^h = 55$, and $I^m = 300$.

The structure of the payoffs in this game yields the following insights: First, notice that if m chooses to stay, h has no incentive to emigrate: His payoff in {stay, stay}, which is 55, is higher than that in {stay, migrate}, which is 50 [= 150 – 100]. Given the cost of migrating (100), the gross income (150) h stands to receive in the host country is simply not large enough (i.e., not greater than the 55 he gets in the home country) to make the enterprise worthwhile. Second, for m “migrate” is a dominant strategy (i.e., it yields higher payoffs no matter what strategy h chooses to play): If h chooses to migrate, she (m) gets 125 if she also chooses to migrate but only 110 if she stays; if instead h chooses to stay, she gets 200 if she migrates but only 110 if she stays. Thus, whatever strategy h chooses, m ’s optimal strategy is to migrate. Third, given that “migrate” is a dominant strategy for m , h ’s best response is to migrate: In {migrate, migrate} he gets 125, whereas in {migrate, stay} he only gets 55. The reason for this happenstance is that when h migrates with m , he is able to free ride on her productivity because host-country employers cannot distinguish their individual contributions to firm output. This is in stark contrast to the case where h migrates while m stays, because then (without any “skirt” behind which to hide his poor productivity) h is found out for the low-productivity worker that he is.

Thus, {migrate, migrate} is the Nash-equilibrium strategy¹⁴ in this game. This outcome, however, is not the best result for m . She can do better with {migrate, stay} where she gets 200 (rather than just 125 in {migrate, migrate}). So for m , the question is, Is there a way that she can somehow persuade h to stay (so that m ’s wage will not be pulled down by h)?

Suppose that m commits to giving h a side payment of 72 to not migrate. Doing so decreases m ’s payoff in {migrate, stay} to 128 [= 200 – 72], but at least it would still be higher than the 125 she gets from {migrate, migrate}. On the other hand, h ’s payoff in {migrate, stay} would increase to 127 [= 55 + 72]. Thus, under this transfer payment scheme, the payoff matrix would become

		Player h	
		Migrate	Stay
Player m	Migrate	125, 125	128, 127
	Stay	110, 50	110, 55

Note that, as a result of the change in payoffs arising from the transfer payment, the outcome {migrate, stay} has become the dominant-strategy equilibrium of the game:¹⁵ For m , “migrate” remains the dominant strategy (since she gets at least 125 if she migrates and only 110 if she stays); for h , “stay” has become the dominant strategy as a result of the transfer payment.¹⁶

¹⁴ A Nash equilibrium is a play of the game in which the strategy chosen by each player is the best response to the choices made by all the other players. In effect, in a Nash equilibrium there is mutual consistency between and reinforcement of the beliefs (regarding what the other players would do) and the actions of the players.

¹⁵ It may be noted that a dominant-strategy equilibrium is always a Nash equilibrium, but a Nash equilibrium is not necessarily composed of dominant strategies.

¹⁶ In the original game, m finds it worthwhile to migrate if $[(1 + \theta)/2]I^m - c > I^h/\theta$ holds. Note that when this condition is satisfied, it gives h the incentive to free ride since it implies that $[(1 + \theta)/2]I^m - c > I^h$ also holds. Given that the condition for m ’s migration is satisfied, transfer payments are welfare improving when the following two other conditions hold as well:

$$I^m - T \geq \frac{1 + \theta}{2} I^m$$

$$I^h + T \geq \frac{1 + \theta}{2} I^m - c,$$

where T stands for the remittance transfer. These two inequalities can be combined into one,

The following predictions are drawn from the strategic motive for remittances model: First, high-productivity workers are the ones who are selected for migration and who remit to the home country. Thus, workers who migrate are also the ones most likely to remit. Second, remittances are targeted at low-productivity workers who can pass themselves off as high-productivity types. For instance, workers with the educational and employment credentials but who may not have the drive to work hard are likely to be the beneficiaries of remittances. Conversely, individuals who are unable to pass the screening process for employment abroad are not likely to receive remittances. Third, once an effective signaling device or screening mechanism¹⁷ can be used to distinguish worker productivity, workers who avail of the signal or who pass the screening process no longer remit money to the home country. Thus, workers who pass their probationary period, for example, are predicted by this model to immediately stop sending remittances. Fourth, as in the altruistic model, remittances are predicted to increase with the migrant's (pre-transfer) income and to decrease as (pre-transfer) income in the home country increases. The effect, however, is stronger here: a currency-unit increase in the migrant's income coupled with a currency-unit decrease in the home country is predicted to increase transfers by more than one currency unit. In effect, the strategic motive for remittances model reflects a greater inequality aversion than the altruistic model.

According to Rapoport and Docquier (2007), the strategic-motive model has been claimed to apply particularly to Filipino nurses, their worldwide high-productivity reputation being allegedly the result of government control of the international recruitment process. This contention notwithstanding, serious doubts have to be raised about the model's applicability or plausibility. First, it is not clear who in particular in the home country receives the bribes cum remittances. Surely, the setting of the model is no longer the household, since worker productivity is more variable across rather than within families. But if remittances are sent to some fund handled by a community organization or government agency that then subsidizes wages in the local economy (for certain professions) or ensures that tight emigration controls are implemented, this in turn raises questions on who the receiving entities are as well as how they are identified for the entitlement, how free riding among migrant workers is inhibited (i.e., what mechanisms are in place that compels a migrant worker who has benefited from emigration controls to pay back in the form of remittances) and what interventions are used to increase local wages or implement strict recruitment rules: Are the bribes actually collected as processing fees collected by government agencies and recruitment firms during the emigration process and prior to departure?

$$\frac{1+\theta}{2}I^m - I^h - c \leq T \leq \frac{1-\theta}{2}I^m,$$

and can be solved to show that $\theta I^m - c \leq I^h$. In words, for transfer payments to be worthwhile in this model, h 's productivity must be so low that his income net of migration cost when only he emigrates does not exceed what he earns in the home country. Combining this last result with the inequality condition for m 's emigration yields $I^m < 2c/\theta$. This says that m 's marginal product in the host country must be sufficiently small such that h 's implied marginal product in the host country (θI^m) does not exceed twice the migration cost.

What this analysis shows is that the strategic motive for remittances arises only under rather restrictive circumstances and may not be viable in general.

¹⁷ A signal is a device used by a party with an unobserved but desirable attribute to reveal that he has the trait. Screening is a process that a party seeking some hidden information implements to distinguish those with the desirable (or undesirable) attributes. For instance, high-productivity individuals may use educational attainment to signal their capability to the extent that low-productivity individuals have a more difficult time acquiring the signal. On the other hand, firms can use an interminable interview process as a screening mechanism for finding high-stamina employees.

Second, average-productivity wages for workers from a particular country of origin seem to ascribe higher computational capabilities to host-country firms than seems plausible. If firms know the average productivity of workers from each country of origin, surely they must find it easier to assess the individual marginal products of workers in their plants or offices. On the other hand, if firms know only the average productivity of new workers (as a group), then a country of origin will be unable to control how this average productivity behaves unless it is the only source of new workers.

Third, as was mentioned earlier, the strategic-motive model gives the right mix of incentives only under very restrictive conditions. Consequently, it cannot have wide applicability.

Stark and Bloom (1985) discuss the strategic motive, but only in the context of migration and with no mention of side payments.

Insurance

Like the strategic-motive model (and unlike the first two models), the insurance model presents migration and remittances as interdependent behaviors arising from a single integrated decision-making framework. Drawing on the observation that incomes in less developed countries tend to be more volatile (and all the more so in their rural and agricultural locales), the model maintains that migration is a coping mechanism adopted by families in such settings to insure themselves against geographic risk. The insight is that, by strategically locating members in a variety of places such that their incomes end up being uncorrelated, these families in effect are able to spatially diversify their portfolios of labor resources, thus minimizing their overall exposure to an income shock in any one place. Remittances then represent intra-family insurance payoffs meant to counter the vicissitudes of fortune experienced by family members where they are and to smooth out their levels of consumption (or maintain their standards of living) over good times and bad.

For a simple account of the insurance motive for remittances, consider the following two-period model of two risk-averse individuals, who are assumed to have identical preference functions over income. Suppose that, in the initial period ($t = 0$), the two, m and h , have each earned, say, 7 (currency units) in the home country. Let it be the start of the second period ($t = 1$), for which the prognosis is somewhat bleak: With a 75 percent chance, income in the home country will be 2, and, with a 25 percent chance, it will be 22.

Exploring her options, m discovers that migrant workers in a neighboring country earn 28 with certainty. Unfortunately, migrating to that country costs 7.5, which is more than she can afford. Moreover, there is neither an option to borrow against future income (i.e., m is liquidity constrained) nor a facility to avail of a loan (i.e., she is also credit constrained).

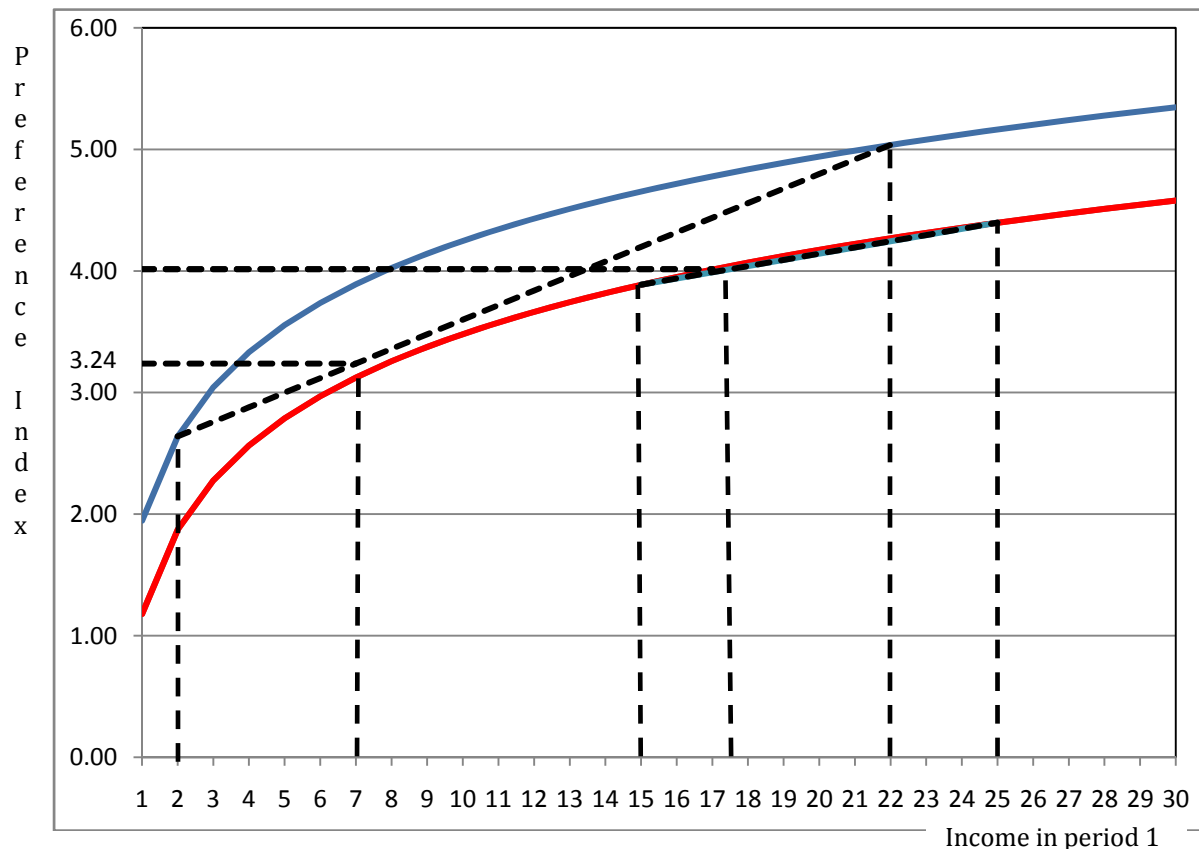
Hitting on a bright idea, m offers a deal to h . If h lends her 3.75 to enable her to migrate (i.e., he shoulders half of the migration cost), m promises to remit 13 at the end of period 1 if it turns out to be a bad time and 3 if it turns out to be a good time.

Evaluating the proposal, h sees that his options and their conditions may be summarized as follows:

Action on proposed deal	Period		
	0	1	
		Bad (prob = $\frac{3}{4}$)	Good (prob = $\frac{1}{4}$)
Reject	7	2	22
Accept	3.25	15	25

If he rejects the deal, his well-being over the two periods depends on his period-0 income of 7 and his period-1 income, which will be 2 with a probability of 3/4 and 22 with a probability of 1/4. If he accepts the deal, his well-being depends on his period-0 income net of his share of m 's migration cost, which is 3.25 [= 7 - 3.75], and his transfer-augmented period-1 income, which will be 15 [= 2 + 13] with a probability of 3/4 and 25 [= 22 + 3] with a probability of 1/4. Concluding that the deal is advantageous to him, h accepts it.

The reasoning that h follows can be gleaned from Figure 1 below.¹⁸ If he refuses the deal, his preference function would be the higher, blue curve, which presumes that he keeps all of his period-0 income.



In period 1, h can earn either 2 or 22. Projecting two vertical lines from the horizontal axis—one at 2 and another at 22—to the blue curve gives the values of h 's preference index at these income levels. Tracing out a straight line with these preference index values as the end points gives all the weighted averages that can be calculated for these two values. In other words, the weighted-average line reflects the changing value of h 's expected preference index as the weight assigned to the index when income is 2 is gradually decreased from 1 to 0, and correspondingly the weight assigned to the index when income is 22 is gradually increased from 0 to 1, with the weights always summing up to unity each time the average is calculated. Since the bad outcome—a period-1

¹⁸ To be consistent with the assumption that m and h are risk-averse, their preference functions (i.e., the index they use to evaluate their well-being) in Figure 1 are specified as $\ln(Y^0) + \ln(I^1)$, where Y^0 is income in period 0 net of the person's share of migration cost and I^1 is income in period 1. Notice that, because the horizontal axis consists of values of I^1 , the vertical intercepts of the curves reflect the values of $\ln(Y^0)$, which are equal to $\ln(7) = 1.95$ when no one migrates and $\ln(3.25) [= \ln(7 - 7.5/2)] = 1.18$ when m migrates.

income of 2—occurs with 0.75 probability and the good outcome—an income of 22—with 0.25 probability, h 's expected income in period 1 is 7 [= $0.75 \times 2 + 0.25 \times 22$] and the value of his expected preference index is 3.24 [= $\ln(7) + 0.75 \times \ln(2) + 0.25 \times \ln(22)$].

If h accepts the deal, on the other hand, his preference function becomes the lower, red curve, since shouldering half of m 's migration cost reduces his period-0 resources to 3.25, in effect decreasing the vertical intercept of his preference function. The compensating factor, however, is that ensuing transfers from m ensure that h 's period-1 income will be either 15 or 25. Since these states of the world occur with probabilities of 3/4 and 1/4, respectively, if he accepts the deal, h 's average income in period 1 is 17.5 [= $0.75 \times 15 + 0.25 \times 25$], and his expected preference index, 4.01 [= $\ln(3.25) + 0.75 \times \ln(15) + 0.25 \times \ln(25)$]. Since his expected preference index if he accepts the deal is higher than if he rejects it, h accepts it.

As for m , note that if she does not migrate, her preference function is also the blue curve in Figure 1, since she has exactly the same preferences and period-0 resources as h . Hence, her expected income and expected preference index are likewise 7 and 3.24, respectively. If she migrates, on the other hand, her preference function is the red curve as well, since, like h , she bears only half of her migration cost.¹⁹ Her period-1 income net of transfers will be 15 [= $28 - 13$] if it turns out to be a bad time and 25 [= $28 - 3$] if it turns out to be a good time. But these will be exactly the transfer-augmented incomes of h as well. Consequently, m 's expected income and expected preference index will likewise be 17.5 and 4.01, respectively.

The reasons underlying the identical distributions of income when m migrates are as follows: First, m and h are assumed to have equal bargaining power, which is reflected in their equal sharing of m 's migration cost. Second, in entering into an insurance arrangement, m and h are in effect agreeing to pool their resources and share them equally using transfers. Thus, under the bad state of the world, total income is 30 [= $2 + 28$] and half of it is 15. Consequently, m sends 13 to h to equalize their incomes in the bad state. Under the good state of the world, on the other hand, total income is 50 [= $22 + 28$] and half of it is 25. Consequently, m sends only 3 to h to equalize their incomes in the good state.²⁰

¹⁹ The higher the share of migration cost that m bears relative to h , the lower is her second preference function since she ends up with less period-0 resources than h .

²⁰ A general description of the model may be given as follows: Let incomes in the home country be I^0 during the initial period, I in period 1 if times are bad, and \bar{I} if times are good. (It goes without saying that $I < \bar{I}$.) Assume that the cost of migration c is such that $I^0 < c < 2I^0$, so that migration is not affordable without help from the other person. As a simplifying convenience, suppose that m and h have identical, risk-averse preference functions, the component felicity functions of which are additively separable over time periods and states of the world, so that expected utility is given by

$$E[V(I^0, I, \bar{I})] = v(I^0) + pv(I) + (1 - p)v(\bar{I}),$$

where p is the probability of the bad state of the world.

Let ω be m 's share of her migration cost, and \underline{T} and \bar{T} be the transfers that m commits to provide h in the bad and good states of the world, respectively. Then the set of Pareto-efficient insurance contracts consists of the triple $(\omega^*, \underline{T}^*, \bar{T}^*)$ that jointly maximizes

$$E(V^m) + \lambda[E(V^h) - \underline{V}^h],$$

where λ is the relative bargaining power of h and \underline{V}^h is the minimum value of h 's preference index that is guaranteed by the contract. Using the expected utility function given earlier, one may rewrite the objective function as

There are two problems with the insurance arrangement just described, however. The first concerns the credibility of m 's promise to remit transfers, and the second has to do with the case in which h 's actions may have a bearing on his income in period 1.

With regard to the first issue, the question may be raised: After obtaining her benefits from the deal, what is to keep m from reneging on her commitment to h ? Without assets that can be used as collateral, which indeed is why m is unable to avail of a loan from formal sector sources to finance her migration in the first place, and absent any co-maker who can be made to bear the burden of such a loan,²¹ the informal contract between m and h —at least when it is an anonymous transaction—suffers from a lack of second-party enforcement mechanisms (i.e., schemes by which h can compel m to honor her promise regarding the transfers).

Such sanctions, though, are readily available within a family setting or a kinship group. If m and h are not merely bound by a business deal but are members of the same family or social network, news that m failed to comply with the terms of the agreement may cause her to lose face, not only among immediate members of the family, but in the larger community as well. Worse, she may be ostracized by the family or disinherited by her forebears as a result.

The upshot then is that the insurance motive is unable to stand on its own merits, but needs to be buttressed by other motives (e.g., altruism or inheritance) to be practicable. But this “coupling” requirement, in turn, makes it difficult to verify the insurance model in empirical settings and to measure the extent to which it influences remittance behavior independently of other motives.

Turning to the second issue, suppose that, instead of home-country income being exogenously determined by Nature, it depends to some extent on h 's effort. For instance, it may well be that, in the good state of the world, income is an increasing function of effort, but, in the bad state, effort

$$v(I^0 - \omega c) + pv(I^m - \underline{T}) + (1-p)v(I^m - \bar{T}) + \lambda\{v[I^0 - (1-\omega)c] + pv(\underline{L} + \underline{T}) + (1-p)v(\bar{L} + \bar{T})\}.$$

The first-order conditions of this problem are:

$$\begin{aligned} -v'(I^0 - \omega c) + \lambda v'[I^0 - (1-\omega)c] &= 0 \\ -v'(I^m - \underline{T}) + \lambda v'(\underline{L} + \underline{T}) &= 0 \\ -v'(I^m - \bar{T}) + \lambda v'(\bar{L} + \bar{T}) &= 0, \end{aligned}$$

which yield the result that

$$\frac{v'(I^0 - \omega c)}{v'[I^0 - (1-\omega)c]} = \frac{v'(I^m - \underline{T})}{v'(\underline{L} + \underline{T})} = \frac{v'(I^m - \bar{T})}{v'(\bar{L} + \bar{T})} = \lambda.$$

In words, this means that maximization of the objective function requires that, in period 0 as well as in each of the two states of the world, the ratio of m 's marginal felicity to that of h must be equal to the bargaining power of h .

To illustrate what these equations mean, suppose that $\lambda = 2$. Then the first equation of the first-order conditions implies that, at the last unit of net period-0 resources consumed, the marginal felicity of m must be twice that of h . Since m and h are risk averse, their marginal felicities decline as income rises. Consequently, m 's net period-0 resources must be less than that of h . But any difference in period-0 resources between m and h can only come from ω and $(1-\omega)$. Hence, it must be that $\omega > (1-\omega)$ or $\omega > 1/2$, i.e., m bears more than half of the cost of her migration if h 's bargaining power is high. (A similar analysis can be carried out on each of the other two equations.)

²¹ A page that can be taken from medieval bargaining practices, noted in North (1990), is that m can send a kin (whose closeness to her is indisputable) as a “hostage” in h 's household. The kin gains his freedom only after it is established that m has honored her end of the deal.

has no effect on income. Assume that effort itself causes a disutility (or discomfort) that increases at an increasing rate. Then, for as long as m can be counted on to deliver her end of the deal, h 's problem may be cast as finding the effort level that maximizes the value of his expected preference index over income.²²

²² This problem may be formally presented as follows: Let h 's preferences over consumption C^h and effort e be defined by

$$V^h(C^h, e) = C^h - \frac{\beta}{2}e^2,$$

where $\beta > 0$. Let

$$C^h = \begin{cases} \bar{C}^h & \text{with probability } q \\ \underline{C}^h & \text{with probability } 1 - q \end{cases}.$$

Then h 's expected preference function may be expressed as expected consumption less the disutility of effort:

$$E[V^h(C^h, e)] = q\left(\bar{C}^h - \frac{\beta}{2}e^2\right) + (1 - q)\left(\underline{C}^h - \frac{\beta}{2}e^2\right) = E(C^h) - \frac{\beta}{2}e^2.$$

Suppose that h 's income I depends on effort only in the good state of the world, but is zero otherwise, so that

$$I = \begin{cases} \alpha e & \text{with probability } q \\ 0 & \text{with probability } 1 - q \end{cases},$$

where $\alpha > 0$ is the marginal product of effort, and transfers from m are triggered when income falls below a mutually agreed upon level, i.e., $I < I^{\min}$. Then h 's expected preference function may be rewritten in terms of effort for a given level of minimum guaranteed income as

$$\begin{aligned} E[V^h(e | I^{\min})] &= q(\alpha e + \max\{I^{\min} - \alpha e, 0\}) + (1 - q)I^{\min} - \frac{\beta}{2}e^2 \\ &= \begin{cases} q\alpha e + (1 - q)I^{\min} - \frac{\beta}{2}e^2 & \text{if } \alpha e \geq I^{\min} \\ I^{\min} - \frac{\beta}{2}e^2 & \text{if } \alpha e < I^{\min} \end{cases}. \end{aligned}$$

The first-order conditions of the problem are therefore given by

$$\frac{\partial E(V^h)}{\partial e} = \begin{cases} q\alpha - \beta e \leq 0 & \text{if } \alpha e \geq I^{\min} \\ -\beta e \leq 0 & \text{if } \alpha e < I^{\min} \end{cases},$$

which yield the following two solutions:

$$e^* = \begin{cases} e_1^* = \frac{q\alpha}{\beta} & \text{if } \alpha e \geq I^{\min} \\ e_2^* = 0 & \text{if } \alpha e < I^{\min} \end{cases}.$$

Moral hazard is precluded when e_1^* yields a higher value of the expected preference function than e_2^* , i.e., when $E[V^h(e_1^* | I^{\min})] \geq E[V^h(e_2^* | I^{\min})]$, which in turn implies that $q\alpha^2/(2\beta) \geq I^{\min}$. Under this "no moral hazard" scenario, the following conditions obtain:

There are two solutions to this problem. The first is presented in Figure 2, which may be interpreted as follows: The (upward slanting) dotted lines are weighted averages of a given level of minimum income and the value of a transformation function that converts effort into expected consumption, where the weights used are the probabilities of the states of the world. The probability of the bad state, specified to be 0.75, is assigned to minimum income, while the probability of the good state is assigned to the effort transformation function. Hence, the vertical intercepts of the dotted lines (i.e., the part of the linear combination that is not due to effort) represent the products of the bad-state probability and minimum income, which are assumed to be zero for the lower line and 800 for the higher line (i.e., $0 [= 0.75 \times 0]$ and $600 [= 0.75 \times 800]$, respectively). On the other hand, the identical slope of the two lines is the product of the good-state probability and a constant marginal productivity of effort (which is specified to be 100).

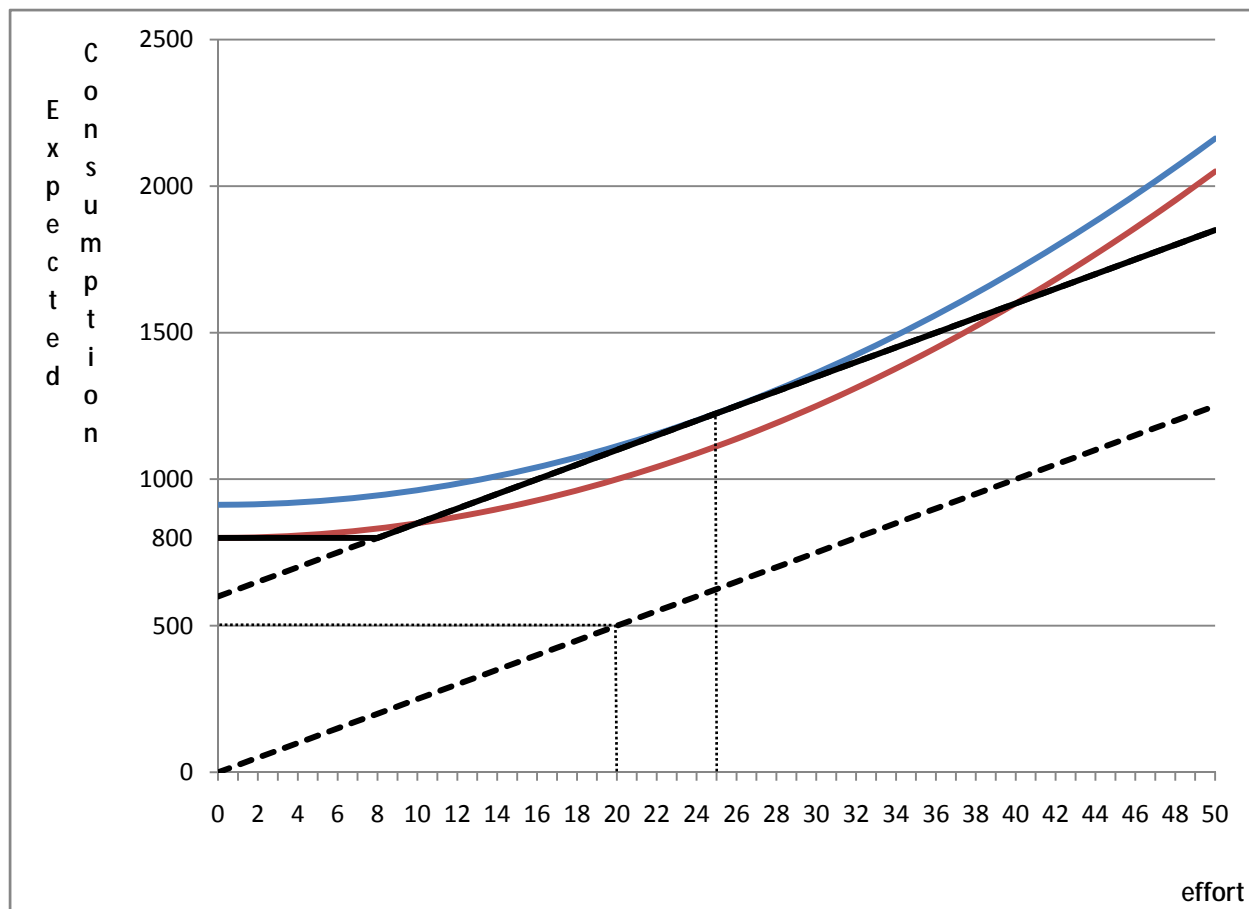
An example helps to clarify further what the lines represent. When minimum income is zero (so that the relevant line is the lower one), an effort level of 20 translates into an expected consumption of 500 $[= 0.75 \times 0 + 0.25 \times 100 \times 20]$. Hence, because the lines indicate how much expected consumption is afforded by a given level of effort, they may also be construed as budget constraints before the actual state of the world is known.

$$E(C^h) = \frac{(q\alpha)^2}{\beta} + (1-q)I^{\min}$$

$$E(T) = (1-q)I^{\min}$$

$$E(C^m) = qI^m + (1-q)(I^m - I^{\min}) = I^m - (1-q)I^{\min}.$$

In contrast, under the moral hazard scenario, the conditions are: $E(C^h) = E(T) = I^{\min}$ and $E(C^m) = I^m - I^{\min}$.



Assume now that a minimum income of 800 is guaranteed for h by his insurance arrangement with m . Then h 's actual budget line is represented by the solid black line, which is initially a horizontal line, since the minimum income specified by the insurance contract acts as an income floor, in effect ensuring h a minimum level of expected consumption (through transfers from m). Once h 's effort level is sufficiently large (or intense) such that it generates a level of expected consumption greater than the minimum income, however, the ex ante budget line merges with the actual budget line.

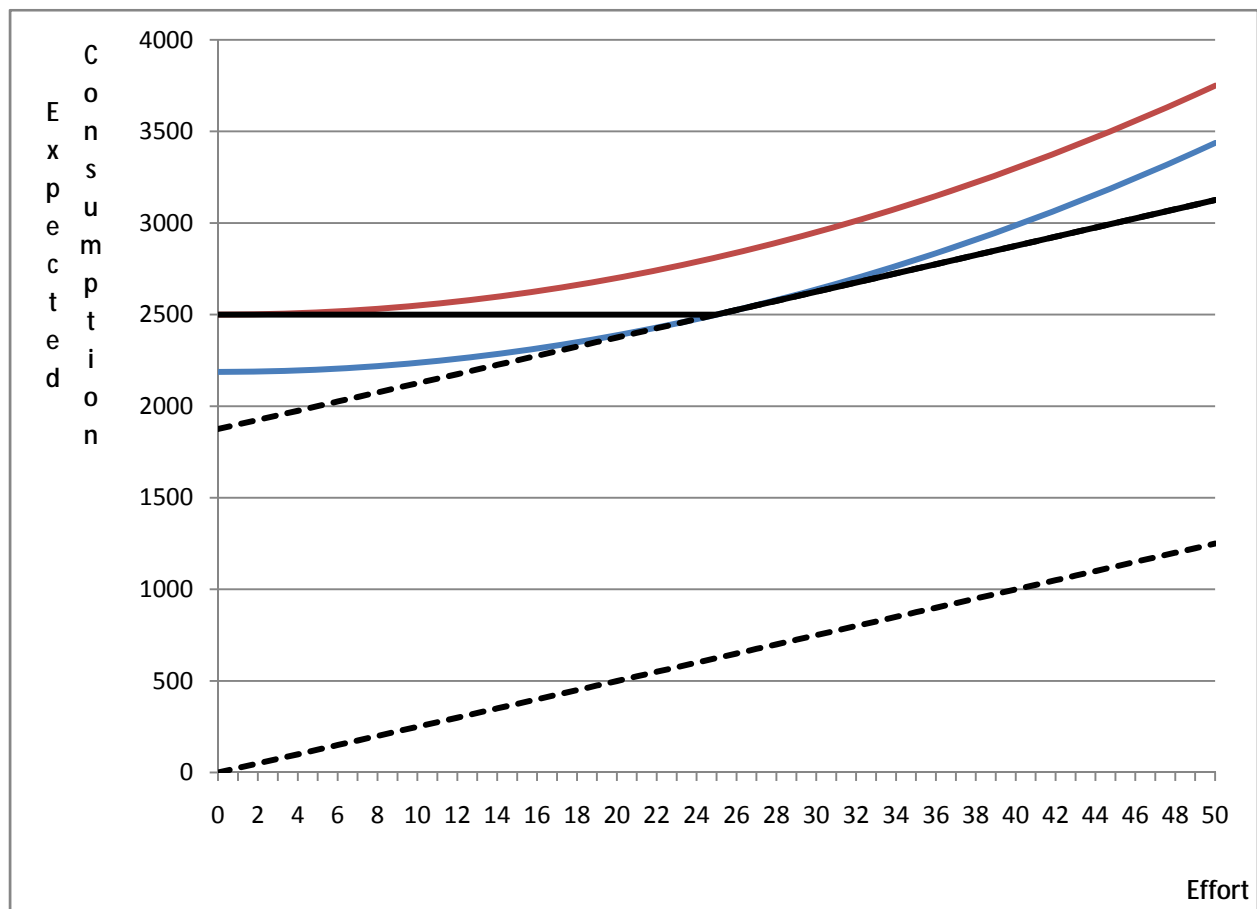
The two other curves (colored blue and red) in Figure 2 are indifference curves. Each indifference curve in the graph represents the locus of points of levels of effort and expected consumption that are equally preferred. Two features of these curves are worth noting. First, the higher an indifference curve is, the more preferred it is. Second, each indifference curve has a convex shape with respect to origin of the graph, because, at a low consumption level, h is assumed to be willing to expend a large amount of effort to be able to consume just a little bit more, but, as his level of consumption increases, he is assumed to become less and less willing exert an additional bit of effort.

The effort level that maximizes the value of h 's expected preference index over income turns out to be either where an indifference curve is just tangent to the budget line (so that the effort level is positive) or where an indifference curve and the budget line intersect at the vertical intercept (so that the effort level is zero). For the first case (which is what applies in Figure 2), the reason is that optimal effort must be at the highest expected preference index value that is still affordable. But points higher than the budget line (at (20, 1500), say) are not affordable: h 's effort transformation function does not allow him to reach levels of expected consumption beyond the budget line. On the

other hand, h can always do better than at points below the budget line: his effort transformation function allows him to move up to higher indifference curves. Thus, in Figure 2, h 's optimal effort is found to be 25.

Notice that the (blue) indifference curve, which is tangent to the budget line, is higher than a second (red) indifference curve. This lower curve gives the locus of points (of levels of effort and expected consumption) that has the same value of h 's expected preference index as when he exerts no effort and makes do with the minimum guaranteed income. In other words, the lower red curve is h 's default indifference curve: It indicates his level of well-being when he behaves in a morally hazardous manner. Happily, since the red curve is everywhere lower than the blue one, h prefers to work given the configuration of curves in Figure 2. That is, because the value of h 's expected preference index at the optimal level of effort (and at the implied expected income) is higher than that at zero effort (and at the minimum income guaranteed by transfers from m), it can be said that the insurance scheme does not "pervert" h 's incentives and morally hazardous behavior is precluded.

The alternative scenario, where the effort level is zero, is presented in Figure 3. Notice that, now, minimum income is 2500, which proves to be too high given h 's marginal productivity and disutility of effort (which underlies the shape of the indifference curves). As a consequence, h 's default (red) indifference curve is everywhere higher than the (blue) indifference curve that yields the positive "optimal" effort. In this case, h chooses not to work and to consume the minimum guaranteed income. In other words, the insurance scheme perverts h 's incentives, inducing him to be completely dependent on m 's remittances.



In this second case, h is said to be behaving in morally hazardous manner in that, being already guaranteed a minimum level of income, he acts adversely against his insurance contract and differently from if there were no contract.²³ The effect of this morally hazardous behavior is to increase the likelihood of occurrence of the insured event (that h earns only the low level of income)—even when the actual state of the world turns out to be the good one.

Under full information, with sufficient bargaining power, m can prevent h 's morally hazardous behavior by judiciously setting the minimum guaranteed income so as not to pervert h 's incentives, given his productivity and disutility of effort functions. A problem, however, is that if this guaranteed income turns out to be lower than what m deems to be appropriate with respect to her altruistic concerns, she can still end up agreeing to an arrangement that induces moral hazard in h and fosters his dependency on her. Obviously, an even more fundamental problem is that h 's preference index is not observable. Thus, it may not even be possible for m to discern the minimal guaranteed income that does not distort h 's incentives in the first place.

Some predictions that can be drawn from the insurance model are as follows: First, as in the altruistic and strategic-motive models and for as long as moral hazard is precluded, remittances increase with the migrant's (pre-transfer) income and decrease as the origin household's (pre-transfer) income in the bad state of the world increases. Moreover, as in the altruistic model, a one currency-unit increase in the migrant's (pre-transfer) income and a one currency-unit decrease in the origin household's (pre-transfer) income in the bad state of the world generates a one-currency unit increase in remittances.²⁴ Second, emigration from and remittances to places with more volatile incomes are more likely. Third, in contrast to the altruistic model, amounts remitted are highly variable and the frequency of remittances is intermittent. Moreover, while it can be argued in the case of the altruistic model that, over time, remittances gradually decline in amount and regularity as the migrant's emotional attachment with the origin family fades, in the insurance model, remittances come to an abrupt stop as soon as the migrant's contractual obligations are fulfilled. Fourth, again unlike in the altruistic model, remittances to poor households are likely to be smaller and their volume small. This is because poor households are less able to afford the migration cost of its members. Thus, in the insurance model, migrants are more likely to come from wealthy households with risky asset portfolios.²⁵ Fifth, if informal insurance contracts do not preclude moral hazard, the proportion of adult members who are not gainfully employed is likely to be higher among families with migrant members. Sixth, the higher the burden of the migration cost the household agrees to bear relative to the value of its assets, the more likely it will engage in morally hazardous behavior.

A policy intervention that is therefore needed in the insurance model is how morally hazardous behavior in the forms of unemployment, visible underemployment, and nonparticipation in the

²³ The morally-upright behavior required of h is that he gives the same level of work effort with or without the income-guarantee scheme.

²⁴ The implications for empirical testing of the predictions on household (pre-transfer) income are very different, however. In the altruistic model, remittances respond to observed differences in household (pre-transfer) incomes. In contrast, in the insurance model, remittances respond to differences in household (pre-transfer) incomes *in the bad state of the world*, which may or may not be realized. In effect, the predictions would coincide only for households suffering from an income shock.

²⁵ Note a fine point on the implication for empirical testing: Within a household, it may well be that a decrease in income increases the amount remitted (as in the altruistic model). Across households, however, a lower income may mean smaller remittances both in amount and volume (because of a lower capacity to finance migrations). This implies that panel data is needed to sort out these contrasting effects when empirically verifying the insurance model.

workforce may be mitigated, if not eliminated altogether. Two possibilities are training and retraining of workers as well as adopting new technologies to increase the workers' individual marginal productivities and improving working conditions (e.g., with respect to coordination failures as well as financial and time costs) to lower the disutility of effort.

Stark and Levhari (1982) is an early paper that pointed out the risk-dispersing feature of migration.

Investment

As its name suggests, the investment model views migration as an opportunity for a family to increase its wealth. The idea is that a family may exploit spatial differences in wages by financing a member's costs of migration (as well as other preparatory or complementary activities, such as education and job search, that enhance her employability and earning potential in the host country) and in recompense receive annuities in the form of remittance payments.

As the investment model shares certain features with the insurance model, it is useful to point out the similarities as well as the fine distinctions between the two in order to appreciate each in starker relief. The most obvious similarity is that, unlike the other models on remittance motives, both are concerned with the spatial placements of family members. Unlike in the insurance model, however, the underlying reason for the migrations in the investment model is not to minimize risk, but to take advantage of the wage differential between the origin and host countries. In effect, in the investment model, the family has no apprehensions about the geographic concentration of its members' relocations.

A second similarity is that the gamut of issues that beset the insurance model, e.g., the liquidity and credit constraints faced by the potential migrant (at least with respect to formal sector sources), the credibility of her commitment to remit payments once she has migrated, the personal (i.e., non-anonymous) nature of the contractual arrangement, and the norms, sanctions, and enforcement mechanisms that are in play in a family or kinship setting, attend the investment model as well. This has two implications: First, it serves as a reminder that, in studying the investment model (as well as the insurance model) in specific empirical settings, the researcher must pay particular attention to the institutional constraints—especially the specific expressions or formulations of norms, sanctions, and enforcement mechanisms that imbue the informal contract with a non-anonymous character. Moreover, the researcher needs to be sensitive to the possibility that other motives, such as altruism and inheritance, may be operative as well. Second, there is no need to rehash these issues in the exposition that follows.

An account of the investment model may be given thus:²⁶ Suppose that households in a country of origin operate family enterprises. Let three such two-person households have income-generating capacities as are given in the table below:

²⁶ A more general description of this model may be given as follows: Assume that the production function of the family enterprise in the origin country is given by $\alpha(\ell - \beta\ell^2/2)$, where ℓ is the number of household members and $\alpha > 0$ and $\beta > 0$ are parameters. Suppose that there are two periods, 0 and 1, and each person needs at least I^{\min} to survive in each period. The household considers migrating in period 1. Let c the cost of migration per person. If all household members work in period 0, then the number of migrants that can be financed by the household is given by

$$m^c = \left\lfloor \frac{\ell}{c} \left[\alpha \left(1 - \frac{\beta}{2} \ell \right) - I^{\min} \right] \right\rfloor,$$

where $\lfloor x \rfloor$ is the floor function (which returns the nearest integer less than or equal to x). The liquidity constraint with respect to migration cost is said to be binding if $m^c < \ell$. This is more likely to happen the lower

Income in origin country if ...	Household		
	<i>a</i>	<i>b</i>	<i>c</i>
only one member works	100	150	200
both members work	150	225	300

Notice that (a) the households have different productivities (possibly because of differences in asset holdings or technical efficiency), with household *a* being the least productive and household *c* being the most productive, and (b) diminishing marginal productivity is at work for all three households: the increase in income when the second member works is only half that when only one member works.

Let there be two periods, 0 and 1. Assume that in each period an individual needs a minimum income of 50 to survive and that in period 0 all household members work. The households consider whether or not to relocate in period 1. Let migration cost per person be 75. Then the migration cost is a binding constraint for households *a* and *b*. Indeed, household *a* cannot afford to send out anyone, since its income in excess of subsistence costs is only 50 [= 150 - 2 × 50]. On the other hand, household *b* can afford to finance the emigration of only one member, given its excess income of 125 [= 225 - 2 × 50]. Only household *c* has the resources to relocate both its members, with its excess income of 200 [= 300 - 2 × 50].

are the values of α and ℓ (though, in the case of increases in ℓ , the effect is that m^c increases at a decreasing rate) and the higher are the values of I^{\min} and c .

On the other hand, the liquidity constraint does not bind if $m^c \geq \ell$. For households that are so unconstrained, it is the profitability of migration that matters. Let I^m be the income of a migrant in a host country. Then the problem of liquidity-unconstrained households is to

$$\max_m \alpha \left(\ell - \frac{\beta}{2} \ell^2 \right) - mc + \alpha \left[(\ell - m) - \frac{\beta}{2} (\ell - m)^2 \right] + mI^m,$$

where m is the number of migrants. From the first-order conditions, the optimal number of migrants may be derived as

$$m^* = \begin{cases} 0 & \text{if } I^m - c < \alpha(1 - \beta\ell) \\ \frac{I^m - c}{\alpha\beta} - \frac{1 - \beta\ell}{\beta} & \text{if } I^m - c = \alpha(1 - \beta\ell). \\ \ell & \text{if } I^m - c > \alpha \end{cases}$$

It can be readily inferred that m^* is higher the higher are I^m and ℓ and the lower are α and c .

The observed number of migrants thus depends on both the liquidity constraint and the profitability condition. It is given by $m^o = \min\{m^c, m^*\}$.

When $m^o < \ell$, transfers will be observed. Assuming that total income is equally shared among household members, transfers will be the difference between mean household income and the origin-country income per household member left behind, i.e.,

$$\begin{aligned} T &= \frac{1}{\ell} \left\{ \alpha \left[(\ell - m^o) - \frac{\beta}{2} (\ell - m^o)^2 \right] + m^o I^m \right\} - \frac{\alpha}{\ell - m^o} \left[(\ell - m^o) - \frac{\beta}{2} (\ell - m^o)^2 \right] \\ &= \frac{m^o}{\ell} \left\{ I^m - \alpha \left[1 - \frac{\beta}{2} (\ell - m^o) \right] \right\}. \end{aligned}$$

Now consider two other two-person households whose income-generating capacities in the origin country and potential wage per person in the country of destination (along with those of household *c*) are given in the next table.

	Household		
	<i>c</i>	<i>d</i>	<i>e</i>
Income in origin country if ...			
only one member works	200	250	300
both members work	300	375	450
Wage per person in the host country	150	350	350

As may be easily verified, for all three households the liquidity constraint relative to the costs of migration (that income in excess of subsistence costs must be at least 150) no longer binds. Nonetheless, this does not necessarily mean that any or all of the household members will relocate. That decision depends on whether or not an additional condition is satisfied: At the margin, the net benefit (i.e., income less moving cost) gained by the last migrant must be at least as great as the loss in origin-country income that the migrant's relocation represents.

Applying this rule, one readily obtains the following results: Household *c* will stay put, since the net benefit gained by the first member who leaves will only be 75 [= 150 - 75], while the loss in origin-country income will be 100 [= 300 - 200]. In other words, migration is not a profitable venture for household *c*. In contrast, household *d* will relocate, since the net benefit gained by the second member who leaves will be 275 [= 350 - 75], but the loss in origin-country income will only be 250. Finally, in the case of household *e*, only one member will relocate: The first migration makes sense, since the marginal benefit and marginal loss numbers are 275 [= 350 - 75] and 150 [= 450 - 300], respectively, but the second migration does not, given the marginal gain of 275 [= 350 - 75] against the marginal loss of 300.

The upshot of the analysis is therefore that the number of migrants financed under the investment motive depends on affordability and profitability—in particular, on whichever condition yields the lower number of migrants. Only when neither constraint binds, as in the case of household *d*, will the entire household migrate.

When only one household member migrates, as in the case of household *e*, transfers to the member left behind will be observed. Under the assumption that total income is equally shared, the transfer will be equivalent to the difference between the average income of the household members and the income of the non-migrant. In the case of household *e*, the incomes of the migrant and non-migrant members are 350 and 300, respectively. Since average income is 325, the transfer will be 25.

The interesting predictions of the investment model concerns the technical efficiency of the family enterprise in the origin country, which has opposing impacts on liquidity-constrained and profitability-motivated migrations. As may be noted, when the family enterprise is unproductive, what limits the number of migrants is the binding liquidity constraint. Accordingly, improvements in productivity relax this constraint and afford more migrations. In contrast, when the family enterprise is productive, the family's consideration turns to whether or not a member's relocation increases total family income. The more productive the family enterprise is, however, the less likely working elsewhere can do so. Thus, the investment model predicts that, as a proportion of family

size, the fewest migrations will be observed among the poorest and richest families—the former because they cannot afford it, the latter because it is not sufficiently profitable.²⁷

A related set of implications concerns differences in the distributions of factor payments or of wages between the host and origin countries. Specifically, the fewest migrations will be observed in those professions and occupations with the narrowest earnings differentials or with the least harmony in technical standards. Professionals and skilled workers in occupations that have common technical standards and rules and have the highest wage differentials have the greatest incentives to migrate. In contrast, workers whose talents, skills, and habits are less well adapted to the host-country environment do not find relocating as attractive.

As for remittances, the implications of the investment model are that these disbursements will be (a) constant (i.e., will not diminish over time) and regular (i.e., not intermittent) to the extent that transfers represent payments for the migrant's foregone contribution to the family enterprise or, what amounts to the same thing, her foregone contribution to family income, (b) larger the larger is the income of the migrant and the lower is the pre-transfer income of the household, and (c) increasing at a decreasing rate with respect to number of migrants (implying that the amount remitted by each migrant falls as the number of members who migrate increases). In addition, the model predicts that, on a per member basis, transfers will decrease at a decreasing rate as the household size increases.

Finally, among all the remittance-motives models, the investment model is the only one that reminds that migration can be a long-term goal involving a series of preparatory activities and related decisions, such as choice of school, years of schooling and educational attainment, occupation, career, and work experience.²⁸ An implication of this insight is that the social and private costs and benefits of migration must be measured along with the impact on migration that these preparatory activities have. Policies should then see to it that the marginal social benefits just equal the marginal social cost at the socially-optimal levels of such activities. Obviously, this is easier said than done. Nonetheless, glaring examples ought to be readily curbed, such as the subsidized costs of medical education.

Lucas and Stark (1985) proposes a test for discerning an investment motive: Since the immediate family usually finances a person's education, the coefficient of a son's or daughter's education in a remittance equation would be higher than that of an in-law's education. Hoddinott (1994) interprets the positive and statistically significant coefficient of the migrant-son's earnings in his remittance regressions as repayments for past parental investments in the sons' education (reinforced by the prospect of bequests).

²⁷ An interesting implication for the Philippines that may be inferred from this prediction concerns the beneficiaries of agrarian reform, on the one hand, and the families whose landholdings were appropriated, on the other hand. Since greater asset holdings improve the income-generating capacity of the family enterprise, the liquidity constraint with respect to migration cost is relaxed for the beneficiaries. Since reduced asset holdings worsen the income-generating capacity of the family enterprise, the profitability of migration is enhanced for the displaced landowners. Hence, if the investment model is correct, proportionately more family members of agrarian reform beneficiaries and of the displaced landowners can be expected to migrate than members of families taken at random.

²⁸ Given the Philippines' long record of emigrating workers, it may be interesting to explore to what extent choices on schooling, occupation, career, and work experience are or have been motivated by the desire to emigrate or work overseas.

Inheritance

The inheritance model posits that remittances are one—if not *the*—criterion by which migrant sons and daughters are judged when parental bequests are formulated. Strategic behavior is assumed on both sides of the generational divide: Parents use bequests to reward good behavior, measured by the degree to which the migrant has honored his or her contractual obligations (in the cases of the insurance and investment motives) and exhibited his care and concern for the family (beyond minimum accepted standards); migrant sons and daughters use remittances as stakes on inheritance claims.²⁹ In effect, parents use bequests (or the withholding thereof) as a means to secure remittances from migrant sons and daughters, and migrant sons and daughters use remittances as investments in inheritance.

The inheritance model makes the following predictions: The amount remitted by a migrant son or daughter is larger and more regular (a) the higher the value of household assets not yet bequeathed, (b) the higher the likelihood of being named the major beneficiary, and (c) the wealthier the migrant worker. It is smaller and more intermittent the riskier the investment in inheritance is perceived compared to other investment opportunities.

Lucas and Stark (1985) discuss the inheritance motive and find that sons who are more likely to inherit family owned assets than daughters do remit more when the household owns more cattle, the main inheritable asset. The interpretation of the result, however, cannot disentangle the inheritance motive from the exchange motive, since cattle herds of families are combined. Hodinott (1994) finds empirical support for it using data from rural Western Kenya.

3. Empirical implications

What empirical implications may be drawn from the foregoing survey of economic models on the motives behind migrants' remittances? The first point may be that it is important to distinguish the motives behind remittances, if only because the policy implications can be very different. Alas, many papers do not do so, opting instead to estimate some "reduced-form" equation. Unfortunately, the choice can be driven by data availability.

Two other obvious but nonetheless important insights are that (a) given a sample of migrant workers and recipient households, remittance flows are likely to be due to a variety of motives and (b) even for a given migrant-household pair, different combinations of motives may be present.

To some extent, motives may be correlated with the characteristics of the migrant worker and the recipient households, with "environmental" factors, or with contractual terms, as indicated in Lucas and Stark (1985) and Stark and Lucas (1988). More specifically, the altruistic, insurance, investment, and inheritance motives are more likely to hold when the migrant is a member of the immediate family, while the exchange motive is perhaps more likely when transfers are between distant family members, in-laws, or nonrelatives. On the other hand, the altruistic, exchange, and insurance motives are more likely to be observed when the origin country is hit by an income shock. And remittance flows are more likely to gradually subside over time under the altruistic motive, to stop abruptly under the strategic motive, to be intermittent under the insurance motive,

²⁹ Obviously, the behaviors of both parents and offspring are culturally delimited to some extent. Under primogeniture, for instance, daughters and low birth-order sons do not have an incentive to make inheritance investments, and the "game" would be between the parents and oldest son only.

to be constant under the investment motive, and perhaps to increase over time as the patriarch or matriarch of a wealthy household grows older.

But, as mentioned, mixed motives may be involved. When the migrant workers are the household head and his or her spouse, remittances may be imbued by both altruism and the exchange motive. By contrast, when the migrant workers are the sons and daughters, the altruism and inheritance (as explored in Hoddinnott (1994)) or altruism and investment (as investigated by Lucas and Stark (1985) and Stark and Lucas (1988)) may be the co-existing motives. As discussed in the previous section, the altruistic or inheritance motive is needed for the insurance and investment motives to be practicable.

Because of their different policy implications, it is important to sort out empirically which models apply to which migrant-household pairs and under what conditions. A danger is that models may have offsetting effects or one with a stronger impact may mask that of another. This makes it critical for the researcher to anticipate which combinations of motives are most likely to apply in the circumstances to be explored. Careful modeling of how the motives may coexist in a given migrant-household pair and how they interact should then be undertaken to avoid pitfalls and to minimize the risk of drawing false inferences from the data. Two additional benefits of doing so are that (a) the exercise affords the identification of critical variables, including whether they are exogenous, are correlated with unobserved factors, or have bi-directional causality with the dependent variables and (b) in case data collection is a future activity, it facilitates the development of survey designs and questionnaires that are consistent with econometric models to be estimated and statistical methods to be applied.

On the variables and data to be collected, the models surveyed in the previous section indicate that the dependent variables include the likelihood of remittance and the amounts remitted and that it is important to have longitudinal data to capture frequency and duration of remittance flows as well as whether the amounts remitted remain constant, decrease, or increase over time.

As for the estimation of models on the determinants of remittances, an important issue is to control for sample selectivity to get unbiased estimates. Funkhouser (1995) shows that the act of remitting is not a random event in a given pool of migrants. Rather, it systematically depends on migrant characteristics, the estimated independent effects of which vary by sample. The problem, however, is that, as Menjivar et al. (1998) point out, economic models do not provide good instrumental variables for identifying the selection equation from the remittance amount equation.

A second issue with respect to estimation is the need to treat the endogeneity of pre-transfer incomes. As pointed out in Lucas and Stark (1985), a negative relationship between remittances and recipient-household income may not necessarily mean that remittances are altruistically motivated, as it could be the cross-section artifact of a temporal process in which past remittances have caused the household income to rise. In other words, a bi-directional causality between remittances and household income is involved. As another example, the cautionary tale of the insurance model is that, under moral hazard, the household pre-transfer income may be correlated with unobserved effort whose effect is captured in the error term of the regression.

The upshot of all this is that if emigration and remittances are deemed sufficiently important to merit full study, a panel data set must be collected with the surveys designed such that the different dimensions of the dependent variables (i.e., the frequency of remittances, their amounts over time, and duration) and the explanatory variables, including the identifying instrumental variables, are covered.

4. Concluding remarks

This paper provides an (intermediate-level) exposition of the economic models on the motives behind migrants' remittances. Six models are presented: altruism, exchange, the strategic motive, insurance, investment, and inheritance. The implications for empirically exploring these motives are then discussed. The plea is that, given that migration and remittances are important issues for developing countries, good data that allow researchers to distinguish between the different motives need to be made available. Results of such empirical investigations are building blocks for better policy formulation on how to manage the massive migration and remittance flows that are observed in the world today.

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