Remittances as insurance for social acceptance

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Abstract

This paper presents a theoretical model in which emigrants remit money to the Home country location (the Village) in the absence of altruism. The main idea is that people in the Village can punish those emigrants who do not remit and if the emigrant faces a positive probability of return, then he will find it optimal to remit. There are two key assumptions: the game is repeated infinitely and the probability of return is exogenous. In the model the Village designs a mechanism facing a population of emigrants that is heterogeneous with respect to the unknown wage at the Foreign location. The optimal mechanism leads to a separating equilibrium (each type of worker distinguishes itself from the others). A distribution of remittances is the result from this model.

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1 Introduction

Remittances from emigrants to their families are a common occurrence in rural-to-urban migration and international migration from less developed to industrialized countries. This paper proposes a new explanation for remittances in which altruism is absent.

The motives for the migrant to remit back home can be classified into three groups:

Pure altruistic. This is the most common explanation for remittances. Migrants care about the well being of their family in the sending (or original) country; that is, the well-being of the family enters into the utility function of the migrant. The migrant will remit to maximize his own utility if his marginal utility of the family's well-being is lower than the marginal utility of his own consumption (LaLonde and Topel, 1997; Lucas and Stark, 1985).

Another way to think of pure altruism is to take the whole family as a single economic agent. Lucas (1997) shows that if the risks in the rural and urban environments[1] are uncorrelated, then the rural family can decide to send someone to the city to diversify the risk. Anytime one of the parties (rural or urban) has a bad outcome, remittances take place to maximize family utility.

Part altruistic. These are explanations for remittances that depend on some degree of altruism but have features reflecting self interest.

Andreoni (1989), says that a person may find utility in giving a gift (in this case, remitting) per se, independent from its effect on the well-being of the receiver. That is, people have a taste for giving and derive utility from it. Remittances are, then, caused by altruism as well as by this taste for giving.

Self-enforcing agreements are also used to explain remittances (Lucas and Stark, 1985; Lucas and Stark, 1988; Stark, 1989). Migrants face most of their risk in the early stages of migration and their families face a constant risk.[2] They insure each other, so whenever there is a bad crop or the migrant faces unemployment, the other party sends remittances. Another way of looking at self-enforcing agreements is that the family insures the migrant in the early stages of migration when he faces the higher risks. The migrant then

[1] In many models of remittances, rural-to-urban migration takes place.

[2] Again rural-to-urban migration is assumed to take place.

remits as a form of premium payments. The migrant finds it optimal to remit even after his risk of unemployment has passed because he cares about his family (altruism). Two other reasons that reinforce the agreement are the aspiration to inherit and the continuation of risks for the migrant.

Stark and Falk (1998) explain remittances as a form of insurance against future risks. The idea is that the migrant sending remittances causes the recipients to develop altruism towards him. Therefore, whenever the migrant faces unemployment, the recipient of the remittances will help him out. If the value of such insurance is high enough, the migrant will remit even in the absence of altruism towards his family (or the recipient).

Another explanation for remittances is aspiration to inherit. Assuming inheritance is conditional on behavior, the migrant finds it optimal to behave "nice" remitting money home. The implication of this approach is that the larger the potential inheritance, the larger the remittances (Lucas and Stark, 1985). Altruism from the parents to the migrant is needed, otherwise they would not bequeath to him.

Pure Self-interest. Altruism is not needed in any of these explanations to get remittances as a result. It can, however, reinforce the result.

Lucas and Stark (1985) and LaLonde and Topel (1997) point out that the migrant may want to invest part of his savings at home, trusting his family on the investment and maintenance decisions. Altruism from the family to the migrant "may underlie or enhance such a trust" (Lucas and Stark, 1985).

Lucas and Stark (1985) say that the intention to return home "may suffice to promote remittance for investment in fixed capital such as land, livestock, or a house, *in public assets to enhance prestige or political influence, and in what might be termed social assets— the relationship with family and friends.*"[3] (Lucas and Stark, 1985)

It is on the investment in social assets that this paper is based. The migrant will send remittances if, when he has to return, those remittances will put him in a better social position. The main idea is that the migrant would like to be perceived as a generous person and have the admiration of the rest of the hometown (village, henceforth). He will derive utility from this admiration and therefore he will be willing to spend some of his income to obtain it.

When the migrant faces a probability of returning home, the village can

[3]The emphasis is mine.

threaten to treat him like a "bad son" if he returns unless he sends remittances while he is away. For the threat to be credible, it is necesary that the village finds it in its own interest to punish the emigrant who returns after not remitting. Even though punishing the emigrant goes against its own short run benefit,[4] the village can find the incentives to punish returning emigrants in order to receive higher remittances from richer emigrants and to receive remittances from future emigrants.

We use a game-theoretic model that, even in the absence of altruism, generates a distribution of remittances from utility maximization.

2 Model

The players in this game are classified in two different groups:

Emigrants: Individuals who migrate to the foreign country in search of a higher lifetime utility. Migration is caused in the first place by a differential in wages between both countries. The initial number of emigrants in the foreign country is normalized to 1. It is assumed for convenience, however, that the emigrants are born in the foreign country. We can think of this assumption as similar to assuming that when people in the home country are old enough to begin to work, they migrate to the foreign country.

Village: This player acts for the well-being of the inhabitants of the home country. It does not take into account the utility of the emigrants when they are in the foreign country, but it does whenever they return. Like the emigrants, the village is assumed to be infinitely lived.

There are two locations: foreign and home country. Time is continuous. The village and the emigrants are assumed to discount utility at a constant rate r.

At the home location all emigrants earn the same wage, w. The emigrants are heterogeneous with respect to wages in the foreign country. The wages, θ, are distributed as $F(\theta)$ over $[\underline{\theta}, \bar{\theta}]$. Henceforth, we will refer to θ also as the emigrant's type.

[4] The welfare of the village depends on the utility of everyone who lives in the village.

Each migrant sends a remittance, ρ, continuously per period of time. With exogenous probability λ the emigrant has to return. The probability of return is assumed to be constant across types and over time.

Whenever an emigrant returns, the village assigns him a social acceptance value α. His future utility depends on the value of α the village assigned and cannot be changed in the future.[5]

The utility functions of the emigrants depend on their own consumption and the social acceptance index. This social acceptance index, α, is:

- Normalized to 1 if the emigrants are in the foreign country.
- Decided by the village for the emigrants when they return. It has a lower bound,[6] $\underline{\alpha}$, and an upper bound, $\bar{\alpha}$.[7]

The instantaneous utility of an emigrant with type θ is given by

$$U(\theta) = \begin{cases} U(\theta - \rho, 1) & \text{if in the foreign country} \\ U(w, \alpha) & \text{if in the home country.} \end{cases} \tag{1}$$

Where ρ, the amount the migrant remits, is the only choice variable the migrant has to maximize utility.

Each emigrant in the foreign country, then, faces the following maximization problem:

$$\Psi(\theta) = \max_{\rho} U(\theta - \rho, 1)\Delta t + \frac{\lambda \Delta t}{(1 + r\Delta t)} \frac{U(w, \alpha)}{r} + \frac{(1 - \lambda \Delta t)}{(1 + r\Delta t)} \Psi(\theta),$$

where $\Psi(\theta)$ is the expected present value of lifetime utility for an emigrant of type θ. Rearranging the terms and taking the limit as $\Delta t \to 0$, we have:

$$\Psi(\theta) = \max_{\rho} \frac{U(\theta - \rho, 1) + \frac{\lambda}{r} U(w, \alpha)}{\lambda + r}. \tag{2}$$

[5]We could allow for a change but, as the emigrant does not have any more decisions to make in the game, we can always find a single value of α that is equivalent to the changing values of the acceptance.

[6]Determined by the opportunity cost of living in the village.

[7]The value of α is assumed to be costless to the village, this upper bound can be the highest costless value of α to the village. We assume that higher values of α are too costly for the village.

The village maximizes the utility of its inhabitants plus the remittances from the emigrants while they are away. It does not include in its welfare the well-being of the emigrants who are living in the foreign country.

The village's welfare, thus, depends on the amount of remittances plus the utility of all the emigrants who have returned. The village decides the way it is going to treat the returning emigrants, α, at the moment the emigrants return and, as mentioned above, cannot change α afterwards.

As the welfare of the emigrant, once he returns, is determined completely by the value of α, a constant over time as well as the interest rate, r; at each moment the village can calculate the present value of future utility of those emigrants who are returning and forget about them in the future.

Each time an emigrant returns, a new emigrant with the same wage, θ, is born instantly in the foreign country, so that the size and the distribution of wages of the emigrant population in the foreign country remains constant. Once an emigrant returns, he cannot migrate again and stays at the village forever. As the number of emigrants and the distribution of wages are constant, on average $\Delta t \lambda f(\theta)$ emigrants of type θ return at each interval Δt.

The instantaneous welfare of the village is given, then, by:

$$\int_{\underline{\theta}}^{\bar{\theta}} \left[\rho(\theta) + \frac{\lambda}{r} U(w, \alpha(\theta)) \right] dF(\theta), \tag{3}$$

where $\alpha(\theta)$ and $\rho(\theta)$ are the social acceptance and remittances from the emigrants of type θ. As mentioned above, the measure of emigrants in the foreign country is 1 at each period and the distribution of wages $F(\theta)$ is also constant.

Let the difference in wages be such that the migrant would never choose to return voluntarily to the village. Return is, therefore, never endogenously chosen.

The village faces the following maximization problem at each point in time:

$$\begin{aligned} \Omega = \max_{\alpha(\theta)} & \int_{\underline{\theta}}^{\bar{\theta}} \left[\Delta t \rho(\theta) + \frac{\lambda \Delta t}{(1 + r\Delta t)} \frac{U(w, \alpha(\theta))}{r} \right] dF(\theta) \\ & + \frac{\Omega}{(1 + r\Delta t)}, \end{aligned}$$

where Ω is the expected present value of the village's lifetime welfare. Rearranging and taking again the limit as $\Delta t \to 0$, we have:

$$\Omega = \max_{\alpha(\theta)} \frac{1}{r} \int_{\underline{\theta}}^{\bar{\theta}} \left[\rho(\theta) + \frac{\lambda}{r} U(w, \alpha(\theta)) \right] dF(\theta), \tag{4}$$

2.1 Mechanism design

The village's problem can be expressed as a mechanism design problem. Using the revelation principle,[8] the problem can be reduced to the design of a mechanism whereby the village chooses the functions $\alpha(\theta)$ and $\rho(\theta)$ to maximize equation (4) so that everybody is willing to announce their own type (θ) and to play the game. The maximization problem is subject, then, to two constraints: The individual rationality (IR) constraint and the incentive compatibility (IC) constraint. Using equations (2) and (4), we can write the village's problem as:

$$\max_{\alpha(\theta),\rho(\theta)} \frac{1}{r} \int_{\underline{\theta}}^{\bar{\theta}} \left[\rho(\theta) + \frac{\lambda}{r} U(w, \alpha(\theta)) \right] dF(\theta)$$

subject to

$$U(\theta - \rho(\theta), 1) + \frac{\lambda}{r} U(w, \alpha(\theta)) \geq U(\theta, 1) + \frac{\lambda}{r} U(w, \underline{\alpha}) \quad \forall \theta \tag{IR}$$

$$U(\theta - \rho(\theta), 1) + \frac{\lambda}{r} U(w, \alpha(\theta)) \geq U\left(\theta - \rho(\hat{\theta}), 1\right) + \frac{\lambda}{r} U\left(w, \alpha(\hat{\theta})\right) \quad \forall \theta, \hat{\theta}. \tag{IC}$$

For simplicity, let $U(\theta, \alpha) = \alpha V(\theta)$, where $V(\cdot)$ is an increasing concave function, i.e., $V'(\cdot) > 0$ and $V''(\cdot) < 0$. Rearranging the terms reduces the problem to:

$$\max_{\alpha(\theta),\rho(\theta)} \frac{1}{r} \int_{\underline{\theta}}^{\bar{\theta}} \left[\rho(\theta) + \frac{\lambda}{r} V(w) \alpha(\theta) \right] dF(\theta) \tag{5}$$

[8] See Mas-Colell et al, 1995, Fudenberg and Tirole, 1991

subject to

$$V(\theta) - V(\theta - \rho(\theta)) \leq \frac{\lambda}{r} V(w) \left[\alpha(\theta) - \underline{\alpha}\right] \quad \forall\theta \tag{IR}$$

$$V(\theta - \rho(\hat{\theta})) - V(\theta - \rho(\theta)) \leq \frac{\lambda}{r} V(w) \left[\alpha(\theta) - \alpha(\hat{\theta})\right] \quad \forall\theta, \hat{\theta}. \tag{IC}$$

A final condition for the maximization problem is that $\rho(\theta) \geq 0 \quad \forall\theta$.

Proposition 1. *If* (IC) *is satisfied, then* $\alpha(\theta)$ *and* $\rho(\theta)$ *are non-decreasing.*

Proof. We begin by assuming that $\alpha(\cdot)$ is nonincreasing on an interval $[\theta^-, \theta^+]$. Then, we have that $\alpha^- = \alpha(\theta^-)$ is the maximum value of $\alpha(\cdot)$ on the interval. Likewise, $\alpha^+ = \alpha(\theta^+)$ is the minimum value of $\alpha(\cdot)$ on the interval. Let $\rho^- = \rho(\theta^-)$ and $\rho^+ = \rho(\theta^+)$

By (IC), we have:

$$V(\theta^+ - \rho^-) - V(\theta^+ - \rho^+) \leq \frac{\lambda}{r} V(w)[\alpha^+ - \alpha^-], \tag{6}$$

as $\alpha^- \geq \alpha^+$ and because $V(\cdot)$ is increasing, then

$$\rho^- \geq \rho^+,$$

$\rho(\cdot)$ is, therefore, also nonincreasing.

Now assume $\rho^- \geq \rho^+$, then

$$V(\theta^- - \rho^+) - V(\theta^- - \rho^-) \leq \frac{\lambda}{r} V(w)[\alpha^- - \alpha^+], \tag{7}$$

then, by the same principles, $\alpha^- \geq \alpha^+$.

Using (7) and multiplying the inequality by (-1), we have:

$$V(\theta^- - \rho^-) - V(\theta^- - \rho^+) \geq \frac{\lambda}{r} V(w)[\alpha^+ - \alpha^-], \tag{8}$$

combining equations (8) and (6) we have,

$$V(\theta^- - \rho^-) - V(\theta^- - \rho^+) \geq V(\theta^+ - \rho^-) - V(\theta^+ - \rho^+).$$

As $V(\cdot)$ is concave and $\rho^+ \leq \rho^-$, then it must be the case that $\rho^+ = \rho^-$. Using this in equation (6), then $\alpha^+ \geq \alpha^-$. This can only hold if $\alpha^+ = \alpha^-$.

This means that $\alpha(\cdot)$ and $\rho(\cdot)$ are never decreasing. Therefore, we can say that $\alpha(\cdot)$ and $\rho(\cdot)$ are nondecreasing in θ. □

Proposition 2. *Let $\theta^+ > \theta^-$ and let $\alpha^- = \alpha(\theta^-), \alpha^+ = \alpha(\theta^+), \rho^- = \rho(\theta^-)$ and $\rho^+ = \rho(\theta^+)$. If*

$$V(\theta^+ - \rho^-) - V(\theta^+ - \rho^+) = \frac{\lambda}{r} V(w)[\alpha^+ - \alpha^-]$$

then

$$V(\theta^- - \rho^+) - V(\theta^- - \rho^-) < \frac{\lambda}{r} V(w)[\alpha^- - \alpha^+]$$

Proof. Use the definitions from proposition 2 and the concavity of $V(\cdot)$, we know that

$$V(\theta^- - \rho^-) - V(\theta^- - \rho^+) > V(\theta^+ - \rho^-) - V(\theta^+ - \rho^+),$$

but by assumption

$$V(\theta^+ - \rho^-) - V(\theta^+ - \rho^+) = \frac{\lambda}{r} V(w)[\alpha^+ - \alpha^-].$$

Then we can say that

$$V(\theta^- - \rho^-) - V(\theta^- - \rho^+) > \frac{\lambda}{r} V(w)[\alpha^+ - \alpha^-],$$

or

$$V(\theta^- - \rho^+) - V(\theta^- - \rho^-) < \frac{\lambda}{r} V(w)[\alpha^+ - \alpha^-].$$

□

Continue to use definitions from proposition 2.

Proposition 3. *Let*

$$V(\theta^+ - \rho^-) - V(\theta^+ - \rho^+) = \frac{\lambda}{r} V(w)[\alpha^+ - \alpha^-] \quad \forall\, \theta^+ > \theta^- \tag{9}$$

and

$$V(\underline{\theta}) - V(\underline{\theta} - \rho(\underline{\theta})) = \frac{\lambda}{r} V(w)[\alpha(\underline{\theta}) - \underline{\alpha}] \tag{10}$$

then IR holds for all θ.

Proof. Let $\theta^- = \underline{\theta}$ and add (9) and (10),

$$V(\theta^+ - \rho(\underline{\theta})) - V(\theta^+ - \rho^+) + V(\underline{\theta}) - V(\underline{\theta} - \rho(\underline{\theta})) = \frac{\lambda}{r} V(w)[\alpha^+ - \underline{\alpha}]. \quad (11)$$

Note that concavity of $V(\cdot)$ implies that

$$V(\theta^+) - V(\underline{\theta}) < V(\theta^+ - \rho(\underline{\theta})) - V(\underline{\theta} - \rho(\underline{\theta})) \quad (12)$$

or

$$V(\theta^+) < V(\underline{\theta}) + V(\theta^+ - \rho(\underline{\theta})) - V(\underline{\theta} - \rho(\underline{\theta})). \quad (13)$$

Substituting (13) on (11) we get IR for θ^+. □

Using proposition 3 problem (5) simplifies to:

$$\max_{\alpha(\theta),\rho(\theta)} \frac{1}{r} \int_{\underline{\theta}}^{\bar{\theta}} \left[\rho(\theta) + \frac{\lambda}{r} V(w)\alpha(\theta)\right] dF(\theta) \quad (14)$$

subject to

$$V(\underline{\theta}) - V(\underline{\theta} - \rho(\underline{\theta})) = \frac{\lambda}{r} V(w)\left[\alpha(\underline{\theta}) - \underline{\alpha}\right] \quad (IR_1)$$

$$V(\theta - \rho(\underline{\theta})) - V(\theta - \rho(\theta)) = \frac{\lambda}{r} V(w)[\alpha(\theta) - \alpha(\underline{\theta})] \quad \forall\, \theta \quad (IC_1)$$

Proposition 4. *Given the maximization problem in equation* (14)*, let* $F(\theta)$ *be differentiable and let its derivative,* $f(\theta)$*, be continuous, then* $\rho(\cdot)$ *and* $\alpha(\cdot)$ *are continuous.*

Proof. Use (IC_1) to substitute for $\alpha(\theta)$ in the maximization problem (14) and we get:

$$\max_{\alpha(\theta),\rho(\theta)} \frac{1}{r} \int_{\underline{\theta}}^{\bar{\theta}} \left[\rho(\theta) + V(\theta - \rho(\underline{\theta})) - V(\theta - \rho(\theta)) + \frac{\lambda}{r} V(w)\alpha(\underline{\theta})\right] f(\theta) d\theta$$

subject to

$$V(\underline{\theta}) - V(\underline{\theta} - \rho(\underline{\theta})) = \frac{\lambda}{r} V(w)\left[\alpha(\underline{\theta}) - \underline{\alpha}\right] \quad (IR_1)$$

Because $f(\cdot)$ and $V(\cdot)$ are continuous, then the objective function will also be continuous in ρ and θ. By the theorem of the maximum,[9] we know that the solution $\rho(\cdot)$ is also continuous. Using (IC_1), we know that if $\rho(\cdot)$ is continuous, then $\alpha(\cdot)$ will also be continuous.[10] □

Proposition 5. *Given the maximization problem in equation* (14)*, let* $f(\theta)$ *be continuous, and let* $\rho(\cdot)$ *be differentiable, then*

$$\rho'(\theta) > 0 \quad \textit{and} \quad \alpha'(\theta) > 0 \quad \forall \theta.$$

Proof. By the implicit function theorem, we know that the function $\alpha(\cdot)$ in (IC_1) will be differentiable if $\rho(\cdot)$ is differentiable.[11]

We also know from proposition 1, that they are nondecreasing functions of θ. Totally differentiate (IR_1) with respect to $\underline{\theta}$, we have that

$$V'(\underline{\theta}) - [1 - \rho'(\underline{\theta})]V'(\underline{\theta} - \rho(\underline{\theta})) = \frac{\lambda}{r}V(w)\alpha'(\underline{\theta})$$

or

$$V'(\underline{\theta}) - V'(\underline{\theta} - \rho(\underline{\theta})) + \rho'(\underline{\theta})V'(\underline{\theta} - \rho(\underline{\theta})) = \frac{\lambda}{r}V(w)\alpha'(\underline{\theta}) \qquad (15)$$

As $V(\cdot)$ is increasing and concave, we know that the left hand side of (15) is positive even if $\rho'(\underline{\theta}) = 0$.[12] Then it has to be the case that $\alpha'(\underline{\theta})$ is positive.

Totally differentiate (IC_1) with respect to θ, we have that

$$V'(\theta - \rho(\underline{\theta})) - V'(\theta - \rho(\theta)) + \rho'(\theta)V'(\theta - \rho(\theta)) = \frac{\lambda}{r}V(w)\alpha'(\theta), \qquad (16)$$

note that if $\rho'(\underline{\theta}) = 0$, then (IC) will not hold as $\underline{\theta}$ will prefer to act as someone else.[13] This means that the first two terms in the left hand side of (16) add to a positive number and that means $\alpha'(\theta) > 0$ for all θ.

From (IC_1) we know that if $\alpha'(\cdot) > 0$, then $\rho'(\cdot) > 0$. □

Proposition 5 means that, in equilibrium, the mechanism will result in a separating equilibrium, that is, each type will remit different amount, $\rho(\theta)$, and receive different treatment, $\alpha(\theta)$, from the village.

[9] See, for example, the mathematical appendix on Mas-Colell et al, 1995.
[10] The constraint is a function, so we can assert that the solutions are continuous.
[11] We could also assume that $\alpha(\cdot)$ was differentiable for both to be differentiable.
[12] Unless of course that $\rho(\underline{\theta}) = 0$. We will address this later.
[13] If $\rho'(\underline{\theta}) = 0$ and $\alpha'(\underline{\theta}) > 0$, then $\underline{\theta}$ will be better off acting as a higher type.

3 Conclusions

This paper presents a model in which emigrants may find optimal to insure their social acceptance at the home community, if the people in the community can punish those who do not remit.

Furthermore, the model results in a distribution of remittances where workers with higher wages send more remittances to their home community than those with lower wages, even though the home community can't distinguish among workers.

Although altruism may be the main reason for emigrants to remit home, this paper shows a non-altruistic reason for them to do so. As argued earlier in the introduction, most reasons for the existence of remittances in the existing literature rely on the assumption of altruism towards the family at the home community (and in the case of investments at home, on altruism from the family towards the emigrant).