Effective Cost of Brain Drain

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Abstract

In developing countries, remittances and intra-family private transfers sent by household members who migrate to more developed countries constitute a fundamental source of income and capital accumulation. Then, it is important to understand the motives of migrants who decide to remit back to their families. Drawing on the theory of labor migration under asymmetric information, we show that low-skilled workers are expected to provide higher amounts of remittances when remittances are motivated by self-interest. This transfer paradox is explained as follows. Since low skilled workers are likely to return home when informational symmetry is restored, the optimal remittance level is a decreasing function of the migrant's skill level since remittances may be seen as an implicit insurance, whose benefits are received only under migration return.

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1   Introduction

According to theories of endogenous growth, education is the main determinant of long-run growth. Since high-educated people are more likely to migrate, labor migration of people from developing to developed countries is often associated with a brain drain. This phenomena is expected to reduce the growth rate in poor countries (Haque and Kim, 1995, Miyagiwa, 1991). However, recent studies have argued that a brain drain is compatible with a brain gain. In a poor economy, low returns to human capital limit the acquisition of education. Hence, emigration to a higher returns to skill country provides an incentive to invest in human capital (Mountford, 1997, Stark et alii, 1997, Vidal, 1998). Conditions for a brain gain are not so restrictive. Beine et alii (2000) show that a brain gain is likely to occur since migration prospects play a significant role in education decisions.

A common feature of these studies is the focus on education as the engine of growth. In so doing, they neglect the role of intrafamily private transfers, which constitute a significant share of the extended family revenue in developing countries (see Cox and Jimenez, 1990). For households in poor countries, remittances sent by household members who migrate to more developed countries constitute a fundamental source of income and capital accumulation. Thus, it seems especially important to understand the decisions and motives of migrants who decide to remit back to their families. Identifying the factors that affect the level of remittances may give us valuable information concerning the level of welfare achieved by households sending migrants out.

Several motives have been suggested in the economic literature to explain remittance behavior, ranging from pure altruism to self-interest (see Lucas and Stark, 1985, Stark, 1991). Under altruism, the migrant derives utility from the level

of satisfaction of those left at home. Under tempered self-interest, a migration contract is settled between the prospective migrant and his parents, yielding substantial benefits to both parties (Hoddinott, 1994, Poirine, 1997). Finally, under pure self-interest, remittances are explained either by the aspiration to inherit, decisions to invest in assets in the origin village and ensure their maintenance, and intent to return home (Lucas and Stark, 1985).

Recently, Stark (1995) has suggested the possibility of a strategic self-selection among migrants. In a setting where individual productivity is not observable in the migration country, migrants are paid the average productivity of the migrants' workers. Such a scheme of wages holds only until the migrant's productivity is not observable. Thus, given the context of asymmetric information, high-skilled workers have an incentive to make strategic remittances, so that low-skilled workers are maintained in the home country. Hence, in this asymmetric information setting, one would expect that high-skilled workers send higher amounts of remittances to their family. Such an effect is likely to reinforce the positive impact of the brain gain in poor countries, even if the incentive to remit in a strategic way seems highly questionable (Docquier and Rapoport, 1998, 1999)[1].

In this paper, we prove that the assumption of asymmetric information leads to a transfer paradox that may offset the occurrence of strategic remittances from high-skilled workers, at least when remittances are relevant from self-interest. We consider the case of a family arrangement contract between the migrant and his family. By sending remittances, the migrant insures himself against the risk of leaving the migration country. Indeed, the origin family provides an efficient form of insurance by allowing the migrant to return if he fails to find work or is laid off (see Hoddinott, 1994). When investing in the home area, the migrant's family is a

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[1] Docquier and Rapoport (1998, 1999) prove that the case for positive strategic transfers is weak when pooling among communities is introduced or when there exists a certain degree of altruism.

trustworthy agent in maintaining the migrant's assets. So, remittances are linked to return migration behavior, which arises from the reinstatement of information symmetry[2]. Given the self-interest motive, we prove that low-skilled workers who are more likely to return in their origin village have an incentive to invest more in the home area through family transfers.

The remainder of the paper is organized as follows. In section 2, we present a two-period model of migration under asymmetric information, where ego‹stic migrants invest in their origin village, and we account for the possibility of return migration. In section 3, we show that the model raises a transfer paradox. Low-educated migrants send higher levels of remittances to their families since the probability of return migration is higher for low-skilled workers. Concluding comments are in section 4.

2   The model

We consider a migration model with two types of agents from a poor country, potential migrants and their family. Each migrant is characterized by a skill level denoted by θ. This parameter θ is defined on the closed interval $[\underline{\theta}; \overline{\theta}]$, where $\underline{\theta}$ and $\overline{\theta}$ are respectively the lowest and highest skill levels of migrants. We assume that the skill level is distributed according to a density function $f(\theta)$ and a distribution function $F(\theta)$. There are two periods in the migration model that we consider.

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[2] Other motives for return migration have been suggested in the economic literature. In particular, return migrations may be due to : i) country specific preferences, migrants having a preference for living and consuming in the home country, ii) price differentials, since return allows to take advantage of low price levels at home and iii) human capital investments, migrants improving their earnings position at home later by being in the foreign country now.

In the first period, all potential migrants decide to migrate. For a given occupation, we denote by $W(\theta)$ the net wage for a worker with skill level θ. The wage level is supposed to be an increasing function of θ $(\partial W(\theta)/\partial \theta > 0)$. Besides, to explain the migration decisions, we make the usual assumption that net wages are higher in the rich country than in the poor country. Information pertaining to the skill level of each migrant is unknown to employers in the migration country. The unobservability of individual productivity is due to informational asymmetry (see Stark, 1995). Hence, during the first period, all migrants are expected to receive a wage level which is determined by the average productivity of the group of migrants. Let $\overline{W} = \int_{\underline{\theta}}^{\overline{\theta}} W(\theta) d\theta$ be the average productivity of the migrants. Thus, the first-period consumption C_1 for a migrant is :

$$C_1 = \overline{W} - T \tag{1}$$

where T is the net transfer made to the migrant's family[3]. There is no altruism in the model and we rely on a pure self-interest motive to explain decisions of remittances. We assume that migrants invest in fixed capital such as land, livestock, housing assets and social assets because of the possibility of return.

In the second period, the migrant's participation in the labor market is characterized by full information. Indeed, true skill is revealed in the rich country after one period. Hence, net wages offered to migrant workers no longer depend on the average product of the group, but they are now positively affected by the individual skill level. The more qualified the migrant, the higher the net wage $W(\theta)$ in the labor market. Informational symmetry is restored through monitoring and

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[3] The net level of remittance T may include a previous gift from the migrant's family in order to favor the migration decision and the migrant's assimilation in the rich country. The migrant gains from support provided by family when he establishes himself in an urban area and during the job search.

observation. In the rich country, the signal on the migrant's productivity μ which is revealed by a test is given by :

$$\mu = \theta + \varepsilon \tag{2}$$

where ε is a random variable with distribution function $G(\varepsilon)$. The migration decision is successful when the migrant's signal exceeds the threshold level s. Hence, the probability p that a migrant still works in the rich country in the second period is :

$$p = \Pr(\theta + \varepsilon \geq S) \tag{3}$$

Let us assume that s is characterized by the distribution function $\Gamma(S)$. Then, the probability p also defined by $p = 1 - \Pr(\varepsilon \leq \theta - S)$ may be written as :

$$p(\theta) = \int_{O}^{+\infty} (1 - G(\theta - S)) d\Gamma(S) \tag{4}$$

with $p'(\theta) = \int_{O}^{+\infty} g(S - \theta)) d\Gamma(S) > 0$. The higher the skill level of the migrant, the more likely he is expected to work in the rich country during the second period. Thus, with probability p, the act of migration is still operating in period 2. But with probability $1 - p$, the migrant cannot stay in the developed country in that period and he returns home. In his origin country, his level of resources in period 2 depends on the amount of remittances previously invested in the rural area. In that case, following a standard investment argument, the migrant's revenue is an increasing function of remittances devoted to fixed capital and social assets in the first period. We denote by $I(T)$ a function corresponding to the returns of the first-period remittance, with $I'(T) > 0$ and $I''(T) < 0$.

The second-period level of consumption for the migrant, which is a random variable denoted by $\tilde{c}_2$, is then given by[4]:

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[4] The model can easily be extended by assuming that the child faces three possibilities (rather than two) in the second period. When the act of migration is unsuccessful in period 2, he may

$$\tilde{C}_2 = \begin{cases} W(\theta) & \rightarrow & p(\theta) \\ I(T) & \rightarrow & 1 - p(\theta) \end{cases} \tag{5}$$

Formal presentation of the model ends with consideration of the migrant's utility. Let $U(C_1, \tilde{C}_2)$ be the utility function of the migrant, where U is assumed to be continuous and strictly quasi-concave $(U' > 0, U'' < 0)$. Without loss of generality, we consider a separable and additive utility function $U(C_1) + U(\tilde{C}_2)/\delta$, with δ a discount factor.

3 The transfer paradox

Using this simple framework, we are now able to determine the optimal amount of remittance T and prove the presence of a transfer paradox. Given the migrant's opportunities in the second period, the migrant seeks to maximize the following expected utility :

$$\max_{T \geq 0} EU = U(\overline{W} - T) + \frac{1}{\delta} \left[p(\theta)U(W(\theta)) + (1 - p(\theta))U(I(T)) \right] \tag{6}$$

We begin with the optimal transfer value T, given the non-negativity constraint $T \geq 0$. From the first-order condition $\partial EU / \partial T = 0$, we get the following result :

$$-U'(\overline{W} - T) + \frac{1}{\delta}(1 - p(\theta))I'(T)U'(I(T)) = 0 \tag{7}$$

So, at the equilibrium, the marginal cost of transferring resources to the home country is equalized with the expected benefit in case of return to the home country. In the model, the migrant invests in his origin family from a self-interest perspective because of the possibility to quit the developed country. This self-interest motive for remittance leads to the following transfer paradox.

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either find a job in the developing country (the wage is then an increasing function of θ or return to his origin village. This extension leads to similar theoretical results.

Proposition 1 *High-skilled workers are expected to provide lower amounts of remittances to the home country, i.e.* $dT / d\theta < 0 \quad \forall \theta \in [\underline{\theta}; \overline{\theta}]$.

Proof. From the first-order condition (7) such that $EU_T = 0$ and using the implicit function theorem, we have $dT / d\theta = -EU_{T\theta} / EU_{TT}$. Using the concavity of U, it follows that $\text{sgn } dT / d\theta = \text{sgn } EU_{T\theta}$. Thus, from (7), we get :

$$EU_{T\theta} = -\frac{1}{\delta} I'(T) U'(I(T)) p'(\theta)$$

Since the following inequalities holds, i.e. $p'(\theta) > 0$, $U' > 0$ and $I' < 0$, we arrive at the result that $\text{sgn } dT / d\theta < 0$, which proves the transfer paradox. *QED*

In the model, the decision of return migration occurs in response of information asymmetry. Given the mechanism of information revelation, low-skilled migrants anticipate a greater probability of return and then invest more than high-skilled migrants in the home country. In so doing, they seek to improve their economic situation in case of return by sending higher levels of remittances. Hence, remittances may be seen as an insurance whose benefits are received only under migration return[5].

4 Concluding comments

In this paper, we have analyzed predictions of a two-period model of migration in a context of asymmetric information. A new theoretical result is derived with respect to the previous literature, suggesting that one has to pay close attention to attitudes towards migration return within families when looking at the determinants of remittances. Following a self-interest perspective, migrants make

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[5] The optimal amount T is also an increasing function of the probability of return migration $(dT / d(1-p(\theta)) > 0)$. Higher family transfers are send to the home country in response of a greater risk of unemployment in the developed country when informational symmetry is restored.

private transfers in order to insure themselves against the risk of migration return. Since low-skilled workers are more likely to return when informational symmetry is restored, the optimal remittance value is a decreasing function of the migrant's skill level.

This transfer paradox is thus an additional consequence resulting from the possibility of eventual return for migrants to their country of origin. A policy implication of the model is that the negative impact of brain drain on growth in developed country can be magnified by lower amounts of remittances given the context of asymmetric information. However, the transfer paradox holds only when remittances are motivated by self-interest. Since altruistic feelings may lead to a different outcome, looking at the motives for private intra-family transfers from migrants in developing countries remains a worthwhile issue.

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