Remittances and Savings, Can Banks Help?

Abstract

A remarkable fact of the remittances market is the absence of commercial banks as relevant players. Furthermore, remittances have been identified as a potential catalyst for the financial deepening of receiving countries. This paper sets up a financial model of remittances that acknowledges the altruism component of remittances and the dominant position of Money Transfer Operators mainly due to migrants' mistrust to banks. The model shows that banks can challenge this position thanks to their role as providers of remunerated saving and credit. The entry of banks reduces fees and increases the level of remittances, allows an optimal consumption smoothing and improves the welfare of migrants and their families, although it also increases the volatility of remittances.

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1 Introduction

Worker remittances -monetary transactions between migrants in the host country and their relatives in the origin country- constitute an essential financial resource for countries with a high incidence of migration, reaching, in cases like most Central American countries, to more than 10% of GDP. Moreover the increase in importance has been dramatic during recent years, as in Guatemala, where this ratio grew from 4,3% in 2002 to 10,3% in 2004 (World Bank, IMF).

The market of remittances is dominated by Money Transmitters Operators (MTO's, henceforth), while the participation of banks is strikingly small (Suro 2002, Orozco 2004). MTO's charge an explicit fee that can be a percentage of the amount remitted or a fixed amount (often in dollars). The fee usually depends on the services offered (speed of delivery, home delivery, etc.). The exchange rate spread is the difference between the exchange rate applied by the money transmitter company to convert dollars into local currency and the market (e.g. inter-bank) exchange rate.

Money transfer companies usually offer a less favorable exchange rate to the sender than the market rate. In spite of narrowing in the last decade, the cost of remittances remains high and large differences are observed among different destinations. According to sendingmoneyhome.org, the average cost of sending £100 though MTO's in 2001 for a sample of 40 countries was between 8% and 40% without including the exchange rate charged on money transfers located in local currency. Therefore, currently a significant slice of remittances goes to the operators as rents rather than to the families of the migrants in developing countries. Furthermore, most of the migration countries are characterized by low financial development.

Banks have traditionally kept aside of this apparently attractive financial market. In the US for instance they hardly control a 3% of the market for remittances between this country and Mexico (Orozco, 2004). But why have banks been unable to capture a substantial part of the remittances markets? On the one hand, the branching distribution system of banks seems ill-suited to

reach fast the recipients in remote areas in countries with low financial development where “bancarization” is scarce. This contrasts with capillarity of MTO (non-proprietary) network, which has given them a comparative advantage. Some other studies found that many immigrants fail to understand and are suspicious of bank pricing structures (See Suro et.al. 2003). In many cases this mistrust is linked to the dismal performance of banking systems in the origin countries of migrants, characterized by financial crises, appropriation of savings or depletion of their value. Finally, the requirements of documentation and transparency in banking transactions tend to be higher than on MTO's; the large share of informality in the migrants' job market and their irregular legal situation act as strong deterrents of both access to and use of the banking channel.

Given these obstacles, banks are developing several initiatives to increase financial literacy and build confidence. Some of the initiatives imply indirectly the use of the remittances to promote individual or community investments. However, only a part of the strategies developed so far convey the possibility of banks directly playing its natural role of inter-temporal allocation of financial resources in the origin countries, which is opening savings accounts and giving credit to remittances recipients contemplating such resources as. These direct or indirect initiatives, as well as some others with less intrinsic financial content will contribute to generate more trust and customer linkages which will broaden the scope of banking activities in this market.

Given this scenario, this paper comes as opportune, both from a practical and a policy point of view, since it constitutes the first attempt to formally model the impact of bank entry in the market of remittances. Undoubtedly, a positive effect of the use of the banking channel on savings will boost both, the social and the economic impact of remittances on emerging economies. Regarding the nation of origin of remittances, they can become the levers to lure migrants into the banking system; migrant's consumers can also benefit from the use of financial products attached to the remittances business. In any case, the largest expected benefit from banks' entry is to increase the competition in a market in which large rent-appropriation is perceived on behalf of MTO's.

2 The Model

Remittances constitute monetary transactions between migrants in the host country and their relatives who stay in the origin country, which are channeled through a financial intermediary (MTO's or banks in our model). The model has two periods and there is perfect information. Two different decision processes are entailed in the model, one concerning the families and one concerning the financial intermediary (ies).

There are various possible ways to model the family decision making; in this paper we will use a non-cooperative solution, in which both the altruistic remitter and his family maximize their utility unilaterally taking the other's actions as given. Regarding the second decision process, we consider two types of financial intermediaries: the MTO's which act as just transmitters of money, and banks, which can also allow for saving with a return r^b and extend credit. MTO's and banks charge a fee for sending the money, which may be different (c^{mto}; c^b respectively). This fee also includes the exchange rate premium.

Furthermore, the model has to capture the apparent disutility in which families incur when using banks compared to MTO's due to familiarity, convenience, and simplicity. This is captured by the disutility parameter ε^j, which is positive for banks ($\varepsilon^b > 0$) reflecting the reluctance to use this channel, and null for MTO's ($\varepsilon^{mto} = 0$).

2.1 The Problem of the Families

Each of the agents wants to maximize his own utility function conditional on the kid (k) being a migrant and sending remittances to his parents (p) back home. The kid decides the level of remittances in both periods at the beginning of period one, taking into account the transfer costs. Subsequently, parents make their decision on consumption and saving in the first period.

More precisely, both agents maximize their utility to the following exponential utility function[1]

$$U^{p} = -\frac{1}{\theta} e^{-\theta z_1{}^{p}} - \frac{1}{1+\rho}\frac{1}{\theta} e^{-\theta z_2{}^{p}} \quad (1)$$

$$U^{k,j} = -\frac{1}{\theta} e^{-\theta z_1{}^{k}} - \frac{1}{1+\rho}\frac{1}{\theta} e^{-\theta z_2{}^{k}} - \gamma\left[\frac{1}{\theta} e^{z^{p}{}_1} + \frac{1}{1+\rho}\frac{1}{\theta} e^{-\theta z^{p}{}_2}\right] - \varepsilon^{j} \quad (2)$$

Where $z^{i}{}_{t}$ indicates consumption of agent i in period t ($t = 1,2; i = p,k$ with p = parents, k =kids), ρ is the inter-temporal discount rate and θ is a parameter that captures the intensity of consumption smoothing. γ captures the level of altruism. Finally, ε^{j} is the utility differential migrant loses when she sends money through banks rather than through MTO's. Note that the superscript *j* in what follows refer to the financial intermediary of reference ($j = b, mto\ with\ b = banks$, $mto = money\ transfer\ operator$) .Therefore, $\varepsilon^{j} = 0 \forall j = mto; \varepsilon^{j} \geq 0 \forall j = b$.

As a migrant, the kid's full income budget constraints for periods 1 and 2 are:

$$y_1{}^{k} = z_1{}^{k} + (1 + c^{j}) R_1{}^{j} \quad (3)$$

$$y_2{}^{k} = z_2{}^{k} + (1 + c^{j}) R_2{}^{j} \quad (4)$$

where $y_t{}^{k}$ represents the earnings of the migrant in the foreign country in period t, $R_t{}^{j}$ is the value of transfers he makes to his parents as a migrant in period t when using the j-type of financial intermediary and c^{j} is the cost, in percentage, of sending money to his parents through the j-type of financial intermediary.

In this paper we assume that parents income in both periods rely only on remittances ($y_1{}^{p} = y_2{}^{p} = 0$), therefore the parental full income constraints are

$$R_1{}^{j} = s^{j} + z_1{}^{j} \quad (5)$$

$$R_2{}^{j} = s^{j}(1 + r^{j}) = z_2{}^{j} \quad (6)$$

where s^{j} and r^{j} are, respectively, the level of savings parents hold and the return parents can get from those savings when the son uses the j-type of

[1] Following the relevant literature (Nordblom, K. (1998)) about altruism, U(c_1, c_2) is strictly increasing, concave, and twice continuously differentiable and make possible to obtain a closed form solution.

financial intermediary to send his money. It is important to recall, as indicated above, that $s^j; r^j = 0 \forall j = mto$.

2.2 The Problem for Financial Intermediaries

In order to capture the current behavior of the remittances' market; we will first assume that there are only one MTO in the market, and that banks enter sequentially.

2.2.1 The MTO's problem

We will consider a two-period model. The MTO will choose the total charges for remittances (c^{mto}) in order to maximize its profits taking into account sender's reaction. The problem for a representative MTO can be then expressed as:

$$\max_{c^{mto}} \Pi = (c^{mto} - k^{mto}) R_1^{mto} + \frac{(c^{mto} - k^{mto}) R_2^{mto}}{1+\rho}$$

s.t.

$$(i) R_1 = R_1^{mto}$$
$$(ii) R_2 = R_2^{mto}$$

Where k^{mto} is the (constant) marginal cost of Remittances for the MTO (in percent)[2].

2.2.2 The Problem for Banks

The problem for a representative bank entering first can be expressed as:

$$\max \prod_{c_b, r} = (c^b - k^b) R_1^b + \frac{(r^b - r)s + (c^b - k^b) R_2^b}{1+\rho}$$

s.t.

$$(i) U^{k,b} \geq U^{k,mto}$$
$$(ii) R_1 = R_1^b$$
$$(iii) R_2 = R_2^b$$
$$(iv) s = s^b$$

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Where r^b is the return banks obtain in the financial market for the money in the saving's accounts.

[2] To solve this problem we use the Reduced Gradient (GRG2) nonlinear optimization code developed by Leon Lasdon, University of Texas and Allan Waren, Cleveland State University.

Note that there are three qualitative differences when comparing this expression with the previous MTO's problem The first is the potential for parents to save some of the remittances in a (remunerated) bank account and also to hold negative savings, since banks are allowed to extend credit (in this case $s^b < 0$). This comes out in the profit function of the banks. Second and related to this, in the second period the bank is paying a return r^b for the share of saved remittances but it is able in turn to obtain a yield r for them. This gives banks a competitive advantage over MTO's. The third difference operates on the contrary direction, since banks suffer a behavioral disadvantage indicated by ε^b included in $U^{k,b}$.

The problem for banks will be to choose c^b and r^b to maximize their benefits taking into account that they must be competitive respect to money transfer operators and conditional to families' utilities[3].

2.3 Solution

Using (1); (5) and (6) and assuming for simplicity that ${y_1}^p = {y_2}^p = 0$, the parent's problem can be expressed as

$$\max_{s^j} U^p = -\frac{1}{\theta} e^{-\theta(R_1{}^j - s^j)} - \frac{1}{\theta} e^{-\theta \frac{R^j{}_2 + s^j(1+r^j)}{1+\rho}}$$

where s^j and r^j are, respectively, the level of savings parents hold and the return parents can get from those savings when the son uses the j-type of financial intermediary to send his money ($j = b, mto$; b = banks, mto = money transfer operator).

The resulting Euler condition can be reformulated as an expression for savings:

$$s^j = \frac{1}{\theta} \frac{1}{2 + r^j} \left[\ln\left[\frac{1+r^j}{1+\rho} \right] + \theta(R^j{}_1 - R^j{}_2) \right] \quad (7)$$

With this result, we can proceed to solve the sender's problem, which, using (2); (3); (4) and (8) can be expressed as

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[3] To solve this problem we use the Reduced Gradient (GRG2) nonlinear optimization code developed by Leon Lasdon, University of Texas and Allan Waren, Cleveland State University.

$$\max_{R_1^j, R_2^j} U^k = -\frac{1}{\theta} e^{-\theta\left(y_1^k - (1+c^j)R_1^j\right)} - \frac{1}{\theta} e^{-\vartheta \frac{y_2^k - (1+c^j)R_2^j}{1+\rho}} -$$

$$-\gamma\left[\frac{1}{\theta} e^{-\theta\left(R_1^j - s^j\right)} + \frac{1}{\theta} e^{-\theta \frac{R_2^j + s^j(1+r^j)}{1+\rho}}\right] - \varepsilon^j$$

s.t.

$$(i) s^j = \frac{1}{\theta}\frac{1}{2+r^j}\left[\ln\left[\frac{1+r^j}{1+\rho}\right] + \theta\left(R_1^j - R_2^j\right)\right]$$

$$(ii) R_1^j \geq 0$$

$$(iii) R_2^j \geq 0$$

$$(iv) R_1^j + R_2^j \geq 0$$

From the F.O.C's we can obtain the following system of two equations with two unknowns

$$R_1^j = \frac{1}{\theta}\frac{2+r^j}{(1+r^j)+(2+r^j)(1+c^j)}\left[\ln\frac{\gamma(1+r^j)}{(2+r)(1+c^j)} + \theta y_1^k + \ln[\Omega] - \theta R_2^j \frac{1}{2+r^j}\right] \quad (8)$$

$$R_2^j = \frac{1}{\theta}\frac{2+r^j}{(1+r^j)+(2+r^j)(1+c^j)}\left[\ln\frac{\gamma}{(2+r)(1+c^j)} + \theta y_2^k + \ln[\Omega] - \theta R_1^j \frac{1+r^j}{2+r^j}\right] \quad (9)$$

Where $\Omega = e^{\frac{1}{2+r^j}\ln\left[\frac{1+r^j}{1+\rho}\right]} + \frac{1}{1+\rho} e^{-\frac{1+r^j}{2+r^j}\ln\left[\frac{1+r^j}{1+\rho}\right]}$

Solving the system we get the corresponding expressions for R_1^j and R_2^j. Finally, it is interesting to display the solution when kids use MTO's. In this case, the sender's problem should be re-calculated adding the restriction $s^{mto} \geq 0$ with $r^j = r^{mto} = 0$. If we do this, we can obtain the corresponding expressions for R_1^{mto} and R_2^{mto} for the case in which the restriction $s^{mto} \geq 0$ is binding. This will be the more general case in the paper, since without uncertainty and with a strictly positive discount factor, parents would be eager to anticipate consumption by holding negative savings but with MTO's they can't.

$$R_1^{mto} = \frac{1}{\theta}\frac{1}{(2+c^{mto})}\left[\ln\left(\frac{\gamma}{1+c^{mto}}\right) + \theta y^k{}_1\right] \quad (10)$$

$$R_2^{mto} = \frac{1}{\theta}\frac{1}{(2+c^{mto})}\left[\ln\left(\frac{\gamma}{1+c^{mto}}\right) + \theta y^k{}_2\right] \quad (11)$$

It is immediate to see that there are not inter-temporal linkages among these expressions. Also, it is straightforward to see that remittances increase with the level of altruism (γ), the income level (y_t^k) and are reduced by higher remittances costs (c^{mto}).

2.4 Calibration.

The calibration of the model is rather standard except for two central parameters. The level of altruism and the disutility associated with using the bank instead of the MTO's as channel for remittances.

Let me first briefly comment on the rest of parameters of the model, for the case of newly arrived migrant (N) with a constant income, which is the benchmark case. The value of $\rho = 0{,}01$ was chosen following standard criterion. $\theta = 0{,}5$ was chosen to match the data about reasonable values of care for a smooth consumption. In order to keep things simple, we normalized to obtain $y_1^k = y_2^k = 1$. Finally, $k^{mto} = 0{,}02$ was chosen to leave a margin equal to the mark up observed in the data and for simplicity I set $k^b = k^{mto} = k$.

The calibration of the level of altruism requires, under the model specification, to know the share of income sent as remittances R_1. Furthermore, as that share is expected to depend on the costs of remittances, it is necessary to have data on both at least at a point in time. For the year 2002, survey data by Orozco (2003) establish that the cost of sending USD 200 to Mexico from the United States trough MTO's is 6,343%. Interestingly, a recent paper by Sorensen (2004) provides quite detailed information of the average share of income sent by migrants for the same period, according to their characteristics. Newly arrived migrants -identified as temporary- send around 50% and long settled migrants (permanent) contribute with a significant smaller share of around 15%.

We link this divergence a higher level of altruism of the former, although other factors like higher expected incomes of settled migrants may also play a role. Given the rest of parameters, we calibrate the value for so as to match in the solution the share of remittances on income R_1. The corresponding calibrated value for new migrants is $\gamma_N = 1{,}08$, as shown in Table 1. Note that this calibration

implies that new migrants attach a higher utility to their parents' consumption than to their own. For the sake of completeness, the calibrated value for settled migrants (S), derived from the lower share of remittances is also lower: $\gamma_N > \gamma_S = 0{,}753$. Finally, the disutility factor arising when banks are used is computed taking advantage of the wedge between the known cost of sending remittances through banks or MTO's, which is also provided by Orozco (2003). He states that the remittances fee for banks is around 1% lower than the fee charged by MTO's (5,233% Vs 6,343%). Interestingly, this banks' fee is not attached to the existence of saving account, that is, the bank is effectively behaving as an MTO's, and therefore the differences are related to subjective preferences. Therefore, the calibrated value of $\varepsilon_N = 0{,}009$ is obtained by solving the bank's problem (when they do not offer a saving account to migrant's families) in order to obtain a full transfer cost for banks of 5,233%. Settled migrants have a lower value of $\varepsilon_S = 0{,}002$, indicating that the disutility produced by the lower speed of delivery or by the other aspects in which banks are worse than MTO's, is lower for permanent than for temporary migrants.

3 Results

The solution of the model implies that MTO's and banks maximize their profits and that families maximize their respective utilities. In equilibrium, kids must attain the same level of utility regardless of the channel through which they send the money. The results are presented for new migrants in Table 1.

As outlined above, the solutions will be presented in a sequential way in order to show more transparently the impact of banks entering the market. First, we will assume that MTO's are the only player in the market and that they act as monopolists. Then we will let banks enter the market, acting as MTO's, namely not allowing for remunerated saving or borrowing, even if this is not profitable for them. Finally, we let banks behave as such. This sequencing enables to discriminate between the two expected effects from bank's entry: competition and financial innovation.

TABLE 1

Model's Output for New Migrants with Constant Income

Scenario	Only MTO's	Banks as MTO's		Banks are Banks	
Channel	MTO's	Banks	MTO's	Banks	MTO's
c^j	0,345	0,010	0,020	0,018	0,020
r^b	-	-	-	0,111	-
r	-	-	-	0,122	-
$cons^k$	1,345	0,856	0,869	0,886	0,869
$cons^p$	0,480	1,122	1,098	1,102	1,098
$cons^*$	1,825	1,978	1,968	1,989	1,968
$R_1 / y_1(\%)$	23,940	56,411	55,201	64,815	55,201
$R_2 / y_2(\%)$	23,940	56,411	55,201	43,988	55,201
R^{**}	23,940	56,411	55,201	54,453	55,201
$s / R_1(\%)$	0,000	0,000	0,000	29,200	0,000
$\Pi(\%)$	35,528	-0,994	0,000	0,000	0,000

* $cons = cons^k + cons^p$, $cons^k = c_1^k + c_2^k/(1+\rho)$, $cons^p = c_1^p + c_2^p/(1+\rho)$

** $R = \dfrac{R_1 + R_2/(1+\rho)}{y_1 + y_2/(1+\rho)}$

3.1 Model with MTO's.

In the solution for the MTO as only agent, it just maximizes profits as a monopolist and takes advantage of the high level of altruism of new migrants. The lack of competitive or regulatory restraints in its behavior implies a quite high remittance fee: $c^{mto} = 34{,}5\%$. This figure is indeed much larger than that the fee used for calibration, but it falls within the range mentioned in Section 1 (8-40%)[4], which did not include exchange rate fee.

As expected, the share of remittances is halved relative to the calibrated case (24% in average Vs 50%) due to the higher transfer costs. The restriction $s^{mto} \geq 0$ is binding given ρ and $r = 0$, and the profit rate for MTO's is large: 35,5%.

Finally, the consumption -computed at its present value- is dented by the very high remittances fee. The value of 1,825 is 8,3% less than that which would be

[4] Recall that our calibration was based in the US-Mexican market which is probably one of the most competitive.

obtained by kids, if there where no remittances[5]. Furthermore, the consumption in this case displays a large divergence in favor of kids (almost three times as much) derived from the relatively low rate of remittances.

3.2 Banks enter the Market.

When banks operate they can potentially offer saving account and offer a return for clients (migrants' parents in this case). These savings are in turn invested by banks in the market and they earn a return *r*, so that they may make a profit through savings. The higher attractive of banks -and for banks- of the market may compensate the hindrance attached to mistrust and make profitable their entry into the market. More precisely, there is a trade-off between *r* and ε[6].

Graph 1 displays the trade off, conveyed in the upward slope of the mapping between r and the disutility level. On this line profits are zero. Higher disutility levels require a higher interest rate for banks to become competitive. Points to the left are unattainable, since banks enter to achieve perfect competition into the market. Points to the right indicate the area where the banks attain negative profits. Finally, the line passes through the vortex of the figure since with zero disutility, banks are identical to MTO's and the perfect competition equilibrium would be achieved with $r = 0$ and no profits.

3.3 Banks as MTO's.

Introducing first banks just acting as MTO's is useful to obtain insights on the perfect competition induced by the entry of an indeterminate number of banks, although it is clearly a non equilibrium solution, given the characteristics of the model. To see why, recall that the only difference between banks and MTO's, if the former are deprived from offering saving accounts, is the disutility derived from bank mistrust (ε). In order to compensate for this and deliver the same utility than MTO's to migrants, the bank will have to set $c^b = 1\% < c^{mto}$. But this in turn implies losses to banks (0,99%) and MTO's profits are driven to zero. The

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[5] The potential consumption is computed just by the present value of consumption derived from income, that is $\left[(c_1^k + c_2^k)/(1+\rho)\right] = 1{,}99$

[6] Recall that the latter is calibrated and the former is arbitrarily set in our model. Note that the return to migrants' parents from savings r^b also plays a role, but this parameter is endogenous to the model and it is dragged or pulled by the other two parameters as we will elaborate below.

bank in this case is located in a point like A_N in Graph 1. Banks might decide to operate in this area (with negative profits) on the expectation that ε moves to the left in the graph and the equilibrium point goes back to the vortex. Alternatively, banks may decide to offer savings accounts, that is, moving up the graph when the return on and from saving hits in. In any case, point A_N is not equilibrium.

In spite of this, it is remarkable to see the gains from this "virtual" competition[7]. The share of remittances now jumps to 55,9% and the gap between kids and parent's consumption greatly narrows to around 22%. The gains for the families can be roughly grasped by adding the total consumption of both parents and kids. Now the loss in consumption relative to potential is reduced to 0,6%.

3.4 Banks are Banks.

Table 1 shows, for the parameterization of the model, the results that correspond to point B_N in Graph 1. Given the parameters of the model, this is the minimum value for which it starts to be profitable for banks to enter the market when facing the calibrated value of ε. For the segment AB ($r \in (0, r^b)$), profits are negative.

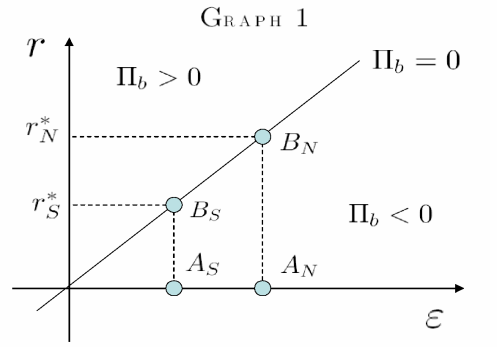
It is important to stress that banks have two control variables at their disposal: the fee for remittances c^b and the return to the parents' savings r^b. The optimal combination of both for the given parameters is an outcome of the numerical solution problem. Under the considered parameterization, $c^b < c^{mto}$ (0,018 Vs 0,020) and $r^b < r$ (11,19% Vs 12,20%). This *r* is the minimum market return that drives banks into the remittances market. Higher values for r would allow profit for banks and in the end would drive MTO's out of the market. Under perfect competition assumption ($\Pi = 0$ for banks and MTO's) banks will do not make any profit either from savings or from transfer fees.

Regarding the behavior of the families, results do not change if MTO's are used relative to the previous case (MTO's profits were also zero). But now the solution for banks is equilibrium and it can be compared with the MTO's. As before, overall remittances grow relative to the non-competitive case. Relative to

[7] The relevant column in this case is the MTO's, since banks would not effectively enter this market.

MTO's, remittances are higher in the first period but fall in the second because now remunerated savings (29,2% of received remittances) allows for this discrepancy. Furthermore, average total remittances decrease with banks (54,4% Vs. 55,2% of average income) due to the income effect: the resources provided by remunerated savings allow for an overall reduction in remittances. Actually, banks allows higher to increase overall consumption by 1,1% (1,989 Vs 1,968) and now consumption is very close to potential (a 0,05% difference).

GRAPH 1



4 Conclusions

This paper develops from scratch a very basic model to obtain some insights on the impact that the entry of banks in the remittances market can have. There are two key elements in this model which enables to address the issue. First, it is the idea that remittances is a special kind of financial and personal transfer, since it is based at least partly on altruism on behalf of the migrants. Second, the specification of the model has to come to terms with the fact that the importance of banks in the market for remittances has been lower than what their condition of main financial intermediaries would imply. Several studies explain this on the basis of reluctance of migrants to use banks to send their money. Upon this basis, it is developed a model which has two kinds of agents: families (composed of migrant's kids and parents) and financial intermediaries of two types: MTO's which are mere transmitters of money and banks which have the possibility of offering remunerated saving accounts and extend credit so as to overcome the competitive drug of being mistrusted by migrants. Implications of the model are rather intuitive. Remittances depend positively on the level of altruism and

negatively on the costs of remittances, but the possibility of banks entering the markets add quite deeper insights to the results.

When MTO's act as monopolists, they set large remittance fees, so that they are able to derive large rents from the market, which increase with migrant's level of altruism. As a consequence, they depress remittances and the level of consumption to kids and parents alike. Furthermore, since in the benchmark case of new migrants with constant income parents would save, but with MTO's they can't, the allocation of remittances through time is suboptimal.

In this model, for banks to compete they have to offer remunerated savings accounts, even if they do not attain any profit from intermediating savings. Why? Because, if banks could only compete through lower remittances fees than MTO's to make up for their disutility drag, then they would have permanent losses. By offering a return of savings, banks actually overcome such competitive disadvantage through other means and can set the remittance fee equal or close to the operation costs so as to eliminate losses. All in all, although the main benefit from banks is to increase competition, it is their financial technology what allows them to be competitive in the market, in this simplified model.

Even in this very basic framework, thus, the model provides some interesting insights. This invites to extending the model to account for other relevant facts that have been disregarded. One line of extension is the introduction of uncertainty, which can be of different types: uncertainty on income or on debtors. It would also be useful to try to embed recent strategies used by banks to lure migrants into using the banking channel. Note that, in terms of our model, some of these initiatives are equivalent to attempts to either reduce the reluctance of migrants to use the banking channel, either by increasing the capillarity and efficiency of the network, or by reducing the mistrusts of migrants.

We have also noted that the entry of banks may have side effects which are not necessarily positive, like the increase in the volatility of remittances. The potential reduction in remittances when banks offer saving accounts may have different interesting policy implications from the perspective of the host and migration countries. Since remittances is a drag on the current account of host

countries, and, reversely, it is an addition of external resources to receiving countries, the former may favor the banking channel of remittances more than the later. However, given the additional impact of the development of the financial system that the banking channel is expected to engineer in the receiving countries, both countries should be interested in developing this channel.

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