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A Model of Remittance Determination Applied to Middle East and North Africa Countries

N. Glytsos

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N. Glytsos
Senior Research Fellow
Centre of Planning and
Economic Research

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ABSTRACT

The objective is to construct and estimate a model of remittance determination which reflects individual behaviour of the migrant and his family, treating remittances as an endogenous variable in the migration system. Behind this model is found the idea of the relative bargaining power, inherent in the implicit contract theory, which determines priorities for present or future consumption of remittances. The model has two purposes: estimate the relative significance of behavioural and macroeconomic variables in remittance determination, and interpret, in a feedback manner, the results with respect to the theoretical postulates. All countries concerned are found to demonstrate unstable and volatile income expectations, with implications to remitting behaviour, and to present-future priorities.

Keywords: Model, Migration, Remittances, Determinants, MENA

INTRODUCTION

The prevailing theory of remittance determination postulates that altruism and self-interest, separately or jointly, motivate migrants in sending remittances to their family in the home country (Lucas and Stark, 1985, Stark and Lucas, 1988). This approach reflects an individualistic behaviour to migration and migrant remittances (Glytsos, 1988), in contrast to the macroeconomic labour market behaviour, which is cast in terms of a portfolio management determination of migrant savings, according to which remittances depend on certain macroeconomic variables (Katseli and Glytsos, 1986, 1989).

A number of models stemming explicitly or implicitly from these theories are empirically tested, using variables that are related to either of these approaches, or perhaps more often a set of variables that express jointly both theoretical approaches (e.g. Straubhaar, 1986; Glytsos,1988; Elbadawi and Rocha, 1992).

The objective of this paper is to construct a model of remittance determination along the lines of the above individual behaviour and enrich it in its empirical estimation with the inclusion of macroeconomic variables. We envisage to accomplish two purposes. One is to estimate the relative significance of behavioural and macroeconomic variables in remittance determination, and the other is to demonstrate, in a feedback manner, the implications of the econometric results for the empirical validity of the theoretical model. This will be done by computing the value of the structural parameters of the model from the estimated regression coefficients.

This feedback evaluation will reveal the nature of migrant income expectations, which influence the stability of the savings target and the length of stay abroad. It will also indicate the strength of the relative bargaining power of the migrant and the family and also the extend of the altruistic motivation in sending remittances, as well as the possibility of concessions on the part of the family in difficult economic times for the migrant (Glytsos, 1988).

1. THEORETICAL APPROACH

Temporary migration is considered as the movement of labour services alone, with beneficiaries the whole family at home, including the migrant after return. In this sense, the remuneration of the migrant contribution to production abroad is translated sooner or later into consumption at home (Kraus, 1976). Lucas and Stark (1985) and Stark and Lucas (1988) have pioneered in setting the whole migration process into a framework of family decision making with mutual benefits for the family and the migrant. These benefits are ensured by an implicit contract, which, among others, determines a minimum amount of remittances for the family support as a condition for migration, thus endogeneizing remittances. In this context, remittances are not a byproduct of migration but an integrated part of this process constituting a decisive factor of labour movements (Glytsos, 1988). Such migration is however controlled by the receiving country's needs of labour services. Stop-go migration policies may result in abrupt changes of the direction and the size of labour movements between sending and receiving countries, affecting consequently the size and regularity of remittances.

In contrast to permanent migrants who relocate for good to a new country, temporary migrants have a different attitude. They set out for a shorter or longer period of time with the purpose of accumulating some savings and return home, fixing revisable savings targets. For minimizing the cost of migration in a broad sense, attaining the savings target and insuring at least the required by the contract minimum flows of remittances, migrants suppress their own current living expenses to a subsistence level and work longer hours. For a comprehensive critical review of theories and realities on remittance determination see Glytsos (2000). The savings target is a moving target "adjusted according to the migrants' employment opportunities and income levels, their changing views as to the scope of migration and their changing horizon of staying abroad, all these depending, among others, on the migration policies of sending and receiving countries" (Glytsos, 1997, p. 422).

Against the actual or anticipated conditions that the migrant and the family faces, the migrant makes some tactical moves for protecting the savings target ensuring the minimum amount of remittances for the current support of the family, motivated by altruism and obligation, as noted above. Glytsos (1988, 2000) interprets the actual amount of remittances as the result of a tug-of-war situation, behind which

lies the relative bargaining power of the migrant and the family, as conceptualized by Lucas and Stark in their implicit contract theory. In this context, Glytsos (2000), proposes a supply and demand setting, represented correspondingly by "affordable" and "warranted" remittances. This approach is compatible with the hypothesis that the migrant, apart from being part of the family, can also take some additional individual initiatives, which allow the possibility of a "disagreement" between the two concerned parties (Hoddinott, 1994).

In Glytsos' (1988) terminology, the minimum level of remittances that the migrant is obliged to send to the family, constitutes the required remittances, or the threshold remittances according to Hoddinott (1994), that are critical for migration to take place. This critical value is defined by Glytsos as the difference between the average income per remaining family member and the average income in the community in which the family lives, and has a dual social and economic character. The social element, raising family income at least to the level of the neighbors' income quantifies, in a way, the wisdom of migrating, and raises the prestige of the family in the eyes of the neighbors (see also Stark and Taylor, 1991).

It is important, however, to consider that remittances have a double character. A component of them is, as discussed, endogenous and the other component is exogenous to the migration system. The latter is motivated by the relative return of savings and investment in the host and home country, in the framework of a portfolio choice approach (Katseli and Glytsos, 1986, 1989), and depends on macroeconomic factors, such as the foreign exchange rate, the interest rate and the inflation rate.

2. THE MODEL

In line with the theoretical thoughts of the previous section, the model starts from the supposition that remittances are an endogenous variable in the migration decision making process, i.e. the migration-repatriation cycle in a family network. The family, apart from the sine-qua-non required remittances, has an additional claim on migrant savings - the warranted remittances in Glytsos' terminology - either counting on the altruistic feelings of the migrant or on an implicit contract with him (Lucas and Stark, 1985; Stark, 1991). This claim will depend on the bargaining power of the family members and will be contrasted with the affordable remittances on the migrant's part which will depend on migrant's savings and his attitudes towards remitting. On the basis of these thoughts, the minimum required remittances for migration to take place will be guaranteed if

$$\left(S_m - S_m^e\right) \geq \left(Y_n - Y_f\right) \qquad (1)$$

where S_m = current saving out of migrant income

S_m^e = a pre-set provisional saving target, subject to adjustment according to the changing conditions of employment and earning capacity of the migrant in the host country,

Y_f = average family income at home

Y_n = average income in the "neighbourhood" of the family

So, $\left(S_m - S_m^e\right)$ is the surplus saving that has to be, at least equal to the income difference so that the family's income is raised, for reasons of social prestige, at least to the level of average income in the "community" of the family residence.

Actual remittances (R) will thus be confined as follows:

$$\left(S_m - S_m^e\right) \geq R \geq \left(Y_n - Y_f\right) \qquad (2)$$

When they are higher than the income difference and lower than the savings surplus they allow correspondingly the family to enter the zone of warranted remittances and enjoy a higher than the neighbors income, and the migrant to build on savings, revising the saving target or changing the length of stay abroad. More

concretely, to account for the volatility of the saving target the affordable remittances (R^a) on the part of the migrant would generally be,

$$R^a = (1-\rho_1)(S_m - S_m^e) \qquad (3)$$

Normally the value of ρ_1 would be expected to be positive and less than unity, but the possibility of a negative value cannot be excluded. A positive ρ_1 indicates a withholding of a proportion of surplus savings as a cushion, i.e., as a security precaution for stabilizing the savings target in times that the vagaries of migrant income fluctuations disturb it. Such a situation may appear in case current savings are reduced in the face of unfortunate conditions in the host country which may reduce migrant income. In contrast, a negative ρ_1 signalizes a run-down of the savings target, presumably due to extremely urgent needs of the family at home. It is clear, that the priorities of the migrant may differ. A $\rho_1 > 0$ sustains or raises the savings target, thus indicating a preference for the future rather than the present welfare of the family, whereas, a $\rho_1 < 0$ draining the savings target, assigns a preference to the present, at the expense of future welfare. In this case, the savings target is downwards revised for satisfying more present needs of the family. These two different priorities reflect the strength of the relative bargaining power of the migrant in determining remittances.

On the demand side, the family claim on migrant's income (R^c) is

$$R^c = (1+\rho_2)(Y_n - Y_f) \qquad (4)$$

or $$R^c = (1+\rho_2)(1-\beta)Y_n \qquad (4a)$$

assuming that $Y_f = \beta Y_n$, with $\beta < 1$ representing the distance between the migrant family's and neighbors' income. Parameter ρ_2 is a coefficient of warranted remittances over the required minimum $(Y_n - Y_f)$ or $(1-\beta)Y_n$ with $\rho_2 \gtrless 0$, which is the demand side counterpart of ρ_1 on the supply side. It reflects the bargaining power of the family vis-a vis its migrated member.

A $\rho_2 > 0$ means that the family claim exceeds the required social minimum level and a $\rho_2 < 0$ indicates family concessions towards the migrant, by accepting a smaller amount than the required minimum remittances. This is family's way of rescuing the

savings accumulation when it is at risk in unfavorable migrant conditions. The positive or negative values of ρ_2, just as the corresponding values of ρ_1,also express different priorities between present and future. A positive ρ_2 as a negative ρ_1 gives preference to the present and a negative ρ_2 as a positive ρ_1 gives preference to the future.

We may notice the possibility of a cooperative action or alternatively of a tug-of-war situation between the migrant and the family depending on the sign of ρ_1 and ρ_2. When the migrant as a guardian of the savings target withholds part of surplus savings $(\rho_1 > 0)$ as a buffer against the risks of draining the savings target, and at the same time, the family as a guardian of the family income at home, claims something more than the income difference with the neighbors' income $(\rho_2 > 0)$, there is a cooperation between the two parties and the purpose of savings accumulation is properly served. In this case, the family subsidizes in fact surplus savings by accepting as remittances less than the full amount of surplus savings, without being deprived of the minimum requirement for their economic survival and their social advancement.

Alternatively, when the needs of the family are urgent the savings target may be revised downwards, which will be reflected in the signs of ρ_1 and ρ_2 $(\rho_1 < 0,\ \rho_2 < 0)$. By expression (3) and (4a) this means that the migrant sends more than the current surplus savings, draining thus the savings target, and yet the family may receive even less than the income difference with the neighbors (when $\rho_2 < -1$). Obviously, this is the case that surplus savings is too little compared with this income difference, so that each party has to make a sacrifice compared with the case of $\rho_1 > 0,\ \rho_2 > 0$. While in this latter case the cooperation of the two parties has taken place in the zone of forward progress, the case of $\rho_1 < 0,\ \rho_2 < 0$ is in the twilight zone of backwardness, as far as the satisfaction of the migration purpose is concerned. Finally, the cases of $\rho_1 < 0$ and $\rho_2 > 0$, or $\rho_1 > 0$ and $\rho_2 < 0$ are unrealistic. The former entails a strong disagreement between the migrant and the family leading the savings accumulation process to an impasse, whereas the latter suggests that the

family resigns from its legitimate minimum claim, although the migrant can afford to satisfy it.

These alternative possibilities determine in effect the relative priorities of the migrant and his family between more consumption now or more consumption in the future, draining or accumulating respectively migrant savings. Let us see more concretely how these priorities are established

The planned saving target $\left(S_m^e\right)$ is a function of the expected migrant income $\left(Y_m^e\right)$, the expected minimum subsidence cost at the destination country $\left(C_{min}^e\right)$ and of a vector representing other factors of migrant remitting behaviour, related to various decisions regarding the length of stay, flexibility in the saving target etc. The function then is

$$S_m^e = f(\overset{+}{Y}_m^e - \overset{-}{C}_{min}^e, \overset{\pm}{Z}) \qquad (5)$$

Assuming linearity in (5) and also that $C_{min}^e = cY_m^e$, where c is the marginal propensity to consume, and collapsing Z to a scalar $\mu_1 = \mu_1(Z)$, due to difficulties of quantifying it (at least with the macroeconomic data to be used for estimating the model), planned target savings are determined by

$$S_{mt}^e = \mu_1 + (1-c)Y_{mt}^e \qquad (6)$$

But actual target savings (S_{mt}^*) are subjected to current conditions, adjusted according to current income and current savings (S_{mt}), through a distributed lag structure, i.e.,

$$S_{mt} - S_{mt-1} = (1-s)(S_{mt}^* - S_{mt-1}) \qquad (7)$$

where $1 \rangle s \rangle 0$ is the coefficient of adjustment. Assume also that current savings are determined linearly by current income abroad, i.e.

$$S_{mt} = \mu_2 + (1-c)Y_{mt} \qquad (8)$$

Substituting from (8) into (7), for S_{mt} and S_{mt-1} and solving the new expression gives,

$$S_{mt}^* = \mu_2 + \frac{1}{1-s}(1-c)(Y_{mt} - sY_{mt-1}) \qquad (9)$$

When current income rises both current savings by (8) and the actual target savings by (9) rise, but actual target savings rise faster, since $\frac{1}{1-s} > 1$, resulting thus in a decrease of actual surplus savings, given by (8) and (9).

$$(S_{mt} - S^*_{mt}) = \frac{s}{1-s}(1-c)(-Y_{mt} + Y_{mt-1}) \qquad (10)$$

This leads, other things being equal, to a decrease of actual remittances, which is explained by the immediate concern of the migrant to raise the savings target. It is clear from (10) that although surplus savings and thus remittances decrease when current income rises, the migrant makes up for the decrease of surplus savings and of remittances later, giving currently first priority to saving accumulation. Temporary migrants often lead an austere life abroad, suppressing their cost of living to the bare necessities for maximizing their savings. There is ample evidence that this is indeed the case (e.g. Glytsos, 1988, p. 528).

Let us see now how the volume of actual remittances is determined in this framework of relative choices between current and future consumption. Setting R^*_t as equilibrium remittances at time t, i.e. $R^a_t = R^c_t$, and R_t as actual remittances, a deviation from equilibrium would be expressed as

$(R^a_t - R^c_t) = (R_t - R^*_t)$ or

$$R_t = R^*_t + (R^a_t - R^c_t) \qquad (11)$$

Remittances are assumed to be adjusted to their equilibrium value by a distributed lag structure, similar to that of the savings target, that is,

$$R_t - R_{t-1} = (1-\delta)(R^*_t - R_{t-1}) \qquad (12)$$

where $0 \le \delta \le 1$, is the adjustment coefficient.

If $\delta = 0$, $R_t = R^*_t$, there is equilibrium at each time period. If $\delta = 1$ remittances will be constant over time $R_t = R_{t-1}$. Considering the empirical evidence of fluctuating remittances, the case of $\delta = 1$ is rather unrealistic. Considering that ρ_1 is a coefficient of withholding surplus savings from being remitted, it reduces affordable remittances, widening the gap to remittance equilibrium. We can therefore

substitute ρ_1 for δ in (12), to simplify our function of remittances, without loosing insight.

Solving then (12) for R_t^* we get,

$$R_t^* = \frac{1}{(1-\rho_1)} R_t - \frac{\rho_1}{(1-\rho_1)} R_{t-1} \qquad (13)$$

Substituting from (13) into (11) for R_t^*, gives

$$R_t = R_{t-1} - \left(\frac{1-\rho_1}{\rho_1} \right) \left(R_t^a - R_t^c \right) \qquad (14)$$

Substituting from (6) and (8), correspondingly for S_{mt}^e and S_{mt} into (3) and (4a) and plugging the expressions for R^a and R^c into (14), we get,

$$R_t = R_{t-1} - \frac{1-\rho_1}{\rho_1} \left[(1-\rho_1)(\mu_2 - \mu_1) + (1-c)(1-\rho_1)(Y_{mt} - Y_{mt}^e) - (1-\beta)(1+\rho_2) Y_{mt} \right] \qquad (15)$$

Now, the expected migrant income (Y_m^e) is assumed to be related to the current income (Y_m) with the following standard lag structure

$$Y_{mt}^e = \lambda Y_{mt-1}^e + (1-\lambda) Y_{mt} \qquad (16)$$

where usually $0 \le \lambda \le 1$, but in our case, by the construction of the model, as we will see shortly, λ is negative.

A high positive value of λ demonstrates relative stable income expectations, because as $\lambda \to 1$, $Y_{mt}^e \to Y_{mt-1}^e$ and a low positive value of λ demonstrates flexible expectations, as $\lambda \to 0$, $Y_{mt}^e \to Y_{mt}$, reflecting correspondingly stable and unstable savings targets. A negative λ giving a large weight to current income, suggests unstable and volatile income expectations and a strong faith that current income is a good basis for evaluating future prospects (Glytsos, 1988).

Lagging (15) one period we get an expression for Y_{mt-1}^e, which inserted in (16), gives an expression of Y_{mt}^e in terms of current variables, which plugged in (15) gives,

$$
\begin{aligned}
R_t = & \left[(\lambda - 1)(\mu_2 - \mu_1)\frac{(1-\rho_1)^2}{\rho_1} \right] \\
& + \left[(1-\beta)\left(\frac{1-\rho_1}{\rho_1}\right)(1+\rho_2) \right] Y^{\pm}_{nt} \\
& - \left[\lambda(1-\beta)\left(\frac{1-\rho_1}{\rho_1}\right)(1+\rho_2) \right] Y^{\pm}_{nt-1} \\
& - \left[\lambda(1-c)\frac{(1-\rho_1)^2}{\rho_1} \right] Y^{\pm}_{mt} \\
& + \left[\lambda(1-c)\frac{(1-\rho_1)^2}{\rho_1} \right] Y^{\pm}_{mt-1} \\
& + [(\lambda+1)] R^{+}_{t-1} \\
& - [\lambda] R^{-}_{t-2}
\end{aligned}
\qquad (17)
$$

Given the range of theoretical values of the parameters as described above, the directional effects of the variables on the right-hand side are indicated by the sign at the head of the variables. Given that $1 > c > 0$, $1 > \beta > 0$ and $\lambda < 0$, the signs of income variables depend on the sign of ρ_1, and for Y_{nt} and Y_{nt-1} also on the sign and value of ρ_2, as suggested by our model. A value of $1 > \rho_2 < 0$ does not make any difference, but a value of $1 < \rho_2 < 0$ changes the sign of these two variables. Equation (17) is an estimable equation derived rigorously from the theoretical model.

On the basis of the estimated regression coefficients and some exogenous values for β and c the complex expressions of the structural parameters in (17) can give values for λ, ρ_1 and ρ_2 which are the core parameters of the migrant and family behaviour concerning remittances. The values of these parameters may then be interpreted in the spirit of the theoretical model and evaluate the migrant family concessions through remittances on the basis of income expectations and their relative bargaining power or migrant altruism in paying and receiving remittances.

3. EMPIRICAL ANALYSIS AND RESULTS

Since, as we indicated, a number of other variables may change the value of remittances in local currencies of the home country, they will also determine the amount of remittances in foreign currency that will be sent, other things being equal, to the family at home. Such are the macroeconomic variables of the value of foreign exchange, the home interest rate and the inflation rate. These variables, in a way, "shift" the core behavioural equation.

The impact of these macroeconomic variables in a regression where all remittances are included is a priori indeterminate. First, in the spirit of this model, foreign exchange is expected to have a negative impact on remittances – the more local currency the family gets per unit of the host country currency, the less is needed for maintaining the current standard of living. Inflation should have a positive effect because it erodes the local value of remittances, and the home interest rate a negative effect because it raises the yield of savings, which is relevant to the extend that family saves some of the remittance income. Second, remittances are not however only sent for the direct support of the family but some are a transfer of migrant savings for deposit, in a portfolio choice framework and for investment (there is empirical evidence on this, e.g. Brown, 1994, p.363). This portion of remittances, for which the yield of savings or the return to investment count, is expected to be positively related to the exchange rate and the home country interest rate. In this context inflation plays a more complex role because apart from changing the purchasing power of remittances, it is often taken as a sign of economic and political instability and scares away remittances.

Concluding, these macroeconomic variables may move remittances in either direction, depending on their relative strength as a shifting factor of the structural equation, that reflects microeconomic migrant or family behaviour, and as a criterion of distributing savings between home and host countries, in which case also the interest rate of the host country plays a role.

Equation (17) is estimated separately for a number of MENA countries, to fill a gap in the relevant literature for the region (Wahba, 1996). The countries will be: Algeria, Egypt, Jordan, Morocco, Syria, Tunisia and Turkey. Time series data of the

period 1973-1998 is used. One or more corresponding migrant receiving countries will be designated for each sending country. For Algeria, Morocco and Tunisia, the receiving country is France, for Egypt, alternatively, Saudi Arabia, Kuwait and Jordan. By 1993, 45.9 per cent of Egyptian migrants were in Saudi Arabia (Farrag, 1996). For Jordan and Syria, the receiving country is Saudi Arabia, while for Turkey is Germany.

Assigning for β and c in (17) the exogenous values of β =0.50 and c=0.50, (we have also experimented with alternative values of β and c, but the nature of the results does not change), we may distinguish three groups of countries according to their empirical performance, regarding the estimated regression coefficients, and the value of the structural parameters obtained from them. The first group (group A), which includes Jordan, Morocco, Syria and Turkey comply to the case of $\rho_1 > 0$ and $(1+\rho_2) > 0$, call it the standard case. The second group (group B) is made up from Egypt alone with $\rho_1 < 0$ and $(1+\rho_2) < 0$, and the third group (group C) includes Algeria and Tunisia, with various combinations of signs for ρ_1 and $(1+\rho_2)$. For Algeria $\rho_1 < 0$ and $(1+\rho_2) > 0$, and for Tunisia $\rho_1 < 0$ and $(1+\rho_2) < 0$, or $\rho_1 < 0$ and $(1+\rho_2) > 0$). As determined by the theoretical model, the various empirical estimates of equation (17) for the three groups of countries confirm the expected corresponding signs of the key structural parameters $\boldsymbol{\lambda}$, $\boldsymbol{\rho_1}$ and ρ_2, verifying that the model can explain, to a certain extent, the different performances of the countries concerned (Tables 1 and 2).

The common behaviour for all seven countries is as follows: Parameter $\boldsymbol{\lambda}$ which is the coefficient of $\boldsymbol{R_{t-2}}$ is always negative, whereas the sign of $\boldsymbol{R_{t-1}}$ is positive for group A and in most of the equations for Egypt. These coefficients are most of the time statistically significant (Table 1). They verify a uniform adjustment of remittances towards their equilibrium level. For all seven countries, the coefficient of lagged home per capita income is negative, (except in two equations for Egypt), which was expected for the standard case of $\boldsymbol{1 > \rho_1 > 0}$ and $\boldsymbol{(1+\rho_2) > 0}$, that is empirically true for almost all countries.

Turning to the three group differential behaviour, we may observe that the countries of group A demonstrate a negative impact of current per capita income

abroad, and a positive impact of its lagged value. And, on the other hand, a positive sign of current per capita income at home and a negative sign of its lagged value, giving the already mentioned $\rho_1 > 0, (1+\rho_2) > 0$. In Egypt (group B) the major difference from group A is the interchange of the signs of per capita income abroad and its lagged value, demonstrating respectively a positive and a negative impact on remittances. Finally, Algeria and Tunisia (group C) behave in the same way as Egypt, regarding the priority of the present versus the future, but they experience mostly a negative sign for current per capita income in the home country, which is the case of $\rho_1 < 0$ and mostly $(1+\rho_2) > 0$, but this condition cannot explain the rest of the regression performance.

Concerning the behaviour of the three macroeconomic variables, the rate of exchange has for all countries, except for Turkey, a positive and in about half of the cases significant coefficients, the rate of interest mostly positive coefficients and the inflation rate positive coefficients in some countries and negative in others, which are at times statistically significant and at others insignificant. So, depending on particular countries, these three variables reflect either the income or purchasing power effect of our hypothesis (negative signs for foreign exchange rate and interest rate and positive for the rate of inflation), or the portfolio and risk effects (positive signs for rate of exchange and interest rate and negative for the inflation rate). The constant term, that according to our model may partly reflect the impact of the migrant stock or the proportion of migrated population[1], is mostly negative and mostly statistically significant.

4. INTERPRETATION OF RESULTS WITH RESPECT TO THE POSTULATES TO THE THEORETICAL MODEL

The unstable and volatile income expectations suggested, according to our model, by the negative values of λ, seem to be present at different degrees in all seven countries of this paper. From the migrant perspective, the finding of $\rho_1 > 0$ for group A countries indicates a relatively stronger preference for future welfare, which is the standard case explaining the purpose of temporary migration, i.e. building up a savings target, channeling part of surplus savings not to remittances but for the upward revision of that target. And when the rise of income is sustained the migrant makes up for the "loss" of remittances. More "successful" seem to be the Syrian migrants in Saudi Arabia, with a high positive ρ_1 ranging between 29 and 53 per cent, depending on the particular specification of the estimated equation. The lowest positive ρ_1 appears for Jordanian migrants, ranging between 2.4 and 3.5 per cent, whereas Morocco and Turkey occupy intermediate places with respectively 6 per cent and 5-8 per cent rates.

We may note here that when $\rho_1 > 0$ and small, as it is in most of our cases in country group A, the migrant sends almost all surplus savings, which suggests a humble and slowly moving upward savings target. We may observe in table 2 that whenever ρ_1 is small, $(1+\rho_2)$ is positive and mostly small, meaning that the family gets just about the crucial income difference, because there are not enough surplus savings to get. Recalling also that ρ_1 represents δ in the structural adjustment of remittances towards their equilibrium level, its positive small value signifies by (12) that actual remittances are almost equilibrium remittances, - the adjustment towards equilibrium being marginal. This is obviously because of the fact, that, by expression (3), affordable remittances are almost equal to the savings surplus, not allowing any room for an upward revision of the savings target, which would be followed by a new equilibrium value of remittances.

Egyptian migrants in Saudi Arabia may be considered as belonging to less successful migration manifesting a rather high valued negative ρ_1 of 35-49 per cent, which suggests a high subsidization of remittances out of accumulated savings by running down the savings target, giving a high priority to present consumption at the

expense of future welfare. This "loss" of savings is made up later if a higher income is sustained allowing an upward revision of the savings target. Relatively lower, 19 per cent is the corresponding subsidization from migrants in Jordan. Algerian and Tunisian migrants in France, although they demonstrate the same behaviour as the Egyptian migrants, they manage to damage little their savings target, with respective subsidization rates of 5-6 per cent and 1.8 per cent.

From the family perspective, this situation in conjunction with a corresponding $\rho_2 < 0$, means that, despite the efforts of the migrant who sacrifices the savings target, the family gets less than the threshold income difference. This is because the adjustment of remittances to their equilibrium value (equation 13), despite the same income expectations ($\lambda < 0$) as in group A countries, looses its dynamic nature and becomes a simple weighted average of two years' remittances with a much stronger weight for their lagged value, i.e. $R^* = \frac{1}{1-\rho_1}\left(R_t - \rho_1 R_{t-1}\right)$.

With respect to the coverage of the "required" minimum remittances, we may observe that only Syrian migrant families get a remission above this threshold[2] $(1+\rho_2) > 1$, i.e. 5 to 9 times higher[3] (Table 3). This finding corroborates the evidence that many migrants transfer funds amounting to three times the income they had before their migration (Burki, 1984). Jordan is close to satisfy the minimum requirements, whereas for the rest of the countries, except Egypt, $(1+\rho_2)$ is positive but less than unity, which means that the family receives remittances below the minimum requirements, subsidizing in effect the migrant for accumulating savings for the future at the expense of current consumption. This subsidization, expressed by the negative value of ρ_2, amounts to 66-85 per cent of the home income difference in Turkey, almost 100 per cent in Morocco and Tunisia, 78-100 per cent in Jordan and 19-24 per cent in Algeria. Egypt is a case by itself where the subsidization of the migrant by the family reaches 2-3 times the income difference[4].

The conclusion here is that, apart from Syrian migrants with a high cushion for target savings and simultaneously a considerable remission well over the required minimum, the migrants of the rest of the countries, either retain a small proportion of surplus savings, or subsidize the minimum remittances by setting moderate savings targets, or even, conversely, they themselves are subsidized by the family at home

which is sacrificing a potentially higher current standard of living for the purpose of enabling them to accumulate savings.

In contrast to minimum requirements which is an exogenous objective magnitude, the claimed remittances is a behavioural adjustable variable related to migrant-family tacit agreement or mutual altruism. As it turns out from our estimates, this claim has been larger than the minimum in Syria and smaller than the minimum in Jordan, Morocco, Turkey and Algeria, whereas it is negative in Egypt and Tunisia. A claim lower than the minimum signifies family concessions to facilitate the savings accumulation in cases the migrant experiences setbacks and difficulties in this effort. It also indicates a preference for future rather than present consumption. Negative claims demonstrate a very generous subsidization by the family and an even stronger priority for future versus present consumption. Jordanian and Moroccan migrants are capable of providing remittances well above the very low claims, whereas Turkish migrant remissions cover comfortably the stronger claims of their families. Syrian and Algerian migrants cover much less than the claimed amount, while the Egyptian and Tunisian migrant families go in the red for supporting their relatives abroad to accumulate savings.

An interesting question for which this paper has an answer is how far the actual flow of remittances below the minimum threshold or the family claim is the result of a compromise between the migrant and the family, forced upon them by the circumstances and how far it is a unilateral action taken by the migrant alone, irrespective of the wishes of the family, or the terms of the implicit contract. The answer lies with the estimated values of equilibrium remittances. Recalling that according to our model, the degree of convergence towards equilibrium depends on the uncertainty of future developments that generate unstable income expectations, the model seems to work rather smoothly in terms of adjusting the savings target and the family claims. Equilibrium remittances which, under the optimum condition of equality of affordable and claimed amounts, are expected to be equal to the actual flows, do not really divert much from them in all countries concerned, as they are calculated in Table 3 by expression (13). Their ratio ranges between 0.85 and 1.19 among countries and different specifications of the estimated equation, with Morocco (0.92-0.96), Syria (1.04-1.06), Algeria (1.05) and Tunisia (0.90-0.94) relatively not far from equilibrium, suggesting a relatively closer co-operation between the migrant and

the family in determining the flow of remittances, compared to Jordanians (1.19), Turks (0.88) and Egyptians (0.85), with a less close co-operation and a smaller flexibility of adjustment to find feasible solutions, which at least for Jordans and Egyptians may be partly explained by the volatility of migration in the oil rich Gulf countries.

5. CONCLUDING REMARKS

Experimenting with seven different countries with respect to migration destinations and economic and social background, the applied dynamic model, obtained rigorously from a theoretical hypothesis concerning remittance behaviour, demonstrates that remittances are affected by unstable and volatile income expectations in the host country. The model is flexible enough to explain the differences among countries in terms of relative preferences of the migrant family for present or future consumption out of remittances. But it allows also the possibility of establishing an agreement or a disagreement between the wishes of the migrant and the family, behind which is found the relative strength of the bargaining power of the two parties, under a regime of an implicit contract between them. Consequently, apart from a common strategic behaviour found among countries, there are differences in their tactical moves in an effort to adjust the savings target and decide on the flow of remittances to their families at home. As a result, the relative present – future priorities mentioned are established for the countries concerned.

APPENDIX

Data and Sources

A word of warning at the outset. The figures on remittances refer only to remittances that are transferred through official channels, leaving out the very often voluminous flows that are processed at a substantial premium through the foreign exchange black market.

The data used for estimating our regression are as follows:

$\boldsymbol{R}$ = volume of remittances (standardized by population in the migrant home country). Sources: for both Remittances and Population, IMF, International Financial Statistics Yearbook (various issues)

$\boldsymbol{Y_m}$ = migrant income that is approximated by the per capita income in the host country. Source: World Bank, World Tables, 1995, World Development Indicators, 1997, 1998 and 1999.

$\boldsymbol{Y_n}$ = average income in the Community of the migrant family, approximated by the per capita income of the sending country. Source: same as above.

$\boldsymbol{e}$ = value of foreign exchange rate (the value of one dollar in national currency units of the home country). Source: IMF International Financial Statistics Yearbook, 1999.

$\boldsymbol{r}$ = interest rate in home country. For Egypt and Turkey is the deposit interest rate and for the rest of the countries the discount rate, except Morocco 1994-98, with money market rate. Source: IMF, International Financial Statistics Yearbook, 1992, 1999.

$\boldsymbol{P_h}$ = inflation rate in the home country (CPI). Source: IMF, International Financial Statistics Yearbook, 1999. For few countries also other issues.

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TABLE 1

Estimated coefficients (standard case $0 < \rho_1 < 1 \quad 0 < \rho_2 < 1$)

Countries-Equations		$log\ y_{nt}$	$log\ y_{nt-1}$	$log\ y_{mt}$	$log\ y_{mt-1}$	$log\ R_{t-1}$	$log\ R_{t-2}$	$log\ e$	$log\ r$	$log\ \rho$	e	r	p	$\overline{R}^2$	DW	Constant
Jordan (Saudi Arabia)	1	0.146	-1.816	-6.967**	5.811**	0.647*	-0.346**							0.539	1.99	23.527
	2	11.821*	-5.860*	-5.403**	2.545	0.171	-0.369*	7.581*	-2.729	-0.642				0.797	2.45	2.298
	4	14.082*	-5.528*	-4.974	1.935	0.113	-0.371*				2.441*	-0.946	-0.053	0.795	2.55	-7.260
Morocco (France)	1	0.049	-0.328	-2.932*	3.943*	0.664*	-0.415*							0.981	2.04	-4.292*
	2	0.217	-0.131	-2.669	3.817	0.629	-0.438	0.058	0.144	-0.519				0.981	2.14	-6.591
	6	0.065	-0.093	-2.769*	3.827*	0.582*	-0.387*							0.989	2.26	-3.769*
	10	0.151	-0.200	-2.679*	3.754*	0.578*	-0.368*							0.988	2.21	-3.958*
Syria (Saudi Arabia)	1	4.213*	-2.900*	-0.613	2.722*	0.926*	-1.176*							0.853	2.08	-27.687*
	6	4.043*	-3.304*	-0.248	2.771*	0.869*	-1.227*							0.894	2.15	-33.244*
	7	5.636*	-3.595*	-0.720	2.459*	0.866*	-1.193*	0.364		-1.612				0.889	2.06	-36.880*
	10	4.302*	-2.798*	-0.744	2.724*	0.946*	-1.164*							0.885	2.04	-25.951*
	11	6.150*	-2.810*	-1.014	2.194	0.907*	-1.158*	0.030		-1.531				0.874	1.92	-29.958
Turkey (Germany)	1	1.467*	-1.243**	-1.378**	1.410*	0.901*	-0.159							0.997	1.98	-1.034
	2	0.522	-1.824*	-2.030*	1,026**	0.584*	0.027	-0.123	0.181*	1.908*				0.999	2.29	31.855*
	3	2.043*	-1.816*	-1.300*	1.130*	0.797*	-0.234*				0.000	0.015*	0.001	0.999	2.71	1.751
	6	1.141*	-0.831	-1.338**	1.426*	0.862*	-0.215							0.997	1.95	-2.259
	10	1.517*	-1.287*	-1.309**	1.540*	0.901*	-0.138							0.997	2.14	0.551
Case II $0>\rho_1>1$, $\rho_2<0$																
Egypt (Saudi Arabia)	1	3.409*	-2.897*	0.726**	-0.424	0.889*	-0.299							0.964	2.11	-5.306
	2	1.712	-0.828	0.325	-0.723	0.433*	-0.195	0.930*	0.750*	-1.105				0.971	2.68	2.997
	3	3.209*	-0.260	1.353*	-0.290	-0.134	0.239				0.732*	-0.281	-0.068*	0.981	2.16	-22.877*
	6	2.868*	-2.672**	0.669	-0.357	0.912*	-0.295							0.969	1.98	-10.552**
	10	3.375*	-2.705*	0.781*	-0.491	0.877*	-0.298							0.973	2.12	-2.318
Egypt (Kuwait)	3	-0.314	2.070	1.082*	0.054	-0.234	-0.543*				1.139*	0.122	-0.042*	0.980	2.40	-15.056*
	7	-0.632	0.938	0.407**	-0.405*	0.298	-0.407*	0.979*	0.988*	0.067				0.982	2.92	6.355
Egypt (Jordan)	1	2.619**	-2.147	2.279**	-1.486	1.009*	-0.613*							0.962	2.33	-6.170*
	6	2.374**	-2.151	2.351**	-1.456	1.024*	-0.629*							0.970	2.34	-10.435*
Other Cases: various values of ρ_1, ρ_2																
Algeria (France)	7	-4.159*	-0.787	6.818	-7.195	-0.086	-0.745*	1.612*		7.578*				0.820	2.54	49.615*
	11	-3.727*	-0.627	7.373	-9.049**	-0.118	-0.705*	1.205**		7.351*				0.835	2.58	47.083*
Tunisia (France)	1	0.416	-0.281	2.294	-1.082	0.475*	-0.399**							0.979	2.15	-11.441*
	2	-0.859	-2.936*	4.409*	-2.093	-0.252	-0.152	0.074	-0.439	4.843*				0.983	1.86	-14.281*

Note: In all countries except for Jordan, remittances and GDP per capita are expressed in the home country currency at current values. In Jordan, remittances and GDP are expressed in USD. For equations 1,2, 3 and 4 the dependent variable is log (remittances/population) of home country. For equations 6 and 7 the dependent variable is log (Remittances) and the home country GDP is in place of home country GDP per capita. For equations 10 and 11 dependent variable log(remittances)and home country GDP is per capita. In the equations of 6 and 7 the constant term includes the impact of the proportion of population emigrated whereas for equations 10 and 11 in the constant term is included the impact of the migrant stock (see note 1). The values of e and r are for all equations at current prices.

* Statistically significant at 5%

** Statistically significant at 10%

TABLE 2
Estimates of the Structural Parameters of the Model*
(For preasigned values of $\beta = 0.50$ and $\gamma = 0.50$)

		λ	ρ_1	ρ_2	$(1+\rho_2)$
Jordan (Saudi Arabia)	1	-0.34637	0,0237	-0,993	0,0071
	2	-0.36895	0,0320	-0,218	0,7815
	4	-0.37083	0,0346	0,009	1,0094
Morocco (France)	1	-0,41538	0,0622	-0,993	0,0065
	2	-0,43827	0,0709	-0,967	0,0331
	6	-0,38755	0,0615	-0,992	0,0085
	10	-0,36789	0,0607	-0,980	0,0195
Syria (Saudi Arabia)	1	-1,17675	0,3750	4,055	5,0556
	6	-1,22737	0,5350	8,303	9,3032
	7	-1,19270	0,3500	5,069	6,0695
	10	-1,16410	0,3404	3,440	4,4403
	11	-1,15764	0,2887	3,992	4,9922
Turkey (Germany)	1	-0,15949	0,0520	-0,839	0,1609
	3	-0,23437	0,0768	-0,660	0,3399
	6	-0,21504	0,0695	-0,830	0,1704
	10	-0,13850	0,0479	-0,847	0,1526
Egypt (Saudi Arabia)	1	-0,299	-0,408	-2,975	-1,9757
	6	-0,295	-0,488	-2,881	-1,8812
	10	-0,298	-0,345	-2,731	-1,7314
Egypt (Jordan)	1	-0,613	-0,190	-1,8365	-0,8363
	6)	-0,629	-0,189	-1,7547	-0,7547
Algeria (France)	7	-0,745	-0,061	-0,761	0,2391
	11	-0,705	-0,053	-0,812	0,1876
Tunisia (France)	1	-0,399	-0,0181	-1,015	-0,0148
	2	-0,152	-0,0177	-0,985	0,0149

* See note of table 1

TABLE 3

Estimated Equilibrium Remittances, Minimum Requirements of Remittances and Family Claims

(all values are at current local currency)

Home (Host) Country & Number of Equation	Actual Remittances per capita of Population (average of the sample)	Estimated parameters		Equilibrium remittances $R^* = 1/(1-\rho_1)(R_t - \rho_1 R_{t-1})$		Minimum Requirements $R^{min} = \gamma(1-\beta)Y_n$		Estimated Family Claim $R^c = (1+\rho_2)\gamma(1-\beta)Y_n$	
		Proportion of withheld surplus savings (ρ_1)	Premium (+) or surcharge (-) on minimum requirements (ρ_2)	Level	As a proportion of actual remittances	Level	As a proportion of actual remittances	Level	As a proportion of actual remittances
Jordan (Saudi Arabia)									
1	2806.7	0.024	-0.993	3339.9	1.190	77.3	0.028	0.5	0.000
2	2806.7	0.032	-0.218	3339.9	1.190	77.3	0.028	60.4	0.022
4	2806.7	0.035	0.009	3339.8	1.190	77.3	0.028	78.0	0.028
Morocco (France)									
1	456.9	0.062	-0.993	438.4	0.960	976.5	2.137	6.8	0.015
2	456.9	0.071	-0.967	419.8	0.919	976.5	2.137	32.2	0.071
6	456.9	0.061	-0.992	419.8	0.919	976.5	2.137	7.8	0.017
10	456.9	0.061	-0.980	419.8	0.919	976.5	2.137	19.5	0.043
Syria (Saudi Arabia)									
1	263.9	0.375	4.055	280.9	1.065	2395.1	9.076	12107.0	45.879
6	263.9	0.535	8.303	299.8	1.136	2395.1	9.076	22281.2	84.435
7	263.9	0.35	5.069	278.8	1.057	2395.1	9.076	14535.6	55.083
10	263.9	0.34	3.440	278.0	1.054	2395.1	9.076	10634.0	40.298
11	263.9	0.289	3.992	274.3	1.039	2395.1	9.076	11956.1	45.308
Turkey (Germany)									
1	2002107.0	0.052	-0.839	1740783.8	0.869	10292541.8	5.141	1657099.2	0.828
3	2002107.0	0.077	-0.660	1765999.9	0.882	10292541.8	5.141	3499464.2	1.748
6	2002107.0	0.070	-0.830	1758802.8	0.878	10292541.8	5.141	1749732.1	0.874
10	2002107.0	0.048	-0.847	1736872.2	0.868	10292541.8	5.141	1574758.9	0.787
Egypt (Saudi Arabia)									
1	117.4	-0.408	-2.975	99.7	0.849	197.0	1.678	-389.1	-3.313
6	117.4	-0.488	-2.881	99.4	0.846	197.0	1.678	-370.6	-3.155
10	117.4	-0.345	-2.731	100.0	0.851	197.0	1.678	-341.0	-2.904
Egypt (Jordan)									
1	117.4	-0.190	-1.836	100.8	0.858	197.0	1.678	-164.7	-1.402
6	117.4	-0.189	-1.755	100.8	0.858	197.0	1.678	-148.8	-1.267
Algeria (France)									
7	91.7	-0.061	-0.761	96.9	1.056	2709.3	29.532	647.5	7.058
11	91.7	-0.053	-0.812	96.9	1.056	2709.3	29.532	509.3	5.552
Tunisia (France)									
1	45.7	-0.018	-1.015	42.9	0.937	160.5	3.509	-2.4	-0.053
2	45.7	-0.018	-0.985	41.3	0.902	160.5	3.509	2.4	0.053

Sources: IMF, International Financial Statistics Yearbook (various issues), Estimates of the paper

Note: Parameter β is the proportion of the per capita income of the migrant families over the per capita income in the home country (Y_n), and γ is the proportion of home country population abroad.

Notes:

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[1] Due to the lack of figures on the migrant stock abroad, we cannot have remittances per migrant. Instead we use alternatively remittances per capital of the population of the home country or the volume of remittances, adjusting accordingly the right-hand side of the equation to account for the missing migrant stock. Remittances per migrant (R/M) would have been in log form $(\log R - \log M)$. Moving $\log M$ to the right-hand side of the equation, we collapse it to the constant term. Or, alternatively, if the migrant stock ***(M)*** is expressed as a proportion μ of the home country population ***(P)***, i.e., $M = \mu P$, then $\log R - \log \mu - \log P$ would be the dependent variable. Shifting terms, the right-hand side of the equation would include $\log \mu + \log P$. In that case, given that per capita income of the home country, i.e., $\log Y - \log P$, is one of the independent variables, ***log P*** is cancelled, leaving ***log Y*** as the independent variable, ***log*** μ being collapsed to the constant term.

[2] Since the stock of migrants from each country is unknown, our figures on remittances are per capita of the population. Therefore, the minimum level of remittances, that according to our hypothesis is the sine-qua-non for migration to be considered ex-ante rewarding, and consequently the claim of the family on migrants income refers to the unknown remittance recipients (P_r) that is $R^{min} = R/P_r$. But in our calculations the per migrant family income is approximated as a proportion $\beta < 1$ of per capita income in the home country (Y_n). Then $(R/P_r) = (1-\beta)Y_n$. Now, for comparing it with actual per capita remittances of total population for the purpose of assessing the relative satisfaction of remittance recipients it has to be adjusted accordingly, by setting $P_r = \gamma P$, where $\gamma < 1$ is the proportion of recipients to the population. Substituting for (P_r) we get $\left(\frac{R}{P}\right)_{min} = \gamma(1-\beta)Y_n$. The $\gamma, \beta < 1$ give the expression $\gamma(1-\beta) < 1$, suggesting that the minimum expected remittances per capita of the population is as set out lower than the average per capita income in the home country. Given that the β and γ parameters are unknown, we need assign exogenous values to them. There is a case here that β and γ may be roughly related, although the relation may not be linear, under the assumption that the larger is the difference between the migrant family income and the average income in the home country expressed by β - that is, the more unequal is the income distribution- the higher would be the proportion of emigrated population that sends remittances, expressed by γ. Under these conditions the expression $\gamma(1-\beta)$ may represent a considerable range of alternative realistic values of β and γ. Assuming as a basis of a realistic pair of values $\beta = 0.25$ and $\gamma = 20$, giving $\gamma(1-\beta) = 0.15$. Some alternative plausible values for various countries that satisfy this equation could, for instance, be: $\beta = 0.20, \gamma = 0.19$, $\beta = 0.50, \gamma = 0.30$, $\beta = 0.70, \gamma = 0.50$

[3] Such premium or subsidization rates could of course be better appreciated if one knew the savings target and the family income difference from the average in the home country.

[4] At first sight, there seems to be a contradiction in the case of countries with simultaneous negative value of ρ_1 and ρ_2, because this means that despite the downward revision of the savings target by the migrant and his desire to remit more than the savings surplus, the family ends up with "refusing" to receive such remittances. On the contrary, in fact it helps the migrant to sustain the savings target, demonstrating a very strong preference for the future. However, this does not mean that they are not receiving any remittances. An example would perhaps be illuminating: Take the extreme case of Egypt. As we will see in a moment, the estimated minimum requirements for Egyptians is 197 pounds and the claim on the family income minus 340 to minus 390 pounds, depending on the specification of the equation (367 pounds average). In this case, the family makes in fact a concession to the migrant by forgoing this amount of remittances, which is however partly compensated by the actual flow of remittances amounting to 117 pounds (Table 3). As a result of these ex-post developments the family gives in effect up in favor of the migrant 197-117=80 pounds from the minimum expected remittances or 367-117=250 pounds that would potentially under better conditions claim.