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Why do migrants remit? Testing hypotheses for the case of Morocco

Jamal Bouoiyour^{1*} and Amal Miftah^{2,3}

* Correspondence: jamal.bouoiyour@univ-pau.fr
¹University of Pau, Pau, CATT, France
Full list of author information is available at the end of the article

Abstract: We use Moroccan data to study the determinants of international migrants' remittances, testing the altruistic and welfare hypotheses. In particular, we analyze and assess what motivates migrants to send remittances back home. Our results lend support to the altruistic hypothesis suggesting that remittances are sent to households with low levels of welfare. Furthermore, the decision to remit is intensely associated to individual characteristics such as migrant income, gender and age. Likewise, remittances may be viewed as loan repayment if the migration costs were borne by the remittance-receiving family.

JEL classification: F22, J61, D1, D91, O55.

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Introduction

According to the World Bank's estimation, in 2013, remittances to developing countries were expected to reach \$414 billion and over \$550 billion worldwide (World Bank 2013). In some countries, migrants' remittances represent more than 20% of GDP (for example, Tajikistan and Haiti). They have been rising steadily for many years in developing countries, to become as important as direct investment flows and much higher than the amount of official development assistance. These flows have the advantage of being more stable than other forms of external funding and provide support to remittance-recipient households and communities hit by external shocks. As remittance inflows are a large and stable source of foreign currency, they behave very differently from foreign private capital flows, which often move pro-cyclically, thus raising incomes during booms and depressing them during downturns (Ratha 2013). If remittances are such a big chunk of the receiving country's budget, and if they are resilient throughout the business cycle, it is important to understand the motives of the individual migrants who remit. While this is a true statement, on average, for many countries, we seek to examine whether the theoretical predictions hold for Morocco.

Several studies have focused on the determinants and motivations of migrants' remittances. Microeconomic studies have examined individual factors that influence the decision to transfer and/or the remitted amount using data from surveys conducted among migrants or households who remained in the country of origin. Overall, there are two different theoretical models that explain a migrant's remittance behavior, namely, individual motivations and familial arrangements. The explanation based on

individual motivations explains that decisions on remittances may be guided by a purely individual strategy, namely, self-interest or altruistic behavior. The second explanation for remittance behavior focuses on the familial contractual arrangements involving migration. The arrangement is a kind of implicit contract between the migrant and his/her family. Remittances should honor the terms of this contract. These arrangements may take the form of insurance (migration is conceived as a family strategy to minimize economic risks through diversification of income sources) and/or loan repayment (the migrant repays the initial migration costs supported by the original family). In particular, contractual arrangements are popular in developing countries because of the absence and/or the failure of national credit, labor and insurance markets. The vast majority of studies on the microeconomic determinants of migrant remittances conclude that different motivations to remit can coexist. As suggested by Lucas and Stark (1985), migrants may have heterogeneous motivations, and their remitting behavior can thus be described as “tempered altruism or enlightened self-interest.” Similarly, several reasons can explain the remitting behavior of the same migrant.

Despite an extensive literature on the microeconomic determinants of remittances, the remittance behavior of migrants from developing countries, such as Morocco, remains poorly or partially known. Most studies focus generally on a small number of countries, notably in Latin America and South Asia¹. This provides the main motivation for undertaking this research which aims at uncovering the empirical motivations of remittances to Morocco. It seeks to answer the following questions: what are the factors that account for the existence and the variation of remittance flows to Morocco? What are the reasons behind migrants’ remitting?

For a country such as Morocco, remittances from international migrants constitute a major source of additional income for their families and a reliable source of foreign currency. Remittances to Morocco, which is the third largest remittance-recipient country in the MENA region, are estimated by the World Bank at more than \$6.5 billion in 2012, which is about 7.5% of its GDP. These inflows have increased significantly over the past decades. While in 2000, the total remittance was less than \$2.2 billion, it exceeded \$5.4 billion by 2006. This continued to increase to \$6.7 billion in 2007 just before the economic crisis and to \$6.89 billion in 2008. These inflows compensate for some of the output losses that Morocco may suffer from by the emigration of highly skilled workers. Savings and investment are just some examples of the contribution of remittances to the Moroccan economy. Recent studies have shown that at the macroeconomic level, remittances from Moroccan migrants could have many virtues. Unlike private capital flows, such as foreign direct investment, remittances are relatively stable, countercyclical—with respect to Morocco’s output—and seemingly were a resilient source of external financing during the recent crisis². Hence, they can help to maintain macroeconomic stability. In fact, thanks to their countercyclical behavior, remittances significantly reduce growth volatility and help the country adjust to external and macroeconomic policy shocks. To a large extent, they have contributed to the stability of Moroccan economic growth (Bouoiyour et al. 2014; Bouhga-Hagbe 2006³). In many circumstances, remittances are so large that they can carry the potential for a “Dutch disease” type of phenomena; however, it appears that Morocco is not experiencing Dutch disease effects (Bouoiyour 2013).

At the microeconomic level, these results are consistent with remittances being driven by altruism or by a risk-diversification strategy, which aims to insure adequate

protection against adverse exogenous shocks. However, this assumption has not been properly demonstrated. Therefore, the contribution of this paper is to assess the accuracy of this evidence. It should be noted that the increasing of the flows of remittances into Morocco corroborates the efforts that are being carried out by Moroccan authorities. Government initiatives have taken various forms—from the creation of dedicated institutions to deal with migrant community issues to the addition of specific functions of existing ministries such as foreign affairs and interior affairs. For example, they have set up a specific Ministry in Charge of Moroccans Living Abroad and Migration Affairs in order to promote relations with their citizens abroad and an institution which conducts studies on migration issues and contributes to the collection of data on the diaspora (“Conseil supérieur des Marocains Résidant à l’Etranger”).

To properly assess the socio-economic issues of migration and analyze the causes of changes in remittance levels, it is certainly interesting to conduct an analysis of the determinants of individual behavior. However, this analysis requires the use of household data which are not always available and often inaccessible. Our empirical study was conducted for the first time from the data of the last Living Standards Measurement Survey (LSMS) for 2006-07, which is designed to be the representative of the Moroccan population. We focus on testing the theoretical motives to remit such as altruism, insurance, loan repayment and the bequest motive. We find that both altruism and family arrangement motives could simultaneously determine remittance behavior of Moroccan migrants.

The rest of the paper is organized as follows. The next section provides the literature review. The third section describes the data and provides descriptive statistics. Section 4 outlines the empirical methodology. Section 5 discusses the results of estimation and Section 6 concludes the paper and explores policies and interventions that are aimed at facilitating remittances inflows.

Microeconomic determinants of migrant remittances

Review of theoretical arguments

Lucas and Stark (1985) have been among the first ever to start a real discussion on motivations to remit. They have pointed out the complexity of family arrangements involving migration. Traditionally, the economic literature on migrant remittances has distinguished two types of theoretical models, namely, the individual models and the “family” models. At the individual level, the researchers consider altruism and self-interest as an explanation of remittances. According to the altruistic model, migrants transfer because they are concerned about the consumption of their families in the origin countries. The intent of these migrants is to improve the welfare of their families and loved ones by incorporating the utility of these people in their own utility (Lucas and Stark 1985; Cox et al. 1996; Rapoport and Docquier 2005)⁴. In contrast, in the model of pure self-interest, it is assumed that the migrants choose an individual strategy of transfer. This latest model highlights three explanatory reasons of migrant remittances, namely, the intention to return to the country of origin, investment in the community of origin and the desire to inherit the assets of the family of origin (Lucas and Stark 1985). Note that this last reason may not reflect a true individual strategy since the existence of an inheritance ensures the continuation of remittances in the long term. In this case, these

financial flows are rather the result of an implicit intrafamilial contract (Hoddinott 1994). In this regard, the recent literature points out the importance of intermediate motivations that represent contractual agreements between the migrant and the family. Specially, two models have been treated: the co-insurance and the implicit contract of loan repayment. The theory of co-insurance contract implies that the family initially invests in the education and livelihood of its members and may finance the costs of its future emigration. Once installed in the host country, the migrants must support their family by transferring a portion of their savings. These new resources will allow the remaining family members to cope with possible transitory socio-economic consequences of shocks or hardships, such as sickness, unemployment, poor harvest, among others, to improve its consumption and to undertake new projects. The family is looking at this co-insurance contract as a means to reduce its economic risks and to potentially increase its revenue by diversifying income sources (Azam and Gubert 2005). Thus, migrants replace missing or imperfect markets (of credit, insurance or employment) in the country of origin (Taylor et al. 1996). According to the New Economics of Labour Migration (NELM), migration is a collective decision made at the household level. It tries to maximize revenue and especially minimize economic risks (Taylor and Martin 2001). A co-insurance arrangement can be mutually beneficial to the migrants and their family of origin. In some settings, personal risks incurred by the migrants in the host community explain their decision to remit money back home to cover those risks (Amuedo-Dorantes and Pozo, 2006).

In the case that migration does not provide insurance to migrants and their family of origin, there may be another family arrangement that explains the existence of remittances. That is the case of an implicit family loan repayment contract which ties migrants to their family. As part of this family contract, remittances are seen as a return on investment; they are simply the repayment of costs incurred by the migratory family (the cost of education and/or the cost of migration). The financing of these costs is subject to an implicit agreement. Under this agreement, parents lend to their children and finance their education, travel and settlement in a foreign country. By doing this, they make an investment that is profitable and sustainable. This investment starts to pay off when migrants repay the loan (and its interest). In this model, remittances are not expected to decrease over time as in the altruistic model because a share of these funds may be used to finance migration costs for future generations. Poirine (1997) provides a further analysis of remittances as an implicit family loan arrangement by considering these remittances as a repayment of educational costs. In their theoretical model, Ilahi and Jafarey (1999) insist not on the educational costs like Poirine (1997), but on the costs of migration.

Other remittance motivations have been identified in the literature as the exchange of services, which can also result from an agreement with the family before the emigration of its members. Through this agreement, the migrants may purchase services from their family members who remain in the country of origin. For example, the migrant parents send remittances to grandparents for caring for their children during their migration. The investment motive can sometimes be part of the service exchange motive. In this case, the migrants send money to their family of origin who is expected to take care of their investment during the period of migration (De la Brière et al. 1997; Hoddinott 1994; Poirine 1997).

More recently, some researchers have focused on the strategic motivations of migrants' remittances. Stark and Wang (2002) have studied the strategic behavior of skilled migrants. Accordingly, the optimization of income earned abroad is one of the key determinants of remittances from skilled migrants. In fact, when information on individual skill levels of migrant workers is unknown by employers in host countries, all migrant workers receive a fixed salary which corresponds to the average productivity of the group of migrants. In this context, in order to maintain and increase their income earned in the host country, skilled migrants will discourage the emigration of low-skilled individuals. They thus send remittances to low-skilled residents, allowing them to compensate for their loss of income due to not emigrating. This strategic motive can also be at the center of family contracts between the migrants and their family of origin.

Review of the empirical literature

Microeconomic studies have shown that socio-economic characteristics of migrants and recipient households, such as the level of wealth, the education or the level of risk to which they are exposed, affect the propensity to remit and receive remittances. Analysis of the results obtained by the most empirical studies highlight in particular the role of the living conditions of migrants and their family in the origin country. Under the assumption of altruism, these studies show that the likelihood of sending remittances and the amounts transferred are increasing functions of migrant income (Lucas and Stark 1985; Vanwey 2004). They also highlight the negative impact of living standards of beneficiaries on amounts transferred by an altruistic remitter (Lucas and Stark 1985; Agarwal and Horowitz 2002). This can also be consistent with the hypothesis of the existence of a family strategy for reducing economic risks, arising from a contract of insurance between the migrants and their family. This highlights the fact that, as in the case of altruism, remittances motivated by insurance considerations help to smooth the earning shocks suffered by the family of origin. Specifically, using data collected in Botswana in 1978-79, Lucas and Stark (1985) found that transfers from migrants to their family increase with the severity of droughts in the community of origin. The study of Gubert (2002) also validates the insurance motive from a sample of migrants from the region of Kayes (Mali). His results show that remittances contribute to cover a wide range of risks (the risk of disease or death as well as the risks related to agricultural activity). In this framework, previous studies have also tried to test the impact of risk incurred by the migrants in the host country (unemployment, illegal status, etc) on their decision to transfer. These findings reveal that migrants send more money to their family when they are confronted with risks during their stay abroad (Amuedo-Dorantes and Pozo 2006; Agarwal and Horowitz 2002; Cox et al. 1996). These last two studies have specifically analyzed the impact of the unemployment situation on migrants' remittances. Their results indicate that this situation has a positive influence on the remitting behavior if the remittances motivation is insurance. The effect remains unknown if altruism is the main reason of these remittances.

There is an implicit assumption that remittance behavior of migrants depend on the permanent or temporary character of migration. Evidence supports that migrants who can stay only for a short period in the host country are more likely to remit. This is particularly true for those who are unable to find long-term contracts of employment.

Given the positive correlation between the level of education and the success in labor market, more educated migrants may be more likely to have residence permits for an unlimited period. In the case of parental investment in sons' human capital, we should note a temporal continuity of migrants' remittances which will be used to repay the costs of educating the migrant but also to finance the education of family members in the community of origin (Poirine 1997). It should be noted that remittances can decrease as time goes on, but not in the first years of migration since they can continue to grow (Lucas and Stark 1985). A number of empirical studies have examined the relationship between the amounts transferred by migrants and their level of education. Durand et al. (1996), for example, have noted that migradollars (i.e., remittances) of Mexican migrants increase by 4.3% with their years of education until a certain age (40s), where older migrants are less likely to remit.

Furthermore, there is a consensus in the literature about the effect of the costs of migration on migrants' remittances. Durand et al. (1996) have highlighted that migradollars increase by 4.5% for every \$100 "loaned" or "given" to finance emigration to United States. Using survey data on Pakistani migrants, Ilahi and Jafarey (1999) reported that an increase by 1% in the share of loan granted by the extended family in the total cost of migration leads to a decrease of transfers to the immediate family by 4.6%.

The size of the family is an important factor to consider for a migrant's remittance behavior. In the case of the altruism approach, the presence of people whom migrants most care in the household of origin (parents, wives and children) will encourage them to remit larger amounts than other motivations (Lucas and Stark 1985). Also, we observe a negative correlation between remittances and the number of migrants from the same family. In contrast, if the true motive is self-interest, and if remittances are driven by the aspiration to inherit, the number of migrants may have a positive effect on transfers, which signifies that if the number of migrants rises, each of them must send more money because of greater competition with other migrants from the same household (Hoddinott 1994; Agarwal and Horowitz 2002).

We also note that few studies of the remittance behavior of migrants provided empirical evidence of migrant gender influence. Vanwey (2004) conducted a theoretical analysis of the determinants of remittances sent to Thailand, which focused on the origin of gender differences in remittance behavior of migrants. This study found that women send more money than men before a wedding to escape the social sanctions of the family. De la Brière et al. (1997) believe that female Dominican migrants play the role of insurers from their parents against negative income shocks. In addition, migrant women who have no brothers abroad send money in order to inherit, whereas male migrants who have no sister migrants seek to ensure their parents.

Data and descriptive analysis

The data used in this study came from the Moroccan Living Standards Measurement Survey (LSMS) for 2006-07. The LSMS in Morocco is a multi-topic household survey covering a wide range of topics that are related to the Moroccan population. It provides information on demographic and socio-economic characteristics of all co-residing household members (the demographic composition of the household and detailed information on consumption, subjective poverty, education, health, housing, labor,

credit, agricultural and non-agricultural activities). Interestingly, it also includes information on the migrant family members and detailed information on the characteristics of these members. The survey is conducted by a questionnaire developed by the World Bank and updated according to the results of the 2004 Population and Housing Census. The sampling procedure has ensured that the sample is highly representative of the Moroccan population. It generates a large country survey dataset on more than 36,000 individuals and a weighting sample of 7,062 households drawn from all regions of Morocco (60 provinces). The LSMS data report which migrants send money back home, whether these remittances are in cash or kind, and total cash remittances received by a household.

Basic descriptive statistics for the entire sample

Table 1 summarizes the data description and the main characteristics of the surveyed households according to the receiving or not of international remittances. We note firstly that among 7,062 Moroccan households, 15% received remittances from abroad during the preceding year (i.e., the recipient households), 33.7% of which are rural households. In reality, the majority of households (remittance-recipient and non-

Table 1 Descriptive statistics of the sample

	All households		Recipient households		Non-recipient households	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Average household expenditure	56,887	54,560	72,756	59,171	54,025	53,190
Average expenditure per person	13,117	15,098	17,305	15,991	12,362	14,807
Food expenditure	24,441	15,804	24,612	16,222	24,410	15,729
Educational expenditure	2,096	5,782	2,899	5,749	1,993	5,779
Health expenditure	2,786	6,065	2,865	7,149	2,773	5,870
Household size	5.144	2.433	4.942	2.438	5.181	2.430
Age of household head	51.64	14.00	55.93	15.10	50.87	13.65
Household head is a male	0.824	0.380	0.736	0.441	0.841	0.366
Proportion of household members with						
Primary	0.2662	0.232	0.2516	0.236	0.2688	0.231
Middle secondary education	0.1382	0.138	0.1617	0.196	0.1340	0.181
High secondary education	0.0780	0.078	0.0972	0.167	0.0745	0.154
Higher education	0.0492	0.049	0.0494	0.125	0.0492	0.140
Mothers' education						
Never enrolled	0.746	0.434	0.676	0.468	0.755	0.429
Primary and middle secondary education	0.190	0.392	0.246	0.431	0.183	0.387
High secondary education	0.037	0.190	0.050	0.219	0.036	0.185
Higher education	0.025	0.156	0.026	0.159	0.024	0.155
Household lives in rural area	0.395	0.489	0.325	0.4687	0.407	0.491
Household owns a land	0.296	0.456	0.268	0.443	0.300	0.458
Household owns a production unit	0.207	0.405	0.207	0.405	0.207	0.405
Proportion of actives	0.366	0.260	0.294	0.257	0.379	0.258
Number of observations	7,062		1,079		5,983	

Source: Moroccan LSMS 2006/07.

recipient) are from urban areas. The study revealed that there are more households headed by men (82.4%) than households headed by women. However, recipient households are more likely to be headed by women than non-recipient household. This could be explained by the fact that more men are involved in international migration than women.

The survey data show that the proportion of household members who have reached a relatively high level of education (college or high school level) is very high among households with migrants. However, there is no significant difference between these two groups in terms of the number of people who graduated higher education. These data also show that at the household level, the level of education of mothers living in recipient households is generally higher than that of those living in non-recipient households.

There seem to be interesting differences in expenditure across household categories. The average annual expenditure of households who receive remittances significantly exceeds that of households without remittances (72,756 MAD⁵ and 54,025 MAD, respectively). Recall that the household expenditure means spending on goods and services such as food, housing, clothing, transportation, health care, recreation, culture, education, health care and tobacco. The structure of household expenditure reveals that the average level of educational expenditure per household is 2,096 MAD per year (2,899 MAD in households with migrants and only 1,993 MAD in households without migrants).

Main characteristics of Moroccan migrants

The migrant part⁶ of the survey highlights some characteristics of the international migrants and indicates that the migrant population is largely dominated by men (71%). A total of 60% of men are single at the time of migration against only 34% of women. Regarding the level of education, 17% of migrants are illiterate or had no more than a primary school education, and 18.11% have reached the level of secondary education. The proportion of migrants who have reached the higher education level before their departure abroad is 15%. This percentage, which is the same for men and women, indicates that the level of education of migrant women is closer to that of men in recent years.

According to the sample, getting a higher education is not the main reason for emigration of Moroccans. The proportion of women who migrate for gainful employment is smaller (25%) than that of those who join their husbands in the host country (60%). For example, female migration, which is mainly due to family reunification, has led in recent years to a great reorganization of the gender make-up of the foreign population in France. Conversely, for a large majority of male migrants, international migration is motivated by economic reasons, for example, by taking a job in the host country (88%). It may be noted that because of these differences, the professional situation of female migrants is not close on several aspects to that of men. Thus, more than half of them (60%) are not working and not looking for work in their host country. In fact, women who join their spouses are finding it hard to get a job in the host countries and thus are more affected by unemployment. Also, their jobs are often precarious and low-skilled (Perrin-Haynes 2008). In the case of France, for example, this situation can be explained in part by their poor command of the French language (Dos Santos 2005) and by ethnic discrimination (Rebzani and De Koning 2009). Not surprisingly, currently more men have

gainfully employed than women. With regard to the host country, our sample reveals that the number of migrants in Spain and France represents 53% of the international migrant population. This trend is often explained by the history of migration and the migration policy development of both host countries.

Financial remittances are a central element of Moroccan migration and a way for migrants to maintain close ties with their country of origin. The survey indicates that 66% of international migrants send money to Morocco, and the average transferred amount exceeds 11,500 MAD per year. In the sample of international migrants, there are, on average, 40% of women (against 63% of men) that send remittances to Morocco. Migrants who transfer funds are between 18 and 93 years of age. Furthermore, remittances are sent at very high frequencies: 36% of individuals sent twelve or more remittances over the sample period (at least monthly), 15.52% sent one or more, and 19% did not send remittances regularly. The survey also indicates that most Moroccan migrants send remittances to their families through formal channels. As can be seen from Table 2, only 8% of migrants sent remittances through banks, while about 37% sent through international money transfer companies (Western Union and Money Gram) and 31% through post offices. However, over the past five years, in Europe, Moroccan banks have a remarkable policy for supporting migrants' access to the banking system. Thus, an increasing number of transfers have gone through banks. They also have promoted access to financial services for the families in Morocco.

It is interesting to note that the survey data only include information about transfers to the family remaining in Morocco and therefore do not take into account remittances to migrants themselves. Table 3 gives a list of recipients of remittances in the household of origin. A total of 74.24% of migrants send remittances to household heads.

The descriptive analysis does not take into account all characteristics of migrants, their family and community of origin. We therefore propose an econometric approach which reveals the main factors that influence the probability of transferring and the amount to be remitted by the migrants.

Methodology

Microeconomic studies on the determinants of migrants' remittances have used very different econometric methodologies. The choice of the analytical method often depends

Table 2 Distribution of migrants by different modes of transferring money

	% of total
Family/friends	9.70
Post office	30.86
Bank	7.94
Western Union	34.57
Money Gram	2.82
Private institution	0.18
Migrant himself	9.70
Others	1.06
Do not know	3.17
Total	100

Table 3 Top beneficiaries of remittances from abroad

	% of total
Household head (HH)	74.24
Father/mother of HH	6.98
Husband/Wife of HH	6.08
Brother/sister of HH	5.90
Child of the HH	1.97
Stepson/stepdaughter	0.18
Other parent	0.18
No family relationship with the HH	0.18
Do not know	4.29
Total	100.00

on the nature of available data and outcome variable. If the data contain information on all migrants (remitter or not) and on the amounts transferred to their home country, researchers have usually implemented a Heckman's procedure (Agarwal and Horowitz 2002; Gubert 2002; Cox et al. 1996; Hoddinott 1994) or Tobit model (De la Brière et al. 1997; Amuedo-Dorantes and Pozo 2006; Brown 1997). Other studies have restricted their analysis to the determinants of the decision of migrants to send remittances (Vanwey⁷ 2004) or to those related to the amount transferred (Lucas and Stark 1985) and generally have used a probit model to estimate the probability of remitting and the method of Ordinary Least Squares (OLS) to estimate the factors that influence the level of transfers received by the family of origin. We now know that using the OLS method leads to biased and inconsistent estimation since, as in our sample, a significant proportion of the migrants do not remit, and therefore the observations that match will be void. Obviously, this situation corresponds to a standard "censored" regression model. Because of the zero censoring in remittance data, the tobit estimation technique remains the best estimating method for remittances. However, there are a number of alternative techniques to solve the issue of zero censoring, such as the Heckman model, which accounts for the possibility of different mechanisms influencing the decision to remit money and the amount of remittances. In fact, the choice of empirical model depends on whether the decision to remit is a two-stage sequential process or a one-stage simultaneous process. In the first case, we would try a Heckman selection model: Probit in the first step, OLS with normal outcome in the second step. The Heckman selection model also allows us to control for potential bias. An alternative to the two-stage approach is to assume that there is only one remittance decision in which the two stages occur simultaneously. In this case, a Tobit model can be used. In other words, if we find no selection effect, or it's impossible to identify it, then we can switch to a simple Tobit model, which assumes that the decision to remit and to determine how much to remit are taken at the same time and are influenced by the same explanatory variables. Alternatively, as in this paper, one can estimate the model of interest using both specifications, that is, a Tobit and a two-part selection model and then test the robustness of results.

Explanatory variables

The availability of data has allowed us to introduce several variables that influence the probability of remitting and the amount transferred by the migrants. Among the several

migrant characteristics, we retain age measured in years, gender and marital status. We also introduce the square of the age of the migrant for capturing the potential non-linearities between age and outcome. We are also particularly interested here in the gender effect. We argue that women should have a lower tendency to remit. Another relevant variable would have been migrant income. To assess its effects, we introduce variables related to educational level, occupational status and duration of stay overseas (in years). Education and age are among the powerful determinants of earnings. We define an “education level” variable as the number of years of education completed; this is likely to have different effects on transfers given the theoretical model considered. Recall that in the absence of data on the income of international migrants, the majority of empirical studies have estimated the function of migrant earnings by taking into account the socio-economic variables related to these migrants (see for example, Gubert 2002; De la Brière et al. 1997).

In addition to these characteristics, the set of explanatory variables includes the information about the migrant’s household of origin such as the household size and income. Empirical studies generally take into account the household income, or expenditure, in their analysis of the determinants of remittances. A key problem with this explanatory variable is that it can be endogenous because of reverse causality. Another reason is that remittances may affect the household income by influencing labor supply of family members who remain in the country, especially in rural communities⁸. Instead, in our research, the predicted value of his income is chosen as an indicator of household wealth. In other words, to obtain per-capita household income, we predict per-capita income levels for households on the basis of a reduced-form specification for the determinants of household’s income. More specifically, we regress the annual expenditure (log) on a set of variables which measures the human and physical capital of the household, such as education level of household members, age and gender of household head, the proportion of active members in the household and ownership of productive assets (see Table 5 in Appendix), and then the estimated expenditure that was reported to the household size (Gubert 2002; De la Brière et al. 1997).

In practice, other household variables are sometimes considered in empirical studies such as the gender of household head, the living area and the number of dependents living within the family of origin. This last variable, which represents the proportion of inactive people in the household, might measure the burden on the active population and possibly on the international migrants.

Explanatory variables also contain the control variables that are used commonly in the literature on remittances. Several variables are included. First, the variable “financing of emigration,” which takes the form of a dummy and indicates whether or not the household has helped his members to emigrate, is expected to have a positive effect on the probability and the amount remitted by the migrant. In our sample, among all migrants who send remittances, 60% have received such aid. Second, we take into account the number of migrants from the same family because several studies have shown that this variable could affect the remitting behavior of migrants (Lucas and Stark 1985; Hoddinott 1994; Durand et al. 1996). It is expected that an increase in the number of migrants abroad leads to a decline in remittances if they are guided by altruism of the migrant. Two dummy variables are finally introduced to take into account both the difficulties faced by households and the characteristics of their community of residence. It is a question whether a negative shock that happened last year influences

the remitting behavior. This “negative shock” variable reflects the fact that the original community of the migrant has recently undergone a remarkable shock which can have an impact on the income of its inhabitants (drought, flooding, lack of food, etc.). Several studies have shown that remittances can be a kind of private insurance which covers economic and environmental risks incurred by the community of origin (Amuedo-Dorantes and Pozo 2006; Gubert 2002; Calero et al. 2008; Agarwal and Horowitz 2002). In our analysis, we also attempt to test the possible link between the poverty rate of the community of origin and the remittance behavior of migrants.

Empirical model

The limited dependent variable models, such as the Tobit model, are characterized by a dependent continuous variable which is observable only on a certain interval. They are estimated using the maximum likelihood method. The standard Tobit model is defined as:

$$Y_i^* = \beta X_i + \varepsilon_i \tag{1}$$

$$Y_i = \begin{cases} Y_i^* & \text{if } Y_i^* > 0 ; \\ 0 & \text{otherwise,} \end{cases}$$

where Y_i^* is a latent variable that is observed only when its value is greater than zero. X_i is a vector including all observable explanatory variables (defined previously), which are observable for all migrants, irrespective of the fact that the variable Y_i^* is observable or not; ε_i is the error term which follows the $N(0, \sigma_\varepsilon^2)$ distribution. Note that although the Tobit model is good for dealing with censoring, it has two main limitations. First, the explanatory variables should act in the same direction for the probability of remitting and the amount remitted by the migrants; this is not always reasonable. For example, any variable which increases the probability of a non-zero value must also increase the mean of the positive values. Second, it has been shown that the Tobit model is less suitable for the situations where the absence of observations of the dependent variable is due to some factors such as search, information, and transaction costs which inhibit the carrying out of explicit choice (Cragg 1971). In fact, observed 0s on the dependent variable can mean either a “true” 0 or censored data, but in our case, the observed zero values are due to the decisions of individuals. In such case, the appropriate procedure would be to model the decisions that produce the zero observations. For this, the Heckman model suggested that when estimating a model based on a sample of data that is generated from a wider population, a selection equation that determines the probability of selection into that database must be developed. This then allows for the construction of an additional regressor –“a sample selection term”– to be introduced into the equation of remittance. The Heckman model is defined as follows:

Selection equation (i.e., propensity to remit):

$$Z_i^* = \delta X_i + \omega M_i + \eta_i \tag{2a}$$

and $Z_i = \begin{cases} 1 & \text{if } Z_i^* > 0 ; \\ 0 & \text{otherwise} \end{cases}$

Remittance equation (outcome equation):

$$Y_i = \beta X_i + \varepsilon_i, \tag{2b}$$

where the dependent variable Z_i^* is a latent variable that is positive when the remitted amount is observed and 0 otherwise. Y_i is the logarithm of the total remittances sent by

the migrant. M_i is a variable that “belongs” to the first equation (selection equation) but not to the outcome equation. η_i and ε_i follow the normal distributions $N(0,1)$ and $N(0,\sigma_\varepsilon)$, respectively, and $\text{Cov}(\eta_i, \varepsilon_i) = \rho$. The estimation of the outcome equation relates only to migrants who have remitted ($Z_i = 1$). Selection bias, initially viewed as a missing dependent variable problem, may be reformulated as an ordinary omitted explanatory variable. In this sense, the Heckman procedure contains two steps: the first step is to estimate the migrant’s “propensity to remit”, and then from that, an inverse Mill’s ratio is calculated and included as an additional regressor in the outcome equation so that the bias due to the fact that data are missing “non-randomly” is seen to arise from the ordinary problem of omitted variables. This new term (λ_i) is defined as: $\lambda_i = \frac{\phi(\delta X_i + \omega M_i)}{\Phi(\delta X_i + \omega M_i)}$, and we can rewrite the outcome equation as:

$$Y_i = \beta X_i + \rho \sigma_\varepsilon \lambda_i + v_i, \quad (2c)$$

where v_i is a stochastic error term that is heteroscedastic and asymptotically uncorrelated with the variables X .

Identification of the Heckman model requires an exclusion restriction: a set of variables (M_i) which ensures that the unobserved variables that determine the probability and the amount of transfer are not correlated. Some works have introduced in the selection equation the proxies for the costs associated with sending remittances (Gubert 2002; Calero et al. 2008). In this spirit, we consider in our model a new instrumental variable, i.e., the variable called “the use of the fast transfer service,” which takes the value 1 if the migrant has chosen an international money transfer company for sending money to home and 0 otherwise. This transfer channel is generally used when money must be transferred to cover urgent needs of the family of origin. The better coverage of these companies in Morocco and all over the world can influence the propensity to remit of migrants. Because of the speed of the services offered by these companies (thanks to its broad network in Morocco), the funds remitted by Moroccan migrants are received almost immediately. For this reason, migrants prefer international money transfer companies such as Western Union and Money Gram despite their higher prices.

Results

Two sets of regressions performed are reported in Table 4. The first set presents the results obtained from a two-stage selection approach. The last 2 columns report the Tobit results. We chose to present the results obtained by the two methods to control the robustness of our results. We note that the parameter estimates vary depending on specification and estimation method. Nevertheless, it is clear that the best specification corresponds to the two-step selection model for two reasons. First, the results of the estimation of the two equations (selection and outcome equations) reveal that all variables do not have the same impact on the probability of transferring and the amount remitted. This can be illustrated by looking, for example, at the variable migrant gender, which appears to be an important factor, especially in determining the amount of transfer, an aspect which is not captured in the Probit results. Thus, it may be more reasonable to assume that the size and the nature of the factors that affect the decision to

Table 4 Tobit and Heckman regression analysis of the determinants of remittances to the family

	Two-stage model				Tobit	
	Selection equation		Remittance equation		Coef.	Robust SE
	Coef.	Robust SE	Coef.	Robust SE		
Use of the fast transfer service	1.034	0.2617***				
Migrant characteristics						
Female	0.2035	0.2504	-0.510	0.2641**	-0.4320	0.2658
Age	0.1526	0.0545***	0.0030	0.03933	0.0600	0.0355*
Age squared	-0.001	0.0006**	0.000	0.00041	-0.0005	0.0003
Single	-0.3166	0.2170	0.1519	0.23849	-0.0495	0.2109
Divorced	0.6778	0.4808	-0.7613	0.3740**	-0.5830	0.4063
Widowed				.	0.3986	1.1149
Higher education	-0.1487	0.3849	-0.0339	0.33931	-0.0976	0.3236
High secondary education	0.3531	0.3374	0.0210	0.27043	0.11431	0.2830
Middle secondary education	0.1724	0.3264	0.1730	0.26050	0.17320	0.2681
Primary	0.1173	0.2967	-0.3931	0.21874*	-0.3907	0.2233*
Duration of stay overseas	-0.0136	0.0140	0.0192	0.01203	0.0172	0.0125
Unemployed	-2.3766	0.6959***	-0.0120	0.46797	-0.6831	1.1122
Inactive	-1.89	0.3339***	-0.3475	0.51967	-1.0911	0.316***
Household characteristics						
Expenditure	1.199	0.6305*	0.1869	0.6439	0.5342	0.53263
Expenditure squared	-0.2463	0.1327*	-0.0655	0.13089	-0.1391	0.10988
Household head is a male	-0.6850	0.2407***	-0.1117	0.2298	-0.3878	0.1907**
Rural	0.1794	0.21762	-0.2488	0.19021	-0.1816	0.18060
Number of dependents living in Morocco	-0.1822	0.36561	0.5288	0.3434*	.41463	0.32780
Control variables						
Number of migrants	-0.4802	0.1506***	-0.4281	0.140***	-0.5133	0.134***
Financing of emigration	0.5966	0.1976***	0.0392	0.2066	0.2247	0.1778
Negative shock	0.3823	0.2858	-0.3167	0.2540	-0.1557	0.2339
Local poverty rate	0.0185	0.0355	-0.000	0.0330	0.00471	0.0299
Constant	-3.62	1.439	8.2619	1.447		
Heckman's lambda ^(a)			-0.594	0.3041*		
R-squared	0.396		0.3676			
Number of observations	338			215		

Notes: variable "Widowed" was omitted in the first estimation due to collinearity problem. Coefficients are after correction of heteroscedasticity. ***, ** and *denote significant at thresholds of 1%, 5% and 10% respectively. (a) The p-value is equal to .052. The table reports marginal effects of Tobit estimates.

remit will be different to those that affect the decision about how much to remit. This leads us away from our analysis of the Tobit model. Second, when estimating the Heckman model, if Heckman's lambda is negative and statistically significant then migrant remitters are not a random sample of the population and are negatively selected.

Looking at the Tobit results, there are some differences from two-stage model results, mainly in the relation to the significant effect that some variables have on migrants' remittances. They include, for example, the significance of the migrant's gender and the marital status variables in the corrected OLS models as well as the insignificance of these variables in the corresponding Tobit models.

It is interesting to note that the variable called “the use of the fast transfer service” is positive and statistically significant at 1%. Thus, as hypothesized, the use of the fast transfer service substantially increases the odds of remitting⁹.

Migrant characteristics

Table 4 clearly shows that migrant characteristics significantly affect the probability to remit as well as the amount sent. A migrant’s remittance behavior is connected strongly to life cycle (age, marital status) characteristics and conditions prevailing in the home and host country. Firstly, the variable age has a positive effect on the probability of remitting, and the quadratic term is negative and significant, which indicates that remittances increase at a decreasing rate. In other words, the younger migrants are more likely to transfer money to Morocco. Second, marital status and the gender of the migrant appear to affect only the amount of remittances. As opposed to being married, being divorced has a negative effect on the amounts transferred.

In addition, women transfer significantly less than men. This is not surprising since as we have noted in the descriptive part of this study that job insecurity and unemployment of migrant women tend to create a very vulnerable situation which may partly explain this result. Finally, it seems that migrants are more likely to send larger amounts if they have the financial capacity to do so. This brings us to the point of the relationship between the income potential of migrants measured by the characteristics of their human capital and their remitting behavior as well as the relationship between their employment status in host country and their remittances. Our results show that these variables, which are related to the employment situation of the migrant, have negative coefficients, i.e., unemployed or inactive migrants have a lower likelihood of remitting. Compared to an employed migrant, being unemployed decreases the probability of remitting by 0.538; being inactive decreases the probability by over 0.595. These two variables, which may also measure the precarious situation of the migrant in the host country, do not confirm the results obtained by some studies conducted in other contexts which indicate that the precariousness of migrants (i.e., unemployment, illegal status in the host country, etc.) should have a positive effect on transfers if they are motivated by the insurance of the migrants (Amuedo-Dorantes and Pozo 2006; Agarwal and Horowitz 2002; Cox et al 1996). In our case, however, the result related to the occupational status of migrants is consistent with the altruism hypothesis (Vanwey 2004). Furthermore, our findings reveal that a high level of education of migrants has no influence on their remitting behavior (only primary level is significant, i.e., compared to illiterate migrants, the least educated migrants (with primary level) send lower amounts to their home country). This may be due to the fact that the potential income of migrants is best measured by their success in the labor market; therefore, it is the employment status in the host country that captures the effect of income on remittances.

Household characteristics

We now turn to examine the effects of family characteristics on the odds of remitting and the amount remitted. In particular, the results widely obtained by empirical studies show that migrants’ transfers strongly depend on the standard of living of his family in the origin country, i.e., the familial expenditure¹⁰. Under the assumption of migrant

altruism, the majority of these studies emphasize that the amounts transferred by the migrant decrease with family wealth (Lucas and Stark 1985). Our results, although consistent with our expectations, are innovative. They indicate that household income has a positive and significant effect on the probability of remitting. However, our empirical analysis is in favor of the inverted U relationship between the income of the migrant's household in the origin country and the likelihood of remitting. Household income increases the probability to send remittances but at a decreasing rate. It thus seems that an increase in family income substantially reduce the need for regular transfers. This suggests that migrant remittances are motivated by altruistic motives.

The family of origin may encourage the emigration of many of its members in order to increase their chances of receiving funds from abroad. Indeed, in the context of pure altruism model, a possible higher number of migrants linked to the family would appreciably decrease their remittance amounts. Our results show that the migration of many people from the same family negatively influences the likelihood of sending remittances and the amount of remittances. With a rise in the number of migrants abroad, the amounts of remittances decline, and migrants are significantly less likely to remit earnings to their family. Note that a positive correlation between the number of international migrants and their remittances means that these migrants are facing competition from other migrants and remit more in order to maintain favor with their parents. The aspiration to inherit could be the origin of remittances.

This will lead us to look at the "financing of emigration" variable. We note that the propensity to remit increases when households pay the emigration costs of its members. Financing of migration costs raises the probability of remitting by 0.2335. Remittances thus serve to repay a debt that migrants owe their family. We must remember that we have not established a relationship between the high level of education of migrants and their remittance behavior. Hence, we cannot assume that remittances are a repayment of education costs. Moreover, if there is a greater emphasis on the cost of migration, as suggested by Ilahi and Jafarey (1999), and not on the cost of education, as in Poirine (1997), we can validate the hypothesis of loan repayment. In addition, we cannot consider the existence of an insurance contract because the money transfers from Moroccan migrants do not smooth the impact of economic shocks on family incomes (i.e., the negative shock variable is statistically insignificant).

At the same time, other socioeconomic determinants related to the family in the origin country can explain the remitting behavior of Moroccan migrants. Specifically, we have studied the impact of the number of dependents residing in the household, our proxy for household economic need, on migrants' remittances. We find that the number of dependent individuals that reside in the migrant's household of origin positively affects the amounts transferred. Each additional family member raises the amount of remittances sent home by those remitting, suggesting that the needs of the family back home are important to migrants and that migrants behave in an altruistic manner (Lucas and Stark 1985).

We notice that the remitting behavior of Moroccan migrants seems to be related to the gender of the household head, which exercises a negative influence on the probability of remitting. In other words, migrants are more likely to send money when the household head is female. We must remember that the descriptive analysis of the survey data indicates that women represent 70% of household heads receiving remittances. This suggests that a migrant whose wife is in the country of origin will be more encouraged to send money to his family.

Conclusions

The objective of this study was to provide a better understanding of the remitting behavior of Moroccan migrants by analyzing empirically the determinants of their remittances. One of the strengths of this study is the use for the first time of the LSMS Moroccan data conducted over the period 2006-2007. The database on Moroccan migrants is used to analyze both the determinants of their propensity to remit and the factors that may influence the amount of remittances. Despite an extensive literature on the microeconomic determinants of remittances, the remitting behavior of migrants from countries such as Morocco remains unclear. To the best of our knowledge, this is the first microeconomic study that assesses the remitting behavior of Moroccan migrants using econometric analysis. At the national level, policy-makers and researchers have now noted the exceptional rise in registered remittances and concentrated their attention on effects of remittances and their determinants. This research seeks to fill this gap and contributes to the empirical literature on migrant remittances.

Our econometric results have revealed that the variables selected for their influence on the probability of transferring are not the same as the ones that determined the amount remitted by migrants. As seen, certain variables influence only the propensity to remit such as the age and the employment status of the migrant, while others only have an effect on the amount remitted, such as the gender of the migrant.

The results of our analysis confirm that remittances of Moroccan migrants can not only be seen as the result of an implicit family arrangement to which it may link funding costs of international migration and remittances together. Of course, these remittances are used to repay a debt that a migrant owes his/her family for the previous support during the first phase of migration, but we also found results that are remarkably consistent with the assumption of altruism. Firstly, the probability of remitting and the amount of remittances increase when remittance-recipient households need financial support from migrants. Secondly, our results show that the employment situation of the migrant significantly influences the likelihood of sending remittances, in particular, unemployed or inactive migrants are less likely to remit. Finally, the negative relationship between the number of migrants abroad and the remittances can fully confirm this hypothesis. In conclusion, our empirical results suggest mixed motivations behind remittances combining both altruism and family arrangements. These outcomes assure a certain stability of remittances in the medium and long terms, providing that the socioeconomic status of migrants does not change significantly.

From a policy perspective, our results seem highly important, particularly for some less developed countries such as Morocco, which could be better equipped to forecast the amount of remittances. Policymakers have long used the benefits of remittances to underpin emigration policy. In principle, remittances were welcome by the country's authorities as they provided a boost to aggregate demand and increased foreign exchange reserves. However, remittances were mostly spent on consumption and "unproductive" household assets, such as housing, but rarely used in productive investments. They therefore have created several policy challenges, including the need to implement proactive measures to stimulate the use of remittances for productive purposes in order to enhance economic development. This paper suggests that from a policy perspective, government agencies can encourage diasporas to invest, assist local communities, and provide policy advice. Encouraging the self-employment investment schemes is an option that governments could consider for stimulating more direct investment in productive assets. It appears also crucial to implement a more effective policy guided by the objective of improving the Moroccan

population's access to financial services and enhancing the regulatory environment that is aimed at promoting secure and low cost remittances services. Because diaspora investors can be a more stable source of funds than other foreign investors, Morocco can launch new financial product lines for migrants, such as diaspora bonds, to raise financing in international capital markets and to finance development projects. The diaspora bonds provide an opportunity to tap into a capital market beyond international investors, foreign direct investment, or loans.

Policymakers in developed countries have used the implicit assumption that remittances are beneficial for the countries of origin; however, remittances should not be viewed as a substitute for official development assistance since they cannot finance public projects and are not accessible to all poor households. Furthermore, in the host countries, unfortunately, there is no oversight board that reviews practices of the money transfer companies and other issues relating to remittances.

Endnotes

¹See, among others, Cox et al. (1996) for the case of Peru, Amuedo-Dorantes and Pozo (2006) and Durand et al. (1996) for the case of Mexico, and Rodriguez (1996) for the case of Filipino migrants.

²Remittance data for the period 2007-2008 concur with this. As a result of the economic downturns in developed source countries, remittances have decreased for all regions of the world. In Morocco, while volumes have declined in 2009 and 2010, it is not possible to observe a phenomenon of collapse.

³The macroeconomic study of Bouhga-Hagbe (2006) shows that because of the altruistic motive that partly drives remittances to Morocco, a sudden drop or reversal of remittances inflows is unlikely in a foreseeable future, as those who receive this assistance are likely to continue to depend on them for a while.

⁴Interestingly, studies that have tested the hypothesis of pure altruism underlined that public and private transfers should be substitutes. As was pointed by Becker (1974), under the mutual altruistic model, an increase in public investment in higher education especially will be linked to a reduction in private investment in education (funded by private transfers).

⁵In 2007, 1 USD = 8.50 Moroccan dirham (MAD).

⁶In the survey, respondents were asked the information on actual migration of their family members.

⁷The author uses logistic regressions. Three dependent variables are considered: remittances from male migrants, from female migrants and the remittances sent by the family of origin.

⁸Some studies raised serious questions about disincentives to work that stem from the receipt of international remittances (Chami et al. 2003; Azam and Gubert 2005). In the case where migration is viewed as an insurance solution, moral hazard problems between the migrants and the recipients of remittances led to their dependency on these financial inflows and induced recipients to use it as a substitute for other income sources.

⁹It is important to consider the potential threats to validity of our instrumental variable. One potential threat is that this instrument does not affect remittance propensity. To allow for this possibility, we have checked that it is sufficiently correlated to the probability of transferring, which is confirmed by the first-stage results of the Heckman regression. A second possible threat to validity is the possibility that our instrument has a direct effect on the

amount sent. We have thus performed supplementary analysis that, in our opinion, can provide one of the potential contributions of our work. We have tested whether the instrument is exogenous in the outcome equation by checking whether there exist any relationship between this instrument and both the amount remitted and the error term in this outcome equation. None of these results entails that the exogeneity is valid (results are available on request).

¹⁰The inclusion of this generated regressor is likely to cause bias in the standard errors. We have computed bootstrap estimates for the standard errors of the coefficients of the remittance equation. These results (available on request) are substantively similar in terms of direction and significance of effects to those that don't use bootstrapping.

Appendix

Table 5 depicts the results of the income function estimated by OLS. The annual expenditure (log) is regressed on a set of variables of interest: education level of household members, education, age and gender of household head, proportion of active members in the household, ownership of productive assets.

Table 5 Estimates used in imputation of household income. Dependent Variable: Log of expenditure

	Coef.	Robust SE	t-value
Household head male (dummy)	0.2475	0.0454	5.45
Age in years of household head	0.0506	0.0077	6.49
Age in years squared of household head	-0.0004	0.0000	-6.15
Household head has completed			
Primary education	0.0823	0.0477	1.72
Middle secondary education	0.2822	0.0719	3.92
High secondary education	0.1842	0.0969	1.90
Higher education	0.3412	0.1101	3.10
Others	0.1621	0.0938	1.73
Proportion of household members with middle and high secondary education	0.3870	0.1420	2.72
Proportion of household members with higher education	1.092	0.1937	5.64
Proportion of actives	-0.1942	0.0749	-2.59
Household owns a production unit	0.1208	0.0470	2.57
Household owns a land (dummy)	0.1203	0.0469	2.56
Constant	9.2972	0.2253	41.26
R-squared	0.2115		
Number of observations	1011		

Notes: Income function estimated by OLS.

Competing interests

The IZA Journal of Migration is committed to the IZA Guiding Principles of Research Integrity. The authors declare that they have observed these principles.

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Author details

¹University of Pau, Pau, CATT, France. ²University of Paris-Dauphine, Paris, Leda, France. ³IRD, UMR225-DIAL, Paris, France.

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