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**WHY DO MIGRANTS REMIT?
AN INSIGHTFUL ANALYSIS
FOR MOROCCAN CASE**

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Why do migrants remit? An insightful analysis for Moroccan case

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Abstract: This paper uses the LSMS Moroccan data and the Heckman two-step estimator to analyze, the determinants of migrants' remittances at a microeconomic level. In particular, we assess what motivate international migrants to send remittances towards households and we examine the main factors that affect the likelihood of remittances being sent. Our results lend support to the altruistic hypothesis involving that remittances are sending 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.

Keywords: international migration, migrants' remittances, Heckman two-step estimator, Morocco

JEL classification: F22, J61, O55.

1. Introduction

According to the World Bank estimates, in 2011, remittances to developing countries have reached \$ 373 billion and over \$500 billion worldwide. These flows 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. They have the advantage to be more stable than other sources of external funding and provide support to household consumption especially during difficult times.

Several studies have examined the determinants and motivations of migrants' remittances. Microeconomic studies have examined individual factors that influence the decision to transfer and / or the amount transferred using data from surveys conducted among migrant or household remained in the country of origin. Overall, there are two different theoretical models that explain remittance behavior, namely, individual motivations and contractual arrangements. Explanations based on individual motivations contend that decisions about 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 her family and remittances are to 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 migration costs supported by the original family). Contractual arrangements are particular in the case of households living 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 the different motivations to remit can coexist. As suggested by Lucas and Stark (1985), migrants may have heterogeneous motivations and their transfer behavior can then be described as "tempered altruism or enlightened self-interest". Similarly, several reasons can explain the behavior of transfer of a 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 the countries of Latin America¹ or South Asia². This research seeks to fill this gap, focusing on the analysis of the empirical motivations of remittances to Morocco. It aims to answer the following questions: what are the factors that account for existence and variation in remittance flows to Morocco? What are the reasons behind transferring money?

For a country such as Morocco, remittances from international migrants constituted a major source of additional income for their families and a reliable source of foreign exchange for the country. Remittances to Morocco, third large recipients in the MENA region, are estimated by the World Bank at more than \$ 7.2 billion in 2011 and about 7.24% of its GDP. These inflows have increased significantly in recent years. Savings and investment are only one aspect of their contribution to the Moroccan economy.

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

² See for example, Rodriguez (1996) for the case of Filipino migrants.

Recent studies have showed that on the macroeconomic level, remittances from Moroccan migrants could have many virtues³. Unlike capital flows like foreign direct investment, remittances are relatively stable, countercyclical with respect to Morocco's output and seemingly they were a resilient source of external financing during the recent crisis. Similarly, they do not entail the emergence of "Dutch disease", smooth consumption and more interestingly contribute to the stability of Moroccan economic growth⁴. At the microeconomic level, these results are consistent with remittances being driven by altruism or by a risk-diversification strategy aiming to insure adequate protection against adverse exogenous shocks. But this assumption has not been properly demonstrated. Therefore, the contribution of this paper is to assess accurately this evidence. It should be noted that these findings corroborate the efforts being carried out by Moroccan authorities. Indeed, Morocco has done considerably well in the past years by creating for example the "adequate" and more effective institutions to maintain a sustainable relationship between Moroccan migrants and their countries of origin. It has thus set up a specific ministry of Diaspora in order to promote relations with their citizens abroad and an institution which conduct studies on the migration issue ("Conseil supérieur des Marocains Résidant à l'Etranger").

To properly assess the socio-economic issues of migration, 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. Using the two-step method proposed by Heckman (1979), we find that both altruism and family arrangement motives could simultaneously determine remittance behaviour.

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.

2. Microeconomics determinants of migrant remittances

2.1. Theoretical motivations

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 of origin. The intent of these migrants is to improve the welfare of their families and loved ones by incorporating the utility of these in their own

³ Bouoiyour et al. (2013), Bouoiyour (2013) and Makhoul (2013).

⁴ Moroccan economic growth remains dependent on weather conditions, which explains its volatility, although this appears to diminish more and more.

utility (Lucas and Stark, 1985, Cox et al., 1996, Rapoport and Docquier, 2005)⁵. In contrast, in the model of pure self-interest, it is assumed that the migrant chooses 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, the 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 of origin. 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. In against part, once installed in the host country, the migrant must support her family by transferring a portion of his savings. These new resources will allow the remaining family 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. Family is looking through this co-insurance contract to reduce its economic risks and to potentially increase its revenues 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 making at the household level, it seeks to revenue maximization and especially to minimization economic risks (Taylor and Martin, 2001). Co-insurance arrangement can be mutually beneficial to the migrant and the family of origin. In some settings, personal risks incurred by the migrant in the host community explain its decision to remit money home to cover for those risks (Amuedo-Dorantes and Pozo, 2006).

In the case where migration does not provide insurance to migrant and her family of origin, there may be another family arrangement explaining the existence of remittances; it is the case of implicit family loan repayment contract binding a migrant to her family. As part of this family contract, remittances are seen as a return on investment, they are only the repayment of costs incurred by 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 settle in a foreign country; they make an investment that is profitable and sustainable. This investment is starting to pay 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

⁵ Interestingly, 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 education (especially higher education) will be linked to a reduction in private investment in education (private transfers).

remittances as a repayment of educational costs. In their theoretical model, Ilahi and Jafarey (1999) insist not on the educational costs as 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 migrant may purchase services from the family remained 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 migrant sends money to his family of origin who is expected to take care of his 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 migrant 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 are 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 no emigration. This strategic motive can also be at the center of family contracts between the migrant and her family of origin.

2.2. Review of empirical motivations

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 which they are exposed, affect the propensity to transfer and to receive remittances. Analysis of the results obtained by the most empirical studies highlight particularly the role of the living conditions of migrant and her family of origin. 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, which is arising from a contract of insurance between the migrant and her 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) find that transfers from migrant to his 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, studies have also tried to test the impact of risk incurred by the migrant in the host country (unemployment, illegal status, etc) on his decision

to transfer. These findings reveal that migrant sends more money to his family when he is confronted with risks during his stay abroad (Amuedo - Dorantes and Pozo, 2006, Agarwal and Horowitz, 2002, and Cox et al., 1996). These last two studies have specifically analyzed the impact of unemployment situation on the migrants' remittances. Their results indicate that this situation has a positive influence on the transfer 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. It is evident that migrants, who can stay only for a short period in the host country transfer are more likely to remit, this is particularly true for those who are unable to find long-term contracts of employment⁶. Given the positive correlation between level of education and success in the 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 migrant 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 continued 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 (or remittances) of Mexican migrants increase by 4.3% with their years of education until a certain age (40s) that make older migrants less likely to remit.

There is a consensus in the literature about the effect of the costs of migration on migrant remittances. Durand et al. (1996) study highlights that migradollars increase by 4.5% for every \$100 served to finance emigration to United States. Using survey data on Pakistani migrants, Ilahi and Jafarey (1999) found that an increase in the share of loan granted by the extended family in the total cost of migration by 1 % leads to a decrease of transfers to immediate family by 4.6%.

The size of the family of origin is an important factor to consider for remittance behavior. In the case of altruism approach, the presence of people whom migrants care about in the household of origin (parents, wives and children) will encourage them to remit larger amounts (Lucas and Stark, 1985). Also, we observe a negative correlation between remittances and the number of migrants from the same family of origin. 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 from other migrants from the same household (Hoddinott, 1994, Agarwal and Horowitz, 2002).

We also note that few studies of remittances behaviour were provided empirical evidence of migrant gender influence. Vanwey (2004) suggests theoretical analysis of the determinants of remittances sending to Thailand and focuses on the origin of gender differences in remittance behavior of migrants. It finds that women compared to men send

⁶ According to a UN report on International Migration and Development in North Africa (2007), data from surveys conducted in the countries of North Africa emphasize that "the propensity to save and transfer is high among North Africans and Moroccans in particular, it is particularly high among migrants in an irregular situation and in temporary and seasonal migration".

more money before the wedding for escaping the social sanctions of the family. De la Brière et al. (1997) think that female Dominican migrants are played the role of insurers from their parents against the negative income shocks. In addition, migrant women who have no brothers abroad send money in order to inherit whereas male migrants who have no sisters migrants seeking to ensure their parents.

3. Data and descriptive analysis

The data used in this study came from Moroccan Living Standards Measurement Survey (LSMS) for 2006-07. It provides information on demographic and socio-economic characteristics of all co-residing household members. It also provides information on the existence of migrant family members and detailed information on the characteristics of these members. This survey is conducted by a questionnaire developed by the World Bank and updated according to the results of 2004 Population and Housing Census. The sampling procedure has ensured that the sample is highly representative. It generates a large country survey dataset on more than 36,000 individuals and 7062 households.

Before studying the determinants of remittances from Moroccans migrants, we propose an analysis not only of the general trends of the survey population and the structure of households receiving international remittances but also the socio-demographic and economic characteristics of migrants.

3.1. General characteristics of survey population

Table 1 presents data on the main characteristics of the households surveyed according to the receipt or not of international remittances. We note firstly that of the 7,062 Moroccan households, 15% receive remittances from abroad, 33.7% of them are rural households. In reality, the majority of households (remittance-recipient and non-recipient) are from urban areas. The study revealed that there are more households headed by men (82.4%) than households headed by women. Recipient households are however more likely than non-recipient household to be headed by women. This could be explained by the fact that international migration concerns more men 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 higher 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.

Table 1. Descriptive statistics of the sample

	All households (N= 7,062)		Recipients (N1=1,079)		Non-recipients (N2= 5,983)	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Average household expenditure	56887	54560	72756	59171	54025	53190
Average expenditure per person	13117	15098	17305	15991	12362	14807
Food expenditure	24441	15804	24612	16222	24410	15729
Educational expenditure	2096.0	5782.5	2899.4	5749.0	1993.0	5779.2
Health expenditure	2785.9	6065.2	2864.9	7148.9	2773.1	5870.2
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 has a land	0.296	0.456	0.268	0.443	0.300	0.458
Household has an production unit	0.207	0.405	0.207	0.405	0.207	0.405

Source : Moroccan LSMS 2006/07

There seem to be interesting differences in expenditure across household categories. The average annual expenditure of households receiving remittances significantly exceeds that of households without remittances (72,756 MAD⁷ 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).

3.2. Characteristics of Moroccan migrants

The survey indicates that migrant population is largely dominated by men (71%). 60% of men are single at the time of migration against only 34% of women. Regarding the level of education, 17% of migrants have no schooling whatever, and 18.11% have reached a level of

⁷ In 2007, 1 USD = 8.50 Moroccan dirham (MAD).

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 less important (25%) than that of those who join their husbands in the host country (60%). Female migration which is mainly due to family reunification has led in recent years to great feminization of foreign population in France for example. Conversely, for a large majority of male migrants, international migration is motivated by economic reasons and by taking a job in the host country (88%). It may be noted that because of these differences, the professional situation of female migrant is not close on several aspects from 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 and 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, more men than women have currently gainfully employed. With regard to the host country, the analysis of the sample shows that the number of migrants in Spain and France represents 53% of international migrant population. This trend is often explained by the history of migration and the migration policies developments 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. 66% of international migrants send money to Morocco and the average amount transferred exceeds 11,500 MAD per year. Furthermore, remittances are sent at very high frequencies: 36 percent of individuals sent twelve or more remittances over the sample period (at least monthly), 15.52 percent sent one or more, and 19 percent did not send remittances regularly. The survey indicates that most Moroccan migrants send remittances to their families through formal channels.

Table 2. Distribution of migrants by different modes of transferring money

	Percent
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

As can be seen from Table 2, only 8% of migrants sent remittances through banks while about 37% through international money transfer companies (Western Union and Money

Gram) and 31% through post offices. In Europe, banks have a remarkable policy for promoting remittances to Morocco. Over the past five years, an increasing number of transfers have done through banks which supporting migrants' access to the banking system. They also have promoted access to financial services for the families.

Table 3. Distribution of Moroccan migrant according to the beneficiaries of remittances

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

Note that, these migrants have developed over the years the saving and investment behaviors, they allocate part of their saving to investment in host and origin countries and to financial support of their family of origin. We think that they send money to their immediate family but also to others persons of a wider social and family circle. It is interesting to note that the survey data are only enquire about transfers to the family remained in Morocco and therefore do not take into account remittances to migrants themselves and to other no-family persons. Table 3 gives a list of recipients of remittances in the household of origin. 74.24% of migrants send remittances to household heads.

The descriptive analysis does not take into account all characteristics of the migrant, his family and community of origin. We therefore propose an econometric approach which reveals the main factors that influence the probability of transferring and the amounts transferred.

4. Methodology

Microeconomic studies on migrants' remittances have used very different econometric techniques. The choice of the analytical method often depends on the nature of available data. If they contain information on all migrants (remitter or not) and on the amounts transferred, researchers implement a Heckman's procedure (Agarwal and Horowitz, 2002, Gubert 2002, Cox et al., 1996 and Hoddinott, 1994) or Tobit (De la Brière et al., 1997, Amuedo-Dorantes and Pozo, 2006, Brown, 1997). Other studies restrict their analysis to the determinants of the decision to send remittances (Vanwey⁸, 2004) or to those related to the amount transferred (Lucas and Stark, 1985) and generally use the probit model to estimate the probability of

⁸ The 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.

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.

The use of OLS can eventually lead to biased coefficients associated with the explanatory variables because in our sample a significant proportion of migrants do not remit and therefore the observations that match will be void. This calls into question the assumption of linearity⁹. In reality, when we regress migrants' remittances on explanatory variables (the remittance equation) observations relating to migrants who do not remit will be removed from the sample. In this case, the sample will include a selection bias since it does not represent the population. This source of selective bias is controlled using the Heckman (1979) procedure. This procedure views similar problems as "omitted variables" problems in that the exclusion of some observations in a systematic manner (i.e., selectivity bias) has introduced the need for an additional regressor in the remittance equation.

Furthermore, the choice of our model will also depend on the hypothesis of simultaneity between the decision to transfer and that related to the amount sending by the migrant. The Heckman selection models allow to verify these assumptions and to control potential bias (Baltagi, 2011). In contrast, the simple Tobit model assumes that the two decisions are taken at the same time and are influenced by the same explanatory variables.

The aim of this empirical section is to highlight the possible link between the decision to remit and the amount transferred. The nature of this link will take us to choose an estimation method which will also ensure the control of a potential selection bias of migrants. At first, we present the explanatory variables used. In a second step, we focus on the specification of our econometric model.

4.1. Explanatory variables

The availability of data has allowed us to introduce several variables that influence the probability of remitting and the amount transferred. Among the several migrant variables, we retain age measured in years, gender and marital status. We also introduce the square of the age of the migrant for verifying the existence of a possible threshold effect related to the age. The descriptive analysis of data reveals that nearly 40% of women (against 63% for men) send remittances to Morocco. This observation leads us into the idea that women have a lower tendency to remit. In our sample, migrants who transfer funds are between 18 and 93 years of age. To assess the level of migrant income, 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, it 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 estimate the function of migrant earnings by taking into account all of these socio-economic variables related to migrant (see for example, Gubert 2002, De la Brière et al., 1997).

⁹ Continuous distribution is inconsistent with the fact that several observations of the dependent variable are equal to zero.

Empirical studies generally take into account the income of the family in their analysis of the determinants of remittances. But household income can be endogenous because remittances may affect the labor supply of family members remained in the country especially in rural communities (Gubert, 2002, De la Brière et al., 1997, etc.)¹⁰. For this reason, we have chosen as an indicator of household wealth, the predicted value of his income. This was obtained by regressing the annual income (log) on a set of variables measuring 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 and ownership of productive assets. The estimated income was then 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 gender of household head, the living area and the number of dependent members who reside within the family of origin. This last variable, which represents the proportion of inactive people in the household, measures 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. 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; it is expected to have a positive effect on the probability and the level of transfer. 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 behavior of migrant remittances (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. Finally, two dummy variables are introduced to take into account both the difficulties faced by households and the characteristics of their community of residence. It is first a question of knowing whether a negative shock happened last year influences the remittance behavior. This "negative shock" variable reflects the fact that the original community of 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 researches 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 of migrants and their remittance behavior.

4.2. Econometric model: Heckman's Two-Step Selection Method

¹⁰ Some 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 device, moral hazard problem between migrants and recipients of remittances led to their dependency on these financial inflows and induces recipients to use it as substitute for other income sources.

The Heckman method distinguishes the determinants of migrants' decision to send remittances of those influencing the amount transferred¹¹. The model to be estimated is as follows:

- Propensity to remit:

$$Z_i^* = \alpha + \delta X_i + \omega M_i + \mu_i \quad (1)$$

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

- Remittance equation:

$$Y_i = \alpha' + \beta X_i + \varepsilon_i \quad (2)$$

Z_i is a dichotomous variable which takes a value of 1 if migrant remit and 0 otherwise. X_i is a vector containing all the explanatory variables defined previously. μ_i and ε_i follow a normal distribution $N(0,1)$ and $N(0,\sigma_\varepsilon)$, respectively; $\text{Cov}(\mu_i, \varepsilon_i) = \rho$.

Identification of this model requires an exclusion restriction: a set of variables M_i which ensure that the unobserved variables determining the probability and the amount of transfer are not correlated. In other words, the selection equation (Eq. (1)) must contain at least one variable that does not exist in the equation (2) and thus not explain the amount transferred. Some works have introduced in the selection equation the proxies for transaction 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 "use of the fast transfer service" which takes the value 1 if the migrant chooses international money Transfer Company for sending money home and 0 otherwise. This transfer channel is generally chosen when money must be transferred to cover urgent needs of the family of origin. The better coverage of these companies in Morocco can encourage migrants to transfer and influence their propensity to remit. In fact, one of the main advantages of these companies is the safety and the speed of the service thanks to its broad network in Morocco; consequently, the funds are received almost immediately. For this reason, Moroccan migrants prefer international money transfer companies such as Western Union and Money Gram despite their higher prices.

The Heckman procedure contains two steps: a dichotomous probit and OLS estimation. The first step is to estimate the migrant's "propensity to remit" and from that, an inverse Mill's ratio is calculated and included as an additional regressor in Eq. (2), 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:

¹¹ The limited dependent variable models are characterized by a dependent continuous variable which is observable only on a certain interval (Simple Tobit model). They use the method of maximum likelihood and take the following form :
$$Y_i = \begin{cases} Y_i^* & \text{if } Y_i^* = \beta X_i + \varepsilon_i > 0 ; \\ 0 & \text{otherwise} \end{cases}$$

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 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.

$$\lambda_i = \frac{\varphi(\alpha + \delta X_i + \omega M_i)}{\Phi(\alpha + \delta X_i + \omega M_i)}$$

We estimate the coefficients of all explanatory variables by using OLS regression. Hence we can rewrite Eq. (1) as follows:

$$y_i = \beta X_i + \rho \sigma_\varepsilon \lambda_i + \nu_i \quad (3)$$

The existence of a selection bias was tested by the assumption that the estimated coefficient of the inverse Mills ratio is statistically significant. In this case, the two-step method allows obtaining unbiased estimates of the coefficients.

5. Results

Two sets of regression performed are reported in Table 4. The first set presents the results obtained by the method of Heckman (1979). The second series presents regression estimated by the Tobit model. 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 Heckman model for two reasons: First, the results of the estimate of the two equations reveal that all variables do not have the same impact on the probability of transferring and the amount transferred. For example, the variable migrant gender has a significant effect on the amount of transfer and no effect on the probability of remitting. These differences in effects lead us away from our analysis the Tobit model. Second, when estimating the Heckman model, there is statistical significance of rho. This implies that there is a significant selection bias and therefore we should use an estimation method that takes into account this selection bias.

➤ Migrant characteristics

It is well seen from Table 4 that several variables related to migrant significantly affect the likelihood of sending remittances and its amount. Firstly, the variable age has a positive and significant effect on the probability of remitting. The introduction of its square indicates that remittances increase until a certain age before starting to decline. In other words, the younger migrants are more likely to transfer money to Morocco.

Second, marital status and gender of migrant appear to affect only the amount of transfer. Compared to married migrant, being unmarried has a negative effect on the amounts transferred. In addition, women transfer significantly less than men. As we noted in the descriptive part of this study, job insecurity and unemployment of migrant women tend to create a very vulnerable situations. These 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 migrant measured by the characteristics of its human capital and the remittances as well as the relationship between employment status and transfers. Our results show that the

variable employment situation of the migrant has a negative coefficient, i.e., unemployed or inactive migrant have a lower likelihood of remitting.

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

	Two-stage model				Tobit	
	Selection equation		remittance equation			
	Coef.	P>t	Coef.	P>t	Coef.	P>t
Use of the fast transfer service	1.025	0.001***				
Migrant characteristics						
Female	.2065	0.502	-.545	0.022**	-2289	0.494
Age	.1481	0.009***	.0136	0.803	947.5	0.047**
Age2	-.001	0.032**	.0000	0.993	-9.504	0.069*
Single	-.309	0.190	-.310	0.100	-8025	0.005***
Divorced	.6667	0.305	-.847	0.017**	-5678	0.363
Widowed	7.921	1.000	.1277	0.892	1797.1	0.917
Higher education	-.107	0.787	-.111	0.708	1858.2	0.670
High secondary education	.4005	0.269	.0799	0.760	-697.8	0.858
Middle secondary education	.2113	0.520	.1585	0.518	1589.1	0.666
Primary	.1464	0.615	-.257	0.202	-541.2	0.863
Duration of stay overseas	-.012	0.409	.0113	0.375	16.727	0.923
Unemployed	-2.62	0.000***	-.740	0.429	-37598	0.000***
Inactive	-1.89	0.000***	-.624	0.114	-18005	0.000***
Family characteristics						
Expenditure predicted	1.142	0.060*	-.077	0.491	7890	0.256
Expenditure predicted 2	-.233	0.067*	.2520	0.646	-1462	0.310
HH male	-.668	0.007***	-.253	0.163	-8143	0.002***
Rural	.1812	0.433	-.298	0.079*	-1915	0.454
Number of dependent persons	-.197	0.632	.5775	0.053*	-356.2	0.938
Control variables						
Number of migrants	-.481	0.002***	-.297	0.019**	-4567	0.010***
Financing of emigration	.5749	0.004***	.2406	0.165	3447	0.130
Negative shock	.3823	0.164	-.311	0.132	-2853	0.364
Local poverty rate	.0171	0.629	-.000	0.977	273.1	0.496
Constant	-3.51	0.016	8.770	0.000	-1172	0.435
Mills Ratio			-.594	0.052*		
Number of obs	338				343	

Notes: Coefficient after correction of heteroscedasticity. ***, ** and * denote significant at thresholds of 1%, 5% and 10% respectively.

This effect related to the difficulties as a result of a precarious situation of the migrant in the host country does not confirm the results obtained by some studies conducted in other

contexts which indicate that the precariousness of migrants (unemployment, illegal status in the host country, etc.) should have a positive effect on transfers if they are motivated by the insurance of the migrant (Amuedo-Dorantes and Pozo, 2006, Agarwal and Horowitz, 2002, Cox et al, 1996). However, this result is consistent with the altruism hypothesis (Vanwey, 2004).

In addition, our econometric results reveal that the level of education of migrants has no influence on their behavior transfer. This may be due to the fact that their income potential is best measured by its success in the labor market and therefore it is the employment status of the migrant that captures the effect of income on transfer habits.

➤ **Household characteristics**

The results widely obtained by empirical studies show that migrants' transfers depend intensely on the standard of living of the family of origin. Under the assumption of migrant altruism, the majority of these studies emphasize that the amounts transferred by the migrant decrease with family wealth (Stark and Lucas, 1985). Our results, although consistent with our expectations, are innovative. They indicate that household income has a significant effect on the probability of remitting. Our empirical analysis is also in favor of the inverted U relationship between the income of the family of origin and the likelihood of remitting. The latter increases when remittance recipients are in need but decreases from a spending threshold above which the families of origin do not need financial support of migrants. 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 its amount. Note that a positive correlation between the number of migrants from the same household and their transfers means that these migrants are facing competition from other migrants and remit more in order to maintain favour 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 household contribute to the financing of emigration costs of his members. Remittances thus serve to repay a debt that migrants have to their family of origin. We must remember that we have not established a relationship between the level of education of migrants and remittance behaviors. 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 Ilahi and Jafarey (1999) and not on the cost of education as Poirine (1997), we can validate the hypothesis of loan repayment. In addition, we can not consider the existence of an insurance contract because transfers of Moroccan migrants do not smooth the impact of economic shocks on family incomes (i.e. the negative shock variable is statistically insignificant).

Alongside, other socioeconomic determinants related to the family of origin can explain the behavior of migrant remittances. Specifically, we have studied the impact of the number of dependent members of the household on transfer behavior. We find that the number of dependent individual that reside in the origin household positively affects the amounts transferred. This result can be explained by the fact that migrants are willing to help their families when several of its members are dependent persons.

We worthy notice that the transfer behavior of Moroccan migrants seems to be related to the gender of the household head, it exercises indeed 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 who has her husband in the origin country will be more encouraged to send money to her family of origin.

The results related to the area of residence (rural / urban) show that households in urban areas are more likely to receive larger amounts than similar households in rural communities. We must remember that the standard of living of urban households is higher than that of rural households. Thus, a contrary result is contrary to logic or common sense.

6. Conclusions and policy implications

The objective of this study was to provide a better understanding of transfer 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, 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 transfer but also the factors that may influence the remittance levels. Despite an extensive literature on the microeconomic determinants of remittances, the transfer behavior of migrants from countries such as Morocco remains unclear. At national level, policy-makers and researchers have just noted the exceptional rise in registered remittances and concentrated their attention on effects of remittances than 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 is not the same as that determined the level of remittances. As seen, certain variables influence the propensity to remit as the standard of living of the family in the country of origin, while others have only an effect on the amount remitted 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. Of course, these remittances are used to repay a debt that migrant has to his family of origin for the previous supports during the first phase of migration, but we also found remarkably consistent results with the assumption of altruism. Firstly, the probability of remitting increases when remittance recipients are in need but decreases from a spending threshold above which the families of origin do not need financial support of migrants. Secondly, our results show that the employment situation of migrant

significantly influence the likelihood of sending remittances, in particular, unemployed or inactive migrant are less likely to remit. Finally, the negative relationship between the number of migrants and the remittances can fully confirm this hypothesis. In conclusion, our empirical results suggest mixed motivations behind remittances combining both altruism and family arrangement. 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 can be better equipped to forecast the level of remittances. Its policy makers 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 earnings. 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 use of remittances for productive purposes in order to enhance economic development. It appears therefore crucial to implement a more "aggressive" policy to guide remittances towards productive investments and priority key sectors of the economy.

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