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THE EFFECTS OF REMITTANCES ON POVERTY AND INEQUALITY: EVIDENCE FROM RURAL SOUTHERN MOROCCO

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The effects of remittances on poverty and inequality: Evidence from rural southern Morocco

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Abstract

In this paper, we examine the effect of migrants' remittances on poverty and inequality. The survey data were collected in Morocco, in the rural areas of the region Souss-Massa-Draa. By applying an original approach, we estimate the counterfactual income of remittance-recipient households corresponding to a hypothetical value of its average income calculated for a scenario without remittances; this is then compared with its current income. We find that the poverty rate and the vulnerability of non-poor households are significantly dropped due to remittances. Our findings also suggest that remittance inflows have increased income inequality compared to the no-migration counterfactual situation.

Keywords: Remittances; Poverty; Income distribution; Morocco.
JEL Classification: D31, F24, I32, O15, O55.

1. Introduction

Poverty alleviation is widely acknowledged as the ultimate objective of any development policy. Thus, poverty assessments and the characteristics of people who are poor have been the main analytic tools for government and policy makers. As other developing countries, Moroccan government has taken significant measures in the area of human and social development. One of the leading measures bears on the launch of National Initiative for Human Development (NIHD) in 2005, targeted at disadvantaged people and geographical areas. Such measures have helped to meet the ambitious goals of gradually reducing the number of its population living in extreme poverty[1]. It must be said at the outset that the country has a long way to go. If we take a closer look at the term review of the country strategy at the social level, we realize that poverty and inequality have increased during the eighties twenty, following the introduction of the Structural Adjustment Program[2]. During this period, Morocco has the largest number of people suffering from education and health degradation. Obviously, over the past years, some progress has been made on extreme poverty eradication, but substantial efforts are still needed to improve the infrastructure, to guarantee access to education and healthcare and to solve the gender and income inequality (IMF, 2013).

Researches that discuss the poverty and income inequality issues in developing countries have shown that public and private transfers received by the targeted households could be an important support to the poor[3] and could contribute to transient poverty reduction. Note that a substantial share of poverty is so-called transient poverty purely due to a temporary drop in income combined with the inability of household resources to keep the household above the poverty line. In addition, cash transfers (in particular private transfers) may have important impacts on chronic poverty if they ease liquidity constraints that inhibit the poor from investing in physical and human capital (Sadoulet et al., 2008). There is therefore an important question about whether private transfers from international migrants (i.e., remittances) can serve as a catalyst for development. Studies that investigate the impact of international remittances on the origin households' well-being have two different views. The apologists of the pessimistic vision argue that only a small fraction of remittances is used for enterprise financing. They may generate dependence phenomenon and give rise to moral hazard risk, i.e., a decrease in the productivity of those who receive them (Chami et al., 2005; Azam and Gubert, 2005). In addition, remittances can exacerbate income inequality between remittance-recipient and non-recipient households (Adams, 1991). In contrast, other studies have defended the idea that remittances support development efforts of origin countries. These studies have analyzed, among other, the beneficial effects of remittances on growth and transient poverty reduction. In this respect, it is very clear from many researches that remittances from migrants could contribute to the reduction of poverty in certain developing countries as they cover first and foremost, current expenditure, flowed by education and

[1] According to statistics from High Commission for Planning (HCP), between 1980 and 2007, poverty at U.S. $ 1 (PPP) per day per person has been virtually eliminated (0.6% in 2007).

[2] In 1985, the relative poverty rate has exceeded 21%.

[3] We can mention here the example of cash transfers to the poor in Mexico and Brazil (see the study of Lopez-Calva and Lustig (2010)). Among the most interesting examples, we mentioned Progresa program implemented in Mexico: the state provides financial support to poor families in order to improve their education, health and food.

health care expenses besides providing consumption smoothing strategies for vulnerable poor and non-poor households. Furthermore, a number of studies have indicated that remittances improve human capital as they relax income constraints that limit investments in education and health for example (Cox-Edwards and Ureta, 2003; Hildebrandt and McKenzie, 2005; Valero-Gil, 2008). The money transferred has a positive impact on education and child labor reduction for children in recipient households (Calero et al., 2008; Mansuri, 2006; Acosta, 2006; Bouoiyour and Miftah, 2013).

To some extent, income poverty is a form of economic inequality. It is seen as the result of an unequal distribution of resources. This is why, several studies have opted an approach to examine the impact of migrants' remittances on both poverty and income inequality. Their reasoning is that remittances may affect poverty to the extent that they can change distributional income in origin country (Barham and Boucher, 1998).

In Morocco, as in many developing countries, recent decades have been marked by unprecedented increase of migrants' remittances. These financial flows provide a steady income for many Moroccan households. We can imagine that, in this context, remittances from international migrants can contribute to the economic inequalities reduction and improve the living conditions of its beneficiary households. This study assesses empirically these effects by focusing on rural households in southern Morocco. The underlying idea is to imagine a hypothetical scenario without migration of a family member. The average expenditures per household are computed for two cases: the counterfactual situation without migration and the real situation with migration. The estimation of a counterfactual expenditure of a household is done by imputing a counterfactual income for households currently receiving remittances with assignment to each migrant an income measuring his productivity. All that remains is the comparison between this counterfactual expenditure and the expenditure of household who actually receive migrants' remittances, and the analysis of the effects of migration and remittances on income inequality and poverty measurements.

This type of analysis in term of scenarios seems more natural and objective than a "naive" measure of the impact of remittances on poverty and income inequality. Our approach is in line with the previous works on the same field (Adams, 1991;, 2006; Barham and Boucher, 1998; Gubert et al., 2010; Brown and Jimenez, 2007; Acosta et al. 2007).

The next section of the paper summarizes the main predictions of studies on the concerned subject. The development of poverty in Morocco presents the object of the third section. The fourth section describes our empirical approach, while the fifth one discusses the obtained results. The last section concludes.

2. Literature review

The potential poverty-reduction impact of international remittances has been widely discussed in the developing world. Such impact is an empirical question that may depend on whether remittances are tacked as exogenous income. The majority of recent studies indicate the utmost importance to take into consideration the potential endogeneity of these flows, i.e. whether migrants' remittances and poverty are determined simultaneously and endogenously. The reverse causality between poverty and remittances or migration is in fact the most important source of endogeneity (see for example, Erhijakpor and Anyanwu, 2007; Adams and Page, 2005). Indeed, for Adams and Page (2005), a variation in the level of poverty can change both the number of individuals who migrate as well as the level of remittances

transferred. In their study pertaining a panel of 71 developing countries, they outline that, on average, an increase by 10% in the share of international migrants in a country generates a decrease by 2.1% in the share of poor people who live on less than 1$ per person per day with the instrumentation strategy for migration, or 3.5% with the instrumentation strategy for remittances. They also show that remittances and international migration can reduce the severity and the gap of poverty in these developing countries. Using an empirical methodology similar to that of Adams and Page (2005), Gupta et al. (2007) find that for sub-Saharan countries, the impact of poverty on migration and remittances could be as important as that of remittances on poverty (in terms of elasticity). Anyanwu and Erhijakpor (2007) have also examined the impact of remittances on poverty in Africa by using a panel of 33 African countries. Their results confirm that the transfers of international migrants reduce the level, the depth and the severity of poverty in Africa. They found for example, that an increase by 10% in remittances leads to a drop by 2.9% in the number of African poor.

Several studies have concluded that remittances are more effective in overcoming poverty in rural areas if the amounts transferred are important and the majority of migrants are coming from poor households. In reality, it is often not the poorest who migrate the most and remittances are sent mainly to middle-income countries and not to the low-income countries (OECD, 2009). According to World Bank study, in Eastern Europe and former Soviet Union, the richest households receive more funds from abroad than the poorest households (Mansoor and Quillin, 2007). Adams (2006) believes that because of its travel costs, international migration represents a more viable option for households with more disposable income. If this is the case, migrants' transfers might not have an immediate and direct effect on poverty. However, the migration costs include not only travel fees but also information costs about for example the policies and institutions in the destination country. The information flow is likely to be more significant as the size of the network of migrants increases (Lopez-Cordova and Olmedo, 2007). Recently, information flow effect of networks has increased due to the great development of the information technologies.

Some empirical studies have shown, however, that in some contexts remittances are sent to the poorest segments of the population. These works suggest that the remittances sent by the poor people who emigrate with the aim of improving the living standard of their origin families can enhance family's well being. The African Development Bank report (2007) mentions that transfers mostly affect the poorest segments of the population. This research focused on Morocco, Senegal, Mali and the Comoros, shows that three quarters of families receiving remittances are from disadvantaged social groups, characterized by a low income level (approximately 240 Euros per family).

It appears also appropriate to ask whether remittances affect income inequality in the origin country. Results of studies are much more ambiguous. For Adams (1991), although remittances have been useful in the fight against poverty, paradoxically, they also contributed to the rise of income distribution inequality in rural Egypt. Studies such as those of Adams and Page (2005) and Docquier and Rapoport (2003) have revealed possible link between inequality in income distribution and poverty. Docquier and Rapoport (2003) have suggested that if the society of origin is less unequal, internal labor market adjustments and remittances could decrease wealth and income inequalities. In the case of high inequality, there will be contradictory effects of remittances and local wage adjustment on inequality e.g., if wages adjustment reduces income inequality among households, migrants' remittances will have a negative effect on earnings dispersion. As we already mentioned, remittances are mainly

intended to middle and higher class households who have the means to afford the high cost of international migration and the migratory project risks (loss of income in case of failure of migratory experience, breach of implied contract between the migrant and his family, etc) and international migration is a selective process (Brown and Jimenez, 2008 and Ratha, 2003), in such case, migrants' remittances could change distributional income in origin country (Barham and Boucher, 1998). Some authors have noted that when emigration rates are high, reducing income inequality could be stronger (Taylor et al., 2005; Docquier and Rapoport, 2003) because as the number of migrants increases, the migration costs of other migrants decrease giving persons living in households with low income the opportunity to migrate. More precisely, Mckenzie and Rapoport (2007) argue that an increase in migratory network size always leads to more increase in migration propensity for the poor than for the rich. Taylor et al. (2005) have evaluated the effects of marginal changes of remittances on poverty in Mexican regions with different levels of migration. They show that in rural areas, migrants' remittances have far more beneficial effects on the distribution of wealth with the expansion of access to migration. The existence of migratory networks that facilitates the emigration of poor and reduces the costs of migration could reinforce this positive effect (Docquier and Rapoport, 2003). However, according to Taylor (1999), there is in the case of Mexico "a knock-on effect of spending that promotes transmission of many benefits derived from remittances to non migrant families (who do not have a migrant abroad) within and outside the rural economy. Poor rural households are among the beneficiaries of these items." In other words, it's also necessary to take into account the indirect multiplier effects of migration and remittances upon communities of origin as a whole (including migrants and non migrant households).

Recent microeconomic literature has used an innovative empirical approach to investigate the impact of migrants' remittances on households' well being (Adams, 1991, 2006; Barham and Boucher, 1998; Brown and Jimenez, 2007; Acosta et al., 2007; Gubert et al., 2010). It treats remittances as a substitute for labor income that the household would have earned if migrant had stayed home. The idea is to imagine a scenario in which migration of family members has not occurred and to estimate the counterfactual household income and allocate a hypothetical income to each migrant. This counterfactual income is compared with that observed with migration and remittances. Studies conducted with such scenario analysis are based on the reference paper of Adams (1991) which estimates the impact of remittances on poverty and inequality in rural Egypt. Following this approach, Barham and Boucher (1998) find that migration and remittances increase inequality in Nicaragua. Gubert et al. (2010) have analyzed the effects of migrants' remittances on poverty and inequality in Mali. The authors use a sample of 4,494 households and find that remittances and migration reduce poverty and can have an equalizing effect on income distribution. According to the authors, as household income fall, the transfers should compensate the effects of migration on his income. They provide evidence of a less level of Gini index for migration abroad compared to that obtained in the non migration framework.

3. Background

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 to become as important as direct investment flows and much higher than the

amount of official development assistance. These data underestimate the real levels of remittance flowing back to this country because they only include the remittances which come back through official means. In the case of Morocco, remittances flows have been considered one of the major sources of foreign currency. According to World Bank data, Morocco has received $ 7.2 billion in 2011, about 7.24% of its Gross Domestic Product (GDP). It is a third large recipients in the MENA region. The amounts transferred by about three and a half million Moroccan migrants constituted a major source of additional income for Moroccan families. Therefore, between 30% and 40% of rural incomes depend on migrants' remittances to Morocco (AFD, 2009).

To better analyze the potential impact of remittances on household welfare in Morocco, it is imperative to properly understand the evolution of standard of living of Moroccans. In recent years, GDP per capita has increased between 2000 and 2010 from 1,270$ to 2,795$. The country's economic performance in the 2000s characterized by an average growth rate reaching 3.2% in 1999-2002 compared to 5% in 2003-2009 (Ministry of Economic, 2011). These economic progresses become particularly notable when we consider the process of economical and institutional evolution of Morocco in earlier times. In the aftermath of its independence, Morocco like several other developing countries, has taken lots of important measures to accelerate its economic growth and base its economic development on a solid foundation. From the 1970s onwards, it has decided to focus on social issues with the creation of the first public social welfare agency namely the Entraide National (1972) and the development of first five-year social economic development Plan (1973 - 1977)[4]. National and international economic conditions in the 1970s (successive budget deficits, international crisis, surge in the value of the US dollar and the world interest rates, explosion of the foreign debt, etc.) were pushed Morocco to engage in further reforms. In 1983, a Structural Adjustment Program (SAP) was adopted in order to improve its economic and financial conditions. If its results at macro-level could on the whole be considered positive in several respects (controlled inflation, lower fiscal deficits, etc.), greater social and economic problems have been repeatedly left in its wake. This program involved substantial cuts in government spending on social services (the subsidy to the basic necessities) and on public employment and investment (education and healthcare spending). These measures have caused an impoverishment of an important part of the Moroccan population and have increased inequalities (lack of infrastructure and social services, unemployment among young graduates, etc.). In fact, the economic growth expected to take over after the austerity cure imposed by SAP, has not been sufficiently strong enough to reduce unemployment and poverty. According to Adams and Page (2003), despite very slow economic growth in the 1980s and the 1990s, the low level of poverty in the MENA region (including Morocco) can be explained by the desire of government to use public work rolls as a means to keep people employed and out of poverty using public sector employment and privatization policy.

In the early 1990s, the Moroccan authorities have developed a social development strategy aimed at meeting priority needs of the most vulnerable population groups in the areas of education, health care, public housing and employment as well as developing local social welfare programs, such as the Agency for the Promotion and Economic and Social Development of the Northern Prefectures and Provinces (1995), the Social Development Agency (2001) and the National Agency for the Promotion of Employment and Skills

[4] National Promotion was established by the Royal Decree in July 15, 1961.

(2000)[5]. Furthermore, major reforms of health and education have been undertaken by Morocco with for example the introduction of compulsory basic health insurance (2005) and the National Charter for Education and Training (1999). These efforts have achieved good progress in child education, decline of extreme poverty and access to healthcare. Additional efforts are needed to improve educational outcomes, to reduce the still-high youth unemployment and the inequality in the distribution of income and to easily access to health care, particularly across regions (IMF, 2013). Since, the analysis of the evolution of the Human Development Index (HDI) shows that despite the steady increase in its value, from 0.435 in 1990 to 0.50 in 2000 and to 0.582 in 2011, Morocco's HDI remains low. About inequalities in Morocco, after a period of stagnation between 1985 and 2000 (between 39.2 percent and 40.9 percent), the Gini coefficient has relatively increased in 2007 (47 percent). In term of poverty, as depicted from Table 1, the majority of the country's poor still live in rural areas. Available household surveys suggest that relative poverty has fallen sharply over the past decade. It fell between 2001 and 2008 from 15.3% to 8.8% for the country as a whole (from 7.6% to 4.7% for urban areas and from 25.1% to 14.2% for rural areas).

Table 1. Poverty rate by area of residence (percent)

	1985	1991	2001	2007	2008
Urban	13.3	7.6	7.6	4.8	4.7
Rural	26.9	18	25.1	14.4	14.2
National	21	13.1	15.3	8.9	8.8

Source : Moroccan High Commissariat of Planning (2009).

4. Empirical approach: variables and econometrical strategy

The data used for this study come from a survey conducted in southern Morocco in 2009[6]. This study looks at the evaluation of the impact of remittances on inequality and poverty in Morocco. The data were collected in 18 communes located in rural and less developed areas of Souss-Massa-Draa, a region with a long history of international migration (the figure in Appendix gives the geographical location of the region). Communes were selected according to certain criteria such as the rate of international migration, the geographic distribution of groups, the socio-ethnic factions, and the access to basic services. Survey was conducted with households randomly collected in these communes. In total, 598 household heads were interviewed, providing information on 4,870 family members. Respondents were asked about, household demographics, labor market participation of household members, agricultural and non-agricultural activities and different income sources, among others. The sample also provides information on family members abroad and detailed information on the demographic and socioeconomics characteristics of these members, including remittance behaviors (transfers channels, sending frequency, recipients, etc).

[5] The Moroccan government has also undertaken development projects and programs in rural areas aimed at providing infrastructure and services in regional Morocco, such as the global rural electrification program and the rural community drinking water supply program.

[6] Survey was conducted in Morocco in 2009 under a project "The impact of migrant remittances on poverty and inequality: a comparison between Morocco and Algeria" with the financial assistance of the European Commission. It was supervised by a team of French-Moroccan researchers (University Paris XIII, University Paris-dauphine and University Mohammed V-Souissi).

In our sample, the percentage of households that receive or have received remittances in the past is about 45%. The data collected show that 55% of households received remittances from their children and 26% from siblings. There are more households headed by men than households headed by women (91.30% compared to only 8.7%). However, most migrants are often males, but curiously in our sample recipient households aren't more likely than no-recipient household to be headed by women (12.4% against 5.8%). Table 2 provides some other characteristics of households with and without migrants. It shows that the average income of migrant households is higher than that of non-migrant (29,564 DH[7] against 25,551 DH). In term of income, however, household receiving remittances has an income which amounts 15.7% more than that of a non-receiving when we include remittances. But relative to non-migrant households, migrant households have less levels of income when we exclude remittances. We even found that migrant households have less farmland than non-migrant households (the same result as Adams (1991), pp. 23). This observation can be explained by the relatively high proportion of households whose income consists primarily of remittances sent back home by migrants. Collected data indicate that remittances represent at least 25% of the income of recipient households for 85% of households. As mentioned in the introduction section, some studies have found in other contexts that households of migrant workers tend to become dependent on remittances for their daily sustenance giving up income generating activities.

Table 2. Characteristics of households with and without international remittances

	Households receiving remittances			Households without remittances			All households		
Variable	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Age in years of household head	264	54,68	13,68	320	51,33	12,71	593	52,89	13,23
Number of active people aged above 15 years	232	2,37	1,72	291	2,154	1,588	531	2,27	1,65
Annually income (excluding remittances)	264	13,824	30,741	323	25,551	32,045	596	20,346	31,892
Monthly expenditure	266	2,231	1,096	319	1,909	1090	594	2,055	1,100
Average number of years of study per household	246	7,455	4,987	313	8,329	5,142	568	7,93	5,08
Land surface[8]	253	9,367	27,14	274	15,894	85,281	535	12,64	63,85
Number of livestock	243	10,14	8,31	271	12,66	18,259	523	11,43	14,36
Number of children attending school (pupils and students)	232	.6896	.9389	295	.6779	.9005	535	.6859	.9233
Household size	232	7,03	3,00	291	6,52	2,08	531	6,76	2,54

Source: Survey of the impact of migrants' remittances on poverty and inequality: a comparison between Morocco and Algeria (2009).

We start by presenting our empirical approach and proposing a conceptual framework for better understanding the influence of migrants' remittances on the standard of living of beneficiary households. We then present the econometric model used to address this question.

[7] In 2009, the exchange rate of the Moroccan dirham (MAD) vis-à-vis the euro was 11.4.
[8] Local unit of measurement is "âbra" or 1/8 hectare.

4.1. A conceptual framework

There are different empirical approaches to model the relationship between migrants' remittances and poverty. Some studies use these financial flows as an explanatory variable of household income[9] and thus estimate a probit model that explains the probability of a household being poor or use the method of Ordinary Least Squares (OLS). In both cases, it is assumed that the incomes of all households (migrant and non-migrant) are the same. However, economic literature considers migration as an endogenous phenomenon (Gibson et al., 2009; Gubert et al., 2010; Acosta et al., 2007, etc.). Several factors can cause this endogeneity. First, migration can be explained by the standard of living of the origin household (i.e., reverse causality problem). Second, it can also be resulted from a non-random selection of the population (selection bias in the sample: migrants and households are not randomly distributed in the population)[10]. Finally, the decision to migrate of household member would depend to observable factors such as education level and age but also to unobservable variables relating to the migrant like its motivation and dedication to work. Because of such endogeneity, the OLS estimators are biased. To minimize selection bias, researchers often use parametric methods such as two-step procedure of Heckman (1979) or semi-parametric methods like matching estimators.

One could go further and attempt to measure the impact of remittances flows on reducing poverty and income inequality by taking into account the contribution of these migrants to the domestic income if they had stayed in their country of origin. In this approach, to consider the differences which can exist between households with and without remittances, the basic idea is to identify household income before and after the migration of his members and then deduct the effect of these remittances on poverty and income inequality. However, information about the income of the household before the migrant left is in general not available directly from household surveys. This is why a counterfactual per capita income of household with remittances is calculated on the basis of a reduced-form specification for the determinants of income among households without remittances (Acosta et el., 2007). However, as pointed by Adams (2006), if migrant families are systematically different from non-migrants in unobservable characteristics (motivation, productivity, etc), there will be selection bias in any estimates of income which are based on non-migrant households. To test for this possible selection bias, empirical researches employ a two-stage Heckman-type selection procedure. In the absence of selection bias of migration, some studies achieve their estimation by using the OLS method[11] (Adams, 2006; Brown and Jimenez, 2007; Gibson et al., 2009)[12]. With respect

[9] In this case, the exogenous part of international migration (poverty is endogenous to migration and remittances) is added as an explanatory variable of household income.

[10] Gibson et al. (2009) suggest the existence of, in addition to the self-selection of migrants, a second form of selection: the household must choose between emigration of all or part of his members. This selectivity cannot be tested and modelled here, because we do not have, as all studies on the subject, data on households in which all members have emigrate.

[11] In this case, the determination of the poverty rate would be possible by calculating a first difference between the predicted value of the non-migrant household income, taking into account parameters relating to migrants and poverty line. The comparison of this rate with that obtained from the observed income of households receiving transfers from abroad may be made.

[12] Adams (2006)'s analysis confirms the absence of selection bias in his sample, while the study of Brown and Jimenez (2007) is based on the absence of such a bias. Gibson et al. (2009) use OLS method because the selectivity problem did not arise in the case of Samoa, since there is a treaty

to the selectivity of international migration, we have chosen to follow the approach adopted by, among others, Barham and Boucher (1998), Acosta et al. (2007) and Gubert et al. (2010), based on an imagination of a hypothetical scenario without migration of a family member, the average income (expenditure)[13] per household is thus computed for two cases: the counterfactual situation without migration and the real situation with migration. The estimation of a counterfactual income of a household is done by assigning each migrant an income measuring his productivity, because if the migration has not occurred, the potential income of each household is measured by the physical and human capital of all his members including migrants. The counterfactual income will then be compared with estimated income of household who actually receive migrants' remittances.

In the context of microeconomic data and selection bias, the most authors use the two-step method (Heckman method). In the first step, a probit regression is conducted to identify the determinants of the probability to be a non-remittance receiver. In a second step, an OLS regression (average expenditure per household as dependent variable) with several potential explanatory variables like the age and gender of the household head and the educational level is conducted. In order to correct for selection bias, the Mills ratio calculated in the first step is included as explanatory variable of household expenditure. Finally, we use these OLS coefficients to compute the counterfactual income of remittances-recipient households, i.e., a hypothetical value for the average expenditure of a household that is affected by the migration of a family member. The average expenditures per household are compared between the hypothetical scenario without migration and the situation with migration in reality[14]. In the last section, the effects of migration and remittances on income inequality and poverty measurements like the poverty rate among the households and the vulnerability[15], the distribution of the income quintiles and the Gini coefficient (%) are analyzed[16].

It should be noted that Gubert et al. (2010) have identified migrant households only by the first step. According to the authors, migration is a selection variable of households. Therefore, they do not include amounts transferred in their estimates.

In order to make the various comparisons, we have chosen the value of the national poverty threshold. According to official statistics, in 2007, the threshold is 3,834 DH per person per year in urban areas and 3,569 DH in rural areas[17]. It is obvious that the use of poverty line

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between this country and New Zealand. This treaty stipulates that 1,100 people have the right to migrate each year (quota). It was entered into force in 2002 and provides an opportunity for all Samoan citizen aged between 18 and 45 years to be registered in the draw held annually by the authorities of New Zealand. The authors regress household income on the exogenous variables related to household members (average age, number of adults and children, the highest level of education and the area of residence) and on the variable that indicate the migration or not of a family member.

[13] In this paper, the terms ''expenditure'' and ''income'' are used interchangeably.

[14] In our sample, only migrant households receive remittances. Furthermore, some migrants do not transfer, while we analyze the effect of international remittances on income distribution, our estimate concern households who receive funds from abroad.

[15] The analysis of the impact of remittances on household vulnerability is the first, to our knowledge, in the empirical literature on the subject.

[16] The Gini coefficient varies between 0 and 1. It is equal to 0 in a situation of perfect equality where all wages, incomes or living standards would be equal. At the other extreme, it is equal to 1 in the unequal situation.

[17] The threshold "is, on average, U.S. $ 2.15 PPP per day per person (U.S. $ 1 PPP = 4.88 DH). Vulnerable household means any household who spend per capita between the national poverty

calculated at the national level leads to an over-evaluation of poverty, because the study area is relatively poor compared to other regions of Morocco. However, in the absence of regional thresholds, we are forced to make this choice. To measure income inequality, we use the distribution of income by quintiles and the Gini coefficient.

4.2. Empirical specification

We consider a production function generating an income Y_i as following specification:

$$\log Y_i = \alpha + \beta X_i + \varepsilon_i \quad (1)$$

In estimating this production function, we consider as inputs (X_i), the physical capital of each household and the supply of labor adjusted by its human capital. In our case, this approach is more appropriate to the rural context of our study and allows to determine the farm income. Equation (1) can be estimated by using the sub-sample of no remittance households and adding information on migrant characteristics. In reality, if the migrants were randomly selected, we just have to run an OLS regression of Eq. (1) on non-migrant households for computing the hypothetical value of household expenditure (Y_{i1}). However, with evidence that both migrants and migrant households are self-selected in the population, we have to introduce in Eq. (1) a variable that represents the household's "propensity to not migrate and/ or not receive remittances" which is a result of two-step procedure of Heckman (1979). To this end, we closely follow Acosta et al. (2007) by adopting in the first step the following probit specification:

$$Z_i^* = \alpha_1 + \beta_1 X_i + \delta\, I_i + \mu_i \quad (2)$$

With $Z_i = \begin{cases} 1 & \text{if } Z_i^* \succ 0 \\ 0 & \text{if } Z_i^* \leq 0 \end{cases}$

Where, Z_i is dichotomous variable which equals one if a family member does not go abroad and not receive remittances, zero otherwise; X_i is the vector of characteristics related to the households. I_i is an instrument variable. A Heckman two step model requires an exclusion restriction/instrument to ensure that the unobserved variables which determine the probability of migrating or not are not correlated with those determining the level of household expenditure. In other words, the selection equation (Eq. (2)) must contain at least one variable which does not exist in the equation (Eq. (1)). We decided to take historical migrants' stock abroad as an instrument of international migration[18] (Acosta et al., 2007). Household access to international migration networks may increase the likelihood of participating in the

threshold and one-and-a-half this threshold; it is a population that is not poor, but has a high risk of poverty" (see HCP (2010)).

[18] It indicates the stock of Moroccan migrants in each host country in the 1990s.

international migration. In other words, the probability of migration should be higher for households who have migrants in the host countries with significant presence of migrant workers. We also think that migrant networks can reduce the costs of remittances and those of migration for potential migrants (McKenzie and Rapoport, 2006).

This first step estimation is used to obtain the probability to be a remittance (non-remittance) receiver that is used to compute the remittances (non-remittances) selection inverse Mill's ratio (λ_i). This term is then added as an independent variable in the OLS regression. Hence, we can rewrite Eq. (1) as follows:

$$\log Y_i = \alpha_2 + \beta_2 X_i + \vartheta \lambda_i + \upsilon_i \qquad (3)$$

Note that for each observation, we compute the value λ_{1i} or λ_{0i} which are respectively the conditional expectation of μ_i for $Z_i = 1$ and $Z_i = 0$ (i.e., the no remittances and remittances selection inverse Mill's ratios respectively). Furthermore, the procedure was replicated to derive the individual bootstrap predictions.

Regarding the explanatory variables (X_i), the usual determinants of household income indicators namely his human capital will be considered. We specifically take into account the number of children attending a high school or an establishment of a higher education and the age and gender of household head. In fact, according to statistics on the unemployment rate in the region, it is very low. Therefore, these children of working age are one of the resources of family labor and therefore an indicator of family labor supply. Adams (2006) also assumes that the age of the household head can positively influence the probability of migrating but it has no influence on household income.

Physical capital is measured by the agricultural land area which corresponds to the heritage declared by households, the number of cattle and the possession of old house[19] (a dummy variable). Table 2 shows that, on the one hand, the migration increases the income of migrant households, and on the other hand, the surfaces owned by migrant households (and the number of cattle) are lower than that owned by no-migrant households. Migrant households are likely to make a choice between international migration and agricultural production (Taylor et al., 1999).

Among the variables relating to the commune of residence of household, we introduce the municipal Human Development Index (ICDH) as measured at local level by elements similar to those of the human development index score[20]. This index could explain the probability of migration, people's participation in local labor market and household income.

To estimate the counterfactual household expenditure without migration, we attribute to each migrant, a gain as he/she has stayed in his country of origin by identifying the information associated to him. Particularly, the size of household includes the number of migrant

[19] For modern house, it uses new housing materials like cement, iron, etc.

[20] This is the official measure of communal human development by including three elements: a) Health situation measured through the infant mortality rate, the number of infant deaths per 1000 live births during the 2004 Census year; b) Education level measured by an indicator combining for two-thirds, the literacy rate of people aged 10 and over and, for one third, the enrolment rate of those aged 7-12 years; c) The average annual expenditure per year and per person (HCP, 2004)..

members, while household's education takes into account the migrant's education[21]. The latter variable allows to report potential income of migrant if he/she was inserted in the national labor market. The descriptive analysis of our sample has shown that the average number of years of education in the sub-sample of households with migrants increases when we consider the level of education of migrants, it goes from seven to eleven years.
Note that we have chosen to assess household's poverty and living standards by his/her actual expenditure (i.e., corresponds to the household budget devoted to food, transportation, clothing, leisure activities and expenses occasioned by religious parties or ceremonies) but not by his/her income. This choice is dictated by the fact that we use the concept of poverty line which is measured in terms of food and non-food spending. Furthermore, income is generally poorly measured especially in the rural areas[22]. In addition, household expenditure can account for the price differences according to the different municipalities. In the absence of data on individual consumption, we use, as all previous studies, the annual expenditure per household divided by the household size.

5. Results and discussion

5.1. Who migrate? What is the role of standard of living in migration decision?

As can be seen from the Table 3, the coefficients of the Mills ratios are significant and thus the Heckman model is relevant. The first part of the table presents hypothetical scenario results without international migration (including information on migrant characteristics) where the Probit model indicates the probability to be a non-remittance receiver and OLS estimates indicate the main determinants of the counterfactual income (expenditure) of household. The second part of the table reports the findings of real situation with migration and receipt of remittances. The Probit model provides information on the probability to be a remittance receiver[23] and OLS estimates give migrant household income.
We first note that our instrument (historical stock of migrants) is significant in both cases (households with and without migration) with opposite signs. Thus, for households with migration, the number of international migrants is positively correlated with the probability of migration and receiving remittances. In other words, the existence of a network (family, friends, etc.) increases the probability of migration. It is a standard result in the literature on migration. For households without migration, and by analogy, we get the opposite result.
Looking at the characteristics of households, the age of the household head and its square does not appear to influence the decision to migrate. Similarly, the gender of the household head is insignificant. The variable ICDH, which reflects the level of development of the municipality of residence, has a positive effect on the decision to remit. One possible

[21] It takes into account the level of education of all migrants at the time of migration since there are only 11 migrants (out of 572) who went abroad to complete their studies.
[22] The World Bank recommends the use of consumption instead of income for several reasons. First, consumption is a better indicator of performance than earnings, then the consumer can be better measured as income and finally, it may reflect more accurately the actual standard of living of a household and his ability to meet his needs fundamental (Coudouet et al., 2002).
[23] As mentioned previously, in our sample only household with international migrants receive remittances.

explanation for this result is that a commune which is humanly developed is an encouraging factor for migration and migrant's remittances. This result is consistent with that found in the literature (see for example Durand et al. (1996) study which indicates that the socio-economic context of the common origin has positive effects on the migrants' decision to transfer). Finally, Table 3 shows that household size is a determinant of household wealth. Intuitively, we note its positive impact on the household expenditure.

Table 3. Migration determinants and expenditure level per household

	Household without migration				Household with migration			
	Probit		MCO		Probit		MCO	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
Age in years of household head	.0061	0.93	.0026	0.83	-.0306	0.63	-.0088	0.42
Age in years squared of household head	.0001	0.84	.0000	0.73	-.0002	0.64	-.0000	0.35
Land surface (log)	-.1101	0.68	.1051	0.02**	.0212	0.89	.1236	0.00***
Number of livestock (cattle and horses) (log)	-.2526	0.23	.0355	0.16	.0986	0.49	.0549	0.00***
Number of children attending higher secondary and higher education levels (log)	-.117	0.57	.0416	0.14	.1266	0.53	.0045	0.85
Indicator of habitat condition (dummy)	-.1229	0.71	.1368	0.08*	.4365	0.15	.1414	0.00***
Household size (log)	-.1555	0.16	.0359	0.08*	.0688	0.39	.0325	0.00***
ICDH (log)	-4.463	0.18	.2942	0.66	7.154	0.01**	.4788	0.18
Mills Ratio			.0514	0.24			-.3041	0.01**
Number of migrants (log)	-.8437	0.00***			.8324	0.00***		
Constant	-13.46	0.00	9.540	0.00	16.57	0.00	9.73	0.00
	Num of obs = 105		Num of obs = 104		Num of obs = 257		Num of obs = 256	
	R2 = 0.269		R2 = 0.279		R2 = 0.282		R2 = 0.328	

Notes: Coefficient after correction of heteroscedasticity. ***, ** and * denote significant at thresholds of 1%, 5% and 10% respectively. The variable gender of household head was omitted due to collinearity problems. The number of migrants is used as instrument of international migration.

Similarly, a positive relationship was observed between household expenditure and the level of wealth. This result is quite intuitive. Thus, we find that for the three variables measuring the standard of living of households, commonly used in the literature, the effect is the same. Surprisingly, the variable land ownership does not explain the probability of migration and receiving remittances[24]. This could be explained by measurement errors resulting for example from a lack of property land rights.

[24] Some authors like Adams (1991) found that families who own land (even the poor) have a higher propensity to migrate and receive remittances.

5.2. Impact of remittances on poverty and income distribution of Moroccan households

Recall that our analysis evaluates the effects of international migration on rural households, by comparing poverty and inequality levels obtained on the basis of both hypothetical situation without migration and real situation with migration. Three scenarios have been conceived for analyzing the impact of migrants' remittances on poverty and income distribution: hypothetical scenario without migration, current situation with migration and naïve counterfactual scenario. This latter is adopted by Adams (2006) who gives migrant household income by adding the counterfactual income to the average amount of funds received by households in the sample. In fact, the author does not have the characteristics relating to migrants (their number, education level, etc.), thus in the absence of such information, only transfers are added to distinguish between migrant households from other households[25].

In columns (1) and (2) in Table 4 are reported poverty and inequality indicators calculated from counterfactual expenditures of households distinguished respectively by the correction or not for selection bias in our data. Columns (3) and (4) provide indicators obtained for remittances-recipient households with and without correcting for selectivity of the migration respectively.

The results of our various estimates confirm the positive and highly significant effect of remittances on economic wellbeing of households who receive them. They confirm those obtained by the majority of studies on the subject (Acosta et al., 2007; Gubert et al., 2010; Adams, 2006; Brown and Jimenez, 2007). In fact, the poverty rate and the vulnerability of non-poor households are significantly reduced thanks to migrant's remittances. Specifically, our results show that the "poor" are less numerous among the households receiving remittances: their proportion is equal to 22.77% and 32.45% depending on whether or not there is a correction of selection bias of migration (columns (3) and (4) of Table 4). For households without migration, this proportion is around 52% (more precisely 52.9% for scenario 1 and 52.56% for scenario 2). In the same vein, our estimates highlight the role of international transfers in reducing the proportion of the vulnerable households. This proportion is located around 73% in case of receipt of financial transfers and around 95% in the absence of such transfers. Although the magnitude of the remittances effect varies with different scenarios, the two indicators used to measure their impact on poverty indicate a sustained reduction among households receiving transfers. Note that in the case of Morocco nationally defined poverty lines tend to yield higher poverty rates than those based on the US$1 and US$2 lines. Moroccan authority uses poverty line of U.S. $ 2.15 PPP[26].

[25] This approach was also considered by the only study conducted in the case of Senegal by the management of the Forecasting and Economic Studies of the Ministry of Economy and Finance (2008) "The impact of migrants' transfers on poverty in Senegal". Working paper n° 07.

[26] The Moroccan High Commission for Planning measures the relative poverty threshold using the FAO-WHO standards and the World Bank estimation method. It usually sets poverty line by adding to the food poverty line (i.e., cost of the food basket satisfying a specific calorie requirement) additional funds for the purchase of non food goods.

Table 4. Poverty and inequality indicators according to different scenarios

	Households without migration		Households currently receiving remittances		Households without remittances	Households with remittances
	Bias corrected scenario1 (1)	Absence of bias scenario2 (2)	Bias corrected scenario1 (3)	Absence of bias scenario2 (4)	Adams's approach Naive scenario (5)	Adams's approach Naive scenario (6)
Predicted average annual expenditure	26,935	26,363	28,501	28,382	24,366	41,040
Poverty rate	52.9	52.56	22.77	32.45	39.1	3
Vulnerability	95.08	96	72	75.35	81	32.22
Inequality :						
1st Quintile	13.1	13.16	12.48	12.63	11.36	16.95
2nd Q	17.34	16.99	17.44	17	17.37	18.63
3rd Q	19.84	19.54	20.02	19.56	19.91	19.73
4th Q	22.25	22.22	22.63	22.47	22.67	21.03
5th Q (top)	27.47	28.03	27.41	28.35	28.69	23.64
Inter-quintile ratio (Q5/Q1)	2.09	2.13	2.19	2.24	2.52	1.39
Gini Coefficient (%)	13.98	14.68	15.48	15.47	16.97	0.07

Source: Authors' calculations from data collected from baseline survey.

On another level, Table 4 reveals the distribution of household expenditure by different indicators of income distribution. Specially, we calculate the quintiles and the Gini coefficient to describe the degree of household income inequality by receiving or not remittances from abroad. Note that there exists an inequality in current expenditure of households. Thus, with or without migration, the richest households (quintile 5) generally receive a greater proportion of the national income (between 23.64% and 28.69%). For example, as can be seen with scenarios 1 and 2, even after the migration, the situation has not improved: the highest 20 % of the population accounted for a little over 27% of national income. In contrast, the most households in the first quintile saw their share in total income decline, with financial remittances. Therefore, the analysis of inter-quintile ratio suggests a slight increase in inequality in favor of the richest households. In sum, for the two first scenarios, financial transfers do not reduce inequality inter-quintile which is confirmed by Gini coefficients results (Table 4). The highest inequality expressed by Gini coefficient is registered with scenario 1 when the distribution of income has increased from 13.98% to 15.48% due to remittances. The gap is smaller with scenario 2. Similar to Barham and Boucher (1998) research, it could be seen that when remittances are substituted for the income of migrants if they stayed in their home country, they can increase income inequality. These authors add that national labour market incomes have a greater equalizing effect on income distribution, unlike remittances, and migration. This contradicts the results obtained by some researchers as Gubert et al. (2010), who found that the counterfactual scenario without migration produces Gini coefficients higher than those obtained in case of migration.

6. Conclusion

In the current global crisis, understanding the poverty-reduction potential on international migration is particularly important. In the case of Morocco, remittances flows have been recently increasing at phenomenal rates. Given the economic importance of migrants' remittances for country like Morocco, it seems crucial to assess accurately and effectively the impact of migration and migrants' remittances on monetary wellbeing of the households who receive them. Based on household survey data collected in southern Morocco and on an original empirical approach, this paper seeks to contribute to the knowledge of the potential effects of these flows. In this study, we identify potential gains from remittances on distributional income in origin country by considering remittances as a substitute for labor income that the household would have earned if migrant had stayed home. We use econometric estimations to predict the incomes of households with and without remittances.

The empirical findings show that migrants' remittances significantly reduce the number of poor households. They also prevent vulnerable households from falling into poverty. In other words, remittances lessen the vulnerability of households to poverty, i.e., the ex-ante risk that a household will, if currently non-poor, fall below the poverty line. Of course, even if migrants are not all from poor families, their remittances may have an indirect effect on the poor through a knock-on effect of spending (Taylor, 2001).

Furthermore, this study reveals the existence of high income inequality and unequal distribution of wealth. Significant differences were also observed in relation to the reception (or not) of migrants' transfers. Our results show that migration and remittances have increased income inequality compared to the counterfactual scenario of no-migration. This result confirms the findings of research using this type of empirical approach (Barham and Boucher, 1998 in particular). However, the naïve analysis of the income distribution of households (Adams's approach) puts in evidence that with transfers, income distribution is less uneven.

More specifically, we noted that despite its considerable efforts, Morocco could not progress in reducing income inequality. Remittances can not replace proactive public policies which aim to fight this scourge. We are therefore entitled to ask about the role of Moroccan government in the income distribution and if recent events in some MENA countries (revolts and changes in political regimes) should encourage a fastest implementation of coherent and long term policies.

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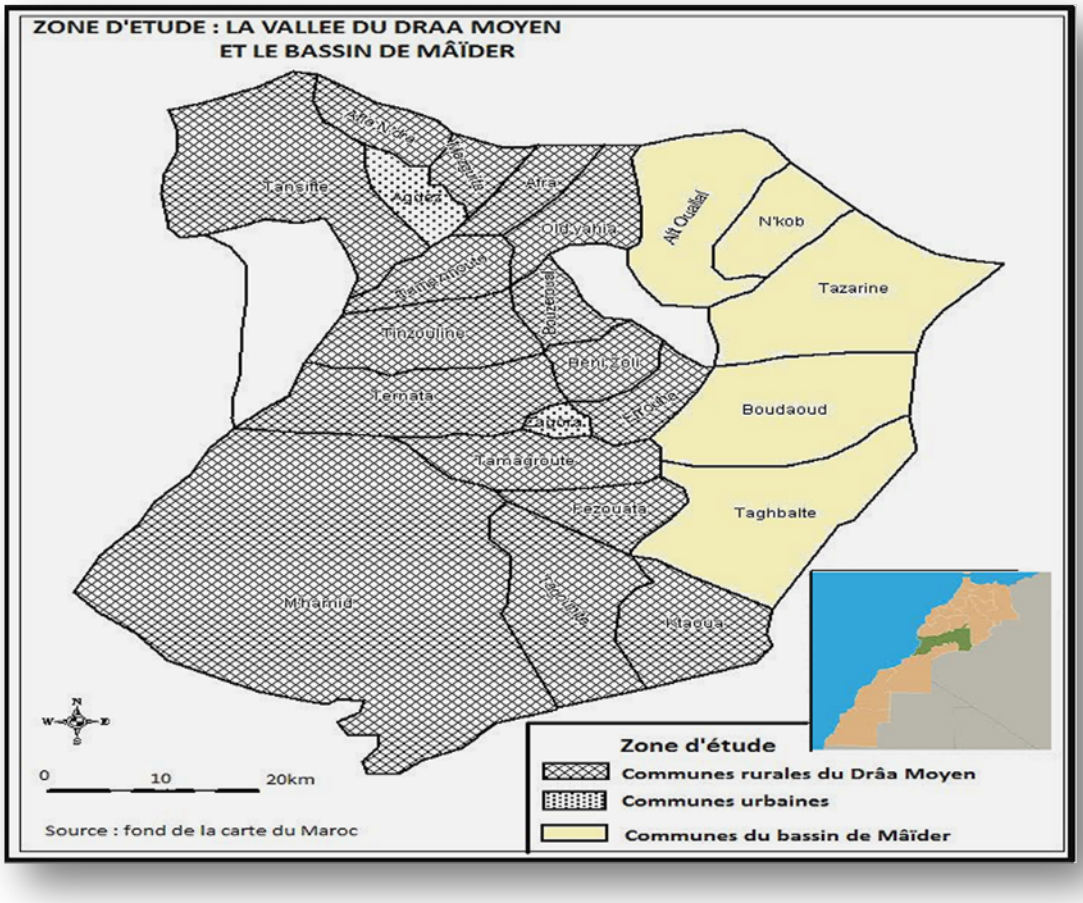
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Appendix

Figure A.1. Map of survey area



Source: Survey of the impact of migrants' remittances on poverty and inequality: a comparison between Morocco and Algeria (2009)