MIGRATION, REMITTANCES AND ENTREPRENEURSHIP: THE CASE OF RURAL ECUADOR

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Abstract

Using data from the Living Standard Measurement Survey 2005-2006 for Ecuador, this study analyses the impact of migration and remittances on the likelihood for a rural household to own a business, and the labor demands of household businesses at both the household and town level. The results show that neither migration nor remittances have any effect on the odds of family business ownership. Instead, education, credit and access to services are positively correlated with the probability of owning a rural enterprise. Regarding labor demand, the number of family members working in a business appears to be higher for those households that have at least one migrant abroad. Contrary to what expected empirical endogeneity tests (Smith-Blundell) fail to reject the null hypothesis of exogeneity of migration, remittances and town remittances with respect to the outcome variables proposed.

1. Introduction

Inspired by the significant increase that the volume of remittances flowing into developing countries has experienced in the last decade, a number of researchers and organizations have repeatedly highlighted the potential of such international money transfers to impel development in migrant sending countries (Inter-American Development Bank, 2006; International Monetary Fund, 2005; Ratha, 2003; Solimano, 2003; World Bank, 2006). Within such research spheres, it is broadly accepted that remittances can significantly contribute to economic development of sending countries by maintaining macroeconomic stability, reducing poverty and inequality, smoothing consumption for remittance recipient households, increasing investment in education and health, promoting small business formation, among other positive effects. Nevertheless, it is also implied that the impact of remittances on development could be greater if a larger share of them is invested in productive activities. In this way they would not only benefit remittance receivers but also non-remittance recipients through dinamization of local economies and employment generation (Inter-American Development Bank, 2006; Orozco, 2006).

By their side, several development practitioners (OECD, 2006; Petrin, 1990, 1994; Stark & Markley, 2008) have upheld the concept of promoting entrepreneurship as a development intervention able to prompt the development process in rural regions. Increasing the number of entrepreneurs may boost development in rural areas by providing local people with off-

farm jobs, diversifying local economies, increasing tax revenue for the public sector, promoting the use of local resources, and hence raising living standards within communities (OECD, 2003; Stark & Markley, 2008). In the particular case of Ecuador, Lanjouw (1998) argues that non–agricultural activities tender a way to leave poverty and that an expansion of off-farm jobs would be associated with a decline of income inequality.

However, rural entrepreneurs in developing countries generally face several constraints such as: poor infrastructure and services, deficient education schemes, and lack of credit for business formation; such intrinsic problems critically reduce the odds of success for entrepreneurial activities in rural areas. In this regard, Petrin (1994) lists the lack of credit as one of the biggest drawbacks for rural business formation. For migrant households, such financial limitations can be overcome using remittances as a source of capital for productive activities (Lucas & Stark, 1985; Taylor, 1999). Further on, even when migrant households themselves do not invest; the demand for certain goods and services that comes together with remittances flows can impel local entrepreneurial activities and employment generation (Durand & Massey, 1992; Taylor, 1999; Taylor et al., 1996). In this sense, Massey & Parrado (1998) state that international migration may impel business formation in two ways; by providing migrant households with capital to invest and by stimulating the demand for goods and services due to the aggregate effect of remittances arriving in sending regions.

In the case of Ecuador, the inflow of remittances has dramatically grown in the last decade reaching US $3,088 million in 2007[1], year in which they accounted for 7% of the GDP. Despite of these numbers, scarce empirical research has been carried out in order to analyze the impact of remittances on business ownership and employment generation. The availability of literature regarding this topic is restricted to some qualitative studies addressing the low share of remittances that is invested in productive activities. To illustrate, the Inter-American Development Bank (2003) shows that only 8% of remittance beneficiaries in Ecuador use the money for entrepreneurial activities; rather 17% of recipients spent remittances on sumptuary goods, category that appears as second in importance after current consumption (61%). Similar numbers are reported by López and Villamar (2004) for the city of Quito and Sánchez (2004) for rural communities in the province of Loja. Such aversion to invest can be explained by the low amounts of the transfers, the uncertainty about the country's future

[1] This amount dropped to US $ 2,822 million in 2008 due to the financial crisis.

together with a generalized distrust on the financial system[2] (Acosta, Villamar, & López, 2006; Inter-American Development Bank, 2003). Other than showing the average expenditure patterns of remittances recipients, such studies do not tell us much about the impact of migration and remittances on entrepreneurship and job creation.

This paper analyses the effects of migration, monthly household remittances and the average remittances per household at town level on business ownership and employment generation in rural Ecuador. In order to answer these questions, this study considers three indicators: i) the likelihood for a household to own a business, estimated with a probit model, ii) the number of household members working in family businesses; and iii) the number of non-family workers in a business, both estimated by means of tobit models. Contrary to what expected, the Smith-Blundell test failed to reject the null hypothesis of exogeneity of migration and remittances with respect to the three outcome variables under study. Besides potential endogeneity issues, the results of this study suggest that neither migration nor remittances play any role on the odds for a household to own a business. Instead, having at least one household member abroad slightly increases the number of family workers in a household business. The rest of the paper is structured as follows: Section 2 reviews the links between migration and productive activities in the rural context, Section 3 describes the data and the variables used for the analysis. Section 4 explains the methodology while Section 5 discusses the results. Finally, Section 6 presents the conclusions.

2. Migration, Remittances and Investment in Productive Activities

In general, the academic literature concerning migration, remittances and their effects on rural regions has been dominated by the debate between two groups with disagreeing perceptions about the topic. On one side, some authors (Reichert, 1981; Stuart & Kearney, 1981; Wiest, 1979) sustain that rather than promoting development in Mexican sending regions, remittances may hamper it by giving origin to a series of negative effects such as dependency, engagement in conspicuous consumption, social differentiation between migrant and non-migrant households, inflation of land prices and stagnation of productive activities. A second group of researchers (Durand, Kandel, Parrado, & Massey, 1996; Durand, Parrado, & Massey,

[2] At the end of the 1990s Ecuador experienced one of the worst economic crises throughout its history. One of outcomes of such a crisis was the closure of several banks and financial institutions with the inherent losses for depositors who in many cases lost all their savings. This fact itself was one of the main reasons that triggered the numbers of international migrants in Ecuador.

1996; Massey, Alarcón, Durand, & González, 1987) presents a more positive and promising view of remittances and their contribution to development. According to this group remittances serve to improve agriculture by allowing recipient households to buy inputs, to grow market demanded cash crops, to expand irrigation, and to overcome credit constraints. In this line Durand, Parrado, & Massey (1996) state that migration detractors fail to consider the multiplier effects of remittances as they are spent on goods and services locally produced. Furthermore, remittances are indeed spent on productive activities when the proper conditions for investment are given (Durand & Massey, 1992; Taylor, 1999; Taylor et al., 1996). However, more contemporaneous Mexican scholars question such an approach, arguing that migration undermines local trade due to depopulation problems and loss of the most educated labor force that are associated with it (Delgado Wise & Márquez Covarrubias, 2007; Delgado Wise, Márquez Covarrubias, & Rodríguez Ramírez, 2004; Márquez Covarrubias, 2006); and that businesses funded with remittances are featured by low investment rates, dependency on family labor and incapability of generating paid jobs, whose multiplier effects under such conditions are rather limited (Canales, 2008; Canales & Montiel Armas, 2004).

Outside Mexico, Adams (1991) concludes that migrant households in rural Egypt present a higher tendency to invest than their non-migrant equivalents being the acquisition of agricultural and building land the main choices for investment allocation. In the case of Pakistan, Adams (1998), reveals that international remittances play a significant role in the acquisition of land, although they exhibit no effect on livestock accumulation. Instead, Lucas (1987) suggests that remittances earned by migrants working in South African mines are associated with livestock accumulation and crop production improvement at the long run. In this line, Mochebelele & Winter-Nelson (2000) imply that remittances received by migrant households in Lesotho allow them to overcome financial constraints that otherwise would prevent them from carrying out timely and regular farm management activities. For Albania, McCarthy, Carletto, Davis, & Maltsoglou (2006) report a rise of rural income which is linked to the change from staples to livestock production. These results are consistent with Miluka, Carletto, Davis, & Zezza (2007) who find that Albanian migrant households invest less in crop production inputs than their non-migrant counterparts and rather turn their investments to livestock production. A similar shifting pattern from staple to livestock production is registered by Wouterse & Taylor (2008) for migrant households in Burkina Faso. In the case of Ecuador, Jokisch (2002) states that international migration and remittances have allowed migrant households to accumulate more land than their non-migrant counterparts but he also reports no relationship between international migration and the amounts of fertilizers applied

to crops. By his side, Gray (2009) finds that international remittances positively affect the expenditure on agricultural inputs.

Apart from agriculture, Massey & Parrado (1998) conclude that "migradollars", as they label remittances flowing from the United States into Mexico, play a significant role in the process of business formation both at household and community levels. Furthermore, neither migration nor remittances have any effect on the number of family and non-family workers, which drive the authors to conclude that the migration process itself cannot be blamed for the small size and little employment generation endorsed to migrant businesses. Similarly, Woodruff & Zenteno (2001) calculate that about 20% of the capital invested in microenterprises in Urban Mexico comes from remittances and imply that remittances allow small-scale entrepreneurs to overcome capital market imperfections that else would prevent them from investing. Yang (2005) determines that depreciation of the Philippine Peso with respect to the currencies used in countries where Philippine migrants work is positively associated with the entry in new entrepreneurial activities and the number of self-employment working hours. By their side, Amuedo-Dorantes & Pozo (2006) study the relationship between remittances and business ownership as a system of equations arguing that both variables obey to a simultaneous process. On one side they find that receiving remittances reduce the probability of owing businesses, instead having a business increases the likelihood of receiving remittances. They explain such results by arguing that remittances increase the reservation wages of migrant households which would stimulate them to spend remittances on other goods and services such as health and education. On the other hand, an already established business would encourage migrants to remit as they may perceive it either as a good investment opportunity or as a chance to be favored in future bequests.

Another group of researchers have studied the links between return migration and entrepreneurship generally reporting a positive relationship. For instance, Arif & Irfan (1997) conclude that savings accumulated by Pakistani migrants during their working time in Middle East countries allowed them to switch from production and service employment to business and agricultural activities as they returned to Pakistan. Dustmann & Kirchkamp (2001) utilize a model where the optimal time of migration and the activity post-migration are simultaneously chosen. They report that more than half of the Turkish returnees in their sample are engaged in some economic activity, most of them in entrepreneurial activities. Similarly, de Haas (2006) finds that more than 35% of the Moroccan returnees in his sample invest in private businesses. By their side, Black & Castaldo (2009) find that the experience

gained while abroad as well as the savings accumulated during the time of migration are positively correlated with the likelihood for Ghanaian and Ivorian returnees to engage in entrepreneurial activities. After controlling for the endogeneity of temporary migration with respect to the odds of having a business, Wahba & Zenou (2009) are able to determine that savings and human capital acquired by Egyptian temporary migrants while abroad increase their probabilities to become entrepreneurs in spite of the loss of local networks that international migration may entail.

Having rural-urban migration in China as a case of study, Liu (2010) concludes that earnings from migration are positively correlated with the probability for a household to engage in off-farm businesses and the profitability of such businesses. Instead, Ma (2001) suggests that human capital, in the form of entrepreneurial skills learnt during the time of migration, plays a more important role in the process of rural business formation than does the savings accumulated by rural-urban Chinese migrants. Using instrumental variable methods to account for the endogeneity of the migration decision with regards to business ownership, Kilic, Carletto, Davis, & Zezza (2007) find a positive correlation between past international migration experience and the likelihood of owning a family business in Albania.

Regarding Ecuador, the literature pertaining to migration and/or remittances and their effects on entrepreneurship are restrained to some anecdotal evidence or local cases of study. To illustrate, Caguana, Pinguil, Tenezaca, Peñafiel, & Zaruma (2008) as well as Camacho & Hernández (2009) report that remittances inflow and the construction boom associated with it have triggered the number of hardware stores and vehicles offering transport services in southern rural Ecuador. This paper intends to fill the gap of empirical research concerning migration, remittances and their impact on business ownership and employment generation in rural Ecuador. To my knowledge, it is the first study that empirically estimates the linkages between migration, remittances and entrepreneurship in Ecuador.

3. Data and Variables

The data mainly come from the Living Standards Measurement Survey 2005-2006 carried out by the National Institute of Statistics (INEC). This cross-sectional data set has national representation and includes information about housing, household composition, health, education, household assets, entrepreneurship, agricultural activities as well as migration and remittances for a total of 13,581 rural and urban Ecuadorian households. This study focuses on the impacts of migration and remittances on the likelihood for a rural household to own a

business as well as the number of family and non-family workers in a business. Hence, in the first case the analyses will be restrained to a sample of 4,753 households as for the number of workers the sample size is reduced to 1,425 households claiming running at least one business.

Table 1 displays the variables used for the analysis as well as the descriptive statistics. Special attention is paid to the effect of international migration and remittances on the propensity of owning businesses and the number of family and non-family workers. Although migration and remittances are closely related, there are at least two reasons to analyze their effects separately. The first reason is connected to the structure of the survey itself. To explain, the questionnaire asks whether a member of the household has migrated in the last five years, notwithstanding it requests in a general way if the household have received remittances during the last twelve months. Consequently, it could be the case that a household receives remittances from members that migrated before 2000[3]. It is also possible that a household receives remittances from distant relatives or friends who were not household members before migrating, In any case, about 62% of the households claiming receiving remittances do not report any household member abroad, what makes the decision of including migration and remittances as separate covariates look wise.

Even if a household reports both having international migrants and receiving remittances; the impact of the implicit labor losses attached to migration deserves special attention in the context of rural migration. For instance, one could imply that migration and its inherent loss of labor drive migrant households to leave labor demanding cropping and to switch to non-agricultural entrepreneurial activities. Among those households owning businesses, the labor gap due to migration may be covered whether with family labor as suggested by Canales & Montiel Armas (2004) or with non-family workers as reported by Kilic, Carletto, Davis, & Zezza (2007) in the case of Albania. For this purpose the models include a dichotomous variable, which takes the value of 1 if the household has one or more international migrants and 0 otherwise. As for remittances, a number of studies (Lucas, 1987; Lucas & Stark, 1985; Taylor et al., 1996; Taylor & Martin, 2001) hold that remittances allow recipient households

[3] Although international migration acquired its nowadays relevance and recognition after the late 1990s economic crisis; several authors (Acosta et al., 2006; Gratton, 2006; Jokisch, 2001) have divided Ecuadorian international migration into two stages. The first started during the 1950s in the southern Ecuadorian Highlands and has the United States as its main destination. The second started in the late 1990s, was triggered by the economic crisis, had national representation and was principally directed to Spain.

to overcome liquidity constraints that otherwise would hold them back from undertaking investments, adopting new technologies or as in this case engaging in entrepreneurial activities. This effect is expected to be captured by adding the monthly amount of remittances received by a household to the model. Additionally, specifications include the average amount of remittances received by a household at town level. With this variable, it is expected to account for the indirect or multiplier effects of remittances at community level.

Among the control variables, this study incorporates household characteristics such as age, sex, and education of the household head. In this sense, the likelihood of business ownership seems to increase for male household heads (Amuedo-Dorantes & Pozo, 2006) who are young and well educated (Massey & Parrado, 1998). A dummy variable taking the value of 1 if the household head considers himself/herself as indigenous is incorporated in order to account for the effect of ethnicity on the output variables proposed. Due to the fact that the labor division within a household could be influenced by gender (Martínez, 2000a, 2004, 2000b) and age in the rural Ecuadorian context, the number of children, young men, young women, adult men and adult women (see Table1 for definitions) are included as separate predictors. Martínez (2004) identifies land scarcity due to egalitarian inheritance as the main driving force for entrepreneurship in rural Ecuador. If such a statement is true, households owning more land should show lower propensity to run a business. Having a home of one's own positively affects the probability of forming a business (Massey & Parrado, 1998), it can be used as a collateral for getting a loan as well as offer a physical space not only for manufacturing but also for retail activities. Taking into account this consideration, a dummy variable for home ownership is incorporated as a control variable.

Lack of credit and poor infrastructure are issues limiting investment on productive activities. To capture the effect of credit, this study includes a dummy variable which take the value of 1 if the household has received a loan[4] and 0 if not. In the case of services, the models contain dummy variables indicating if the household has electricity, piped water and indoor water system. To account for road infrastructure, the median of distance to the closest road and the median of the time needed to reach the closest market at provincial level are taken from the National Agricultural Census 2000.

[4] This variable refers not only to credit explicitly conferred for business formation but to any kind of credit. The main idea behind the inclusion of this variable is to know whether the household is eligible for credit concession or not.

4. Methodology

Empirical strategy

In order to address the objectives set up in the introduction; two methodologies are used. To estimate the likelihood for a household to own a business, this study relies on a probit model of the following form:

$$\Pr(B_i = 1|M_i, R_i, CR_i, X_i) = \phi(\mathbf{M_i}.\beta_1, \mathbf{R_i}.\beta_2, \mathbf{CR_i}.\beta_3, \mathbf{X_i}.\beta_4)$$

Where B_i is a dichotomous variable, which takes the value of 1 if the household owns a business and 0 otherwise, X_i is a vector that includes the control variables described in the last part and ϕ is the standard cumulative normal distribution. As mentioned above in the text, the coefficients of migration (M_i), remittances (R_i) and remittances at town level (CM_i) are of particular interest for this study.

In the case of the number of family and non-family employees, both variables have a value of cero for a considerable number of observations but are still continuous with strictly positive values. Modeling this kind of "corner solution outcomes"[5] with OLS methods result inappropriate and rather the use of tobit models is recommended (Wooldridge, 2002a). Labeling the number of family workers as FW and supposing that there is an unobservable variable FW* which is normally distributed and homoskedastic with 0 conditional mean; FW will equal FW* when FW* > 0 and will be 0 if FW* = 0. The same approach is applicable for the number of non-family workers (NF) in a business. Again, the variables of interests are migration, remittances and remittances at town level.

Addressing the potential endogeneity in the models

In recent years, a growing number of papers about migration and remittances have addressed the endogeneity of the latter with respect to educational attainment (Calero, Bedi, & Sparrow, 2008; Hanson & Woodruff, 2003; López-Córdova, 2006; Mansuri, 2006; McKenzie & Rapoport, 2006), health outcomes (Antón, 2009; Hildebrandt & McKenzie, 2005; López-

[5] See Wooldrige (2002a) for a more extensive definition.

Córdova, 2006; Ponce, Olivié, & Onofa, 2009), entrepreneurship (Amuedo-Dorantes & Pozo, 2006; Kilic et al., 2007; Wahba & Zenou, 2009), rural income (de Brauw, Taylor, & Rozelle, 1999; McCarthy et al., 2006; Miluka et al., 2007), technology adoption (Quinn, 2009) among other outcomes that are affected by decisions made at household level. Further on, Taylor & Mora (2006) warn about the endogenous nature of migration and remittances and conclude that studies ignoring such threats take the risk of bringing in biased estimators. Although most contemporary studies rely on the use of instrumental variables, it is not the only way to deal with the potential endogeneity of migration that can be found in the literature. In this sense, a group of authors (Gray, 2008, 2009; Wouterse & Taylor, 2008) imply that the extent to what endogenity can become a source of bias depends on the own characteristics of each case of study[6] and argue that by removing from the model variables that affect both migration and the outcome variables, including control variables accounting for household characteristics (Gray, 2009) or lagged household assets (Wouterse & Taylor, 2008), and being careful when interpreting the results; the effects of endogeneity can be diluted.

Regarding entrepreneurship, Amuedo-Dorantes & Pozo (2006) argue that remittances may impel entrepreneurship by smoothing household liquidity constraints, however businesses may attract remittances if migrants remit expecting whether to take advantage of good investment opportunities back home or to be favored in future inheritances. The authors address the potential endogeneity in their model by including both remittances and business ownership as outcome variables in a system of simultaneous equations. When estimating the effect of temporary migration on the probability for returnees to become entrepreneurs, Wahba & Zenou (2009) justify the use of instrumental variables by arguing that those individuals planning to become entrepreneurs may be more likely to migrate what would bring endogeneity to the model due to reverse causality. Similarly, Kilic et al. (2007) rely on the use of instrumental variables when estimating the effect of migration experience on the probability of non-farm self employment. The authors argue that the model may be affected by endogeneity due to the fact that past migration decisions may be correlated with household characteristics that also affect the outcome variable.

[6] When modeling for activity choice in Burkina Faso Wouterse & Taylor (2008) claim that the absence of land markets limits the scope to which migration could affect land accumulation and hence the probability for their models to be endogenous. Similarly, Gray (2008) argues that the rareness of land sales in southern rural Ecuador reduces the chances of reverse causality between migration and land ownership.

The use of instrumental variables entails a cost in terms of efficiency of the estimators, thus it is advisable to use a test of exogeneity to determine whether or not instrumental variables are needed (Wooldridge, 2002b). A number of tests (Hausman-Wu, Smith-Blundell, Wald) have been proposed to test for endogeneity. Nevertheless, such methodologies are based on the assumption that instruments are valid. For an instrument to be valid, it must fulfill two conditions: it must have explanatory power with respect to the suspected endogenous variable (migration, remittances and town remittances in this case) and not directly influence the outcome variable (exclusion restriction).

In order to test for the potential endogeneity of the treatment variables, this study considers a set of instrumental variables that are chosen according to the suspected endogenous covariate and the output variable in each case[7]. For the likelihood of owning a business, the instruments for migration are: the number of children under grandparental care and the average unemployment rate[8] at parish level in 2001. In the first case, letting migrants' children under relatives (mainly grandparental) surveillance has been a distinctive feature of Ecuadorian out migration (Aguirre Vidal, 2009; Pedone, 2006). As for unemployment, it is considered as one of the main factors that triggered migration in the late 1990s (Acosta et al., 2006; Ramírez Gallegos & Ramírez, 2005). To instrument for remittances, this study relies on two dummies indicating in each case whether or not the household has received remittances from Spain[9] and whether or not the household has received clothes[10] as gifts in the last twelve months.

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[7] As mentioned above, instrumental variables must not have any effect on the output variables. To be sure that this condition is met, all the instruments were included in the models as regressors and were not used if they were correlated with the output variable (regressions not shown). For these reasons, the instruments used for business ownership may differ from those used for the number of family and non-family employees. To illustrate, the availability of cell phone is highly correlated with business ownership and the number of non-family workers, the migration rate in 2001 significantly affect the likelihood of business ownership and the number of children under grandparental care somehow influences the number of family workers in a business. Additionally, it must be considered that the data base for the likelihood of owning businesses differs from that used for the number of family and non-family members (see section 3).

[8] It could be argued that the unemployment rate in 2001 might have influenced the decision of starting a business in future years. However when this value is included as covariate in the model estimating the propensity of owning a business, it appears not to have any effect on the outcome variable ($z=0.45$, p-value=0.651).

[9] Calero et al. (2008) exploit the country of origin of remittances (EEUU, Spain or Italy) as instruments for remittances. In this study, the dummy indicating if remittances come from EEUU is not taking into account because it somehow influences the likelihood of business ownership while the dummy for remittances from Italy is let apart due to its somehow poor explanatory power.

[10] Even when clothes are considered as remittances in kind, this work is particularly concentrated in monetary remittances. Furthermore, it could be argued that clothes given by a relative abroad could be used to start a clothes store in Ecuador, however this dummy variable does not explain the likelihood of business ownership ($z=1.01$, p-value=0.311).

Calero et al.(2008) reports having successfully used the country of origin of remittances as a valid instrument for the monthly amount remitted while clothes are expected to be a common gift given by migrants to their relatives in Ecuador. Instruments for average per household town remittances are taken from the National Census 2001 and include the number of people with internal migration experience and the average number of women per household, both at parish level. In rural Andean sending regions, internal migration is seen as a first step before international migration (Carpio, 1992) whilst the gender equilibrium is reported to be changed in such regions as a consequence of persistent male migration (Jokisch, 2001).

In the case of the number of family workers, the variables chosen to instrument migration are dummies indicating whether or not the household is mono-parental and whether or not the household has a cell phone at disposal. For several households, the absence of one of the parents is associated with international migration (Aguirre Vidal, 2009; Pedone, 2006), as technologies such as internet and mobile phones are reported to be tools that have allowed Ecuadorian migrants to get in permanent touch with the relatives left behind (Ramírez Gallegos & Ramírez, 2006). The instruments to test endogeneity of remittances with respect to the number of family members are the same than those used for the likelihood of business ownership (remittances from Spain and clothes as gift) while the average number of internet users at parish level from 2001 and the average number of women per household from the same year will serve as instruments for average town remittances.

For the number of non-family workers, the dummy variable for mono-parental household and the migration rate at parish level from 2001 will be used as instruments for migration. In this model, remittances are instrumented with dummies indicating whether or not the household receives remittances from Spain and whether or not the household receives remittances from the United States. Finally, the instruments for average town remittances in this case are: the number of individuals with internal migration experience and the average number of absent household members at parish level both taken from the National Census 2001.

This study relies on the Smith-Blundell test (Smith & Blundell, 1986) to detect if the treatment variables are endogenous or not. Such a methodology focuses on testing endogenity in limited dependent variable models. In order to avoid the pernicious effects of weak

instruments[11], the explanatory power as well as the exclusion restriction of all the instruments proposed above will be tested before applying the Smith-Blundell test of exogeneity. Another drawback of exogeneity tests may be their sensitivity to specification. To explain, the test could reject the null hypothesis of endogeneity under one specification and fail to reject it if a different specification is used. In order to cope with this threat, the exogeneity test will be run with three different specifications; the first includes household and household head characteristics, the second also considers land and home ownership as well as credit, services and road infrastructure while the third adds the provincial dummies to the model. If the null hypothesis of exogeneity is rejected with any of the three specifications, the use of instrumental variables will be justified.

5. Results

Endogeneity tests

Table 2 shows the explanatory power of the variables chosen to instrument migration in the models for business ownership as well as for the number of family and non-family workers. For the sake of brevity, the coefficients of the control variables are not displayed in the table. In each case, the joint significance of instruments is well above the rule of thumb proposed by Staiger & Stock (1997) that instruments can be considered as valid if their joint significance in the first stage regression has a F value larger than ten. Tables 3 and 4 report the results for the monthly amount of remittances and the average remittances at town level. Again, the null hypothesis that the joint significance of instruments is 0 can be rejected at 99.99% probability for the three outcome variables under study.

In order to test if the instruments meet the exclusion restriction, they are included as covariates in the models estimating the likelihood of business ownership, and the number of family and non-family workers. Table 5 displays the joint significance of instruments for migration, remittances and average town remittances together with the p-values for the outcome variables proposed. In all the cases the null hypothesis that the true value of instruments is cero cannot be rejected. Therefore, instruments fulfill the exclusion restriction, that is, they have no influence on the output variables. From these results, it is possible to

[11] The smaller the correlation between the instruments and the endogenous variable the larger the standard errors of the instrumental variable estimators will be. Furthermore, low correlations between the instruments and the endogenous variable can drive to asymptotic biased estimators (Wooldridge, 2002b).

conclude that the instruments proposed are valid; hence they can reliably be used to estimate the Smith-Blundell test of exogeneity.

Table 6 reports the results of the Smith-Blundell test of exogeneity estimated for the three suspected endogenous variables and the three output variables studied. The null hypothesis of exogeneity cannot be rejected for any of the treatment variables with any of the three specifications utilized. Given this somehow unexpected results, I fail to reject the null hypothesis of exogeneity of migration and remittances for these data bases and these output variables, and hence will treat migration and remittances as exogenous covariates.

Why is the endogeneity of migration and/or remittances reported to be a serious threat in similar studies and seems not to be a problem of magnitude in this case? Two possible explanations arise to address such a question, both linked to the own characteristics of Ecuadorian out-migration. To start with, it is necessary to differentiate between temporary migration from Egypt as studied by Wahba & Zenou (2009) or migration from Albania to neighboring countries as studied by Kilic et al. (2007); and Ecuadorian international migration whether to the United States or to Spain. To explain, while temporary migrants somehow know the period of time they will stay abroad, and those who go to neighboring countries may have the possibility of traveling back and forth from their country of origin; Ecuadorian out migration was featured by the lack of legal status of most migrants and uncertainty about the time of return[12]. Hence, investing on entrepreneurial activities at their return may have not been the main incentive for migrants to migrate if the time of return was not clear from the beginning. It is also worthy to note that out migration in Ecuador was a response to a very serious economic crisis featured by a dramatic fell of incomes, a substantial grown of unemployment rates and a very fast process of impoverishment among the population (Acosta et al., 2006; Ramírez Gallegos & Ramírez, 2005). The Inter-American Development Bank (2003) stresses that the possibility of sending money to the relatives left behind and hence helping them to subsist during the harsh post-crisis times, was an integral an even a causal

[12] In order to travel to the United States, Ecuadorian undocumented migrants must engage in a very dangerous and expensive trip that will take them to Guatemala or Mexico by boat to then make their way to the United States (Jokisch, 2001; Jokisch & Pribilsky, 2002). Although less costly and restrictive in terms of migratory controls, migration to Spain was also featured by high travel expenses and the lack of work visa for most migrants. The difficulty of reaching the destination country together with the lack of documents could make the date of return unclear for most migrants.

factor for Ecuadorians to migrate. Under such extreme conditions, it is not illogical to think that starting a business at their return, was not a priority, or the main motivation for migrants when they left Ecuador. Therefore, the effect of reverse causality between entrepreneurship and migration may somehow be of minor scope in this case.

Business ownership and number of employees

The results of the probit model for estimating the probability of business ownership are displayed in Table 7 next to robust standard errors and marginal effects. Neither migration nor remittances, whether at household or community level, have significant effects on the probability for a household to own a business both at household or community level. One probable explanation for these results is that migrants tend to allocate their earnings in less risky investments such as purchasing land or building houses. Land is seen as a safe investment whose price tends to be higher than inflation rates (Adams, 1991; Jokisch, 2002), hence, migrants may prefer purchasing land rather than investing in entrepreneurial activities whose success is uncertain. Another possibility is that given the relative recentness of the massive Ecuadorian out migration, a considerable share of remittances must still be devoted to the repayment of loans asked in order to migrate as well as to cover basic needs of the household; therefore the amounts available for entrepreneurship would be rather low. It is also possible that the economic and political instability post crisis is still fresh in migrants' minds consequently they do not want to risk their savings in entrepreneurial adventures as argued by the Inter-American Development Bank (2003). Unfortunately, the analysis of these factors is out of the scope of this paper.

Consistent with the findings of other studies (Amuedo-Dorantes & Pozo, 2006; Lanjouw, 1998; Massey & Parrado, 1998) both education of the household head as well as the average education of the household positively influence the likelihood of business ownership. Regarding household composition, the number of young women, adult men and adult women significantly raises the probability of owning a business. Especially important is the role of adult women, for every woman older than 30 years the likelihood of owning a family business is augmented by 10%. In contrast, the likelihood decreases by 2% for every young man in the household. One possible explanation for this trend is given by Martínez (2000a) who argues that in the rural-Ecuadorian labor division, off-farm and salaried activities are mainly carried out by men. In the case of land area, it has a slightly negative impact on the probability of

owning a business which is consistent with Martínez (2004) who reports that in the rural Ecuadorian context, entrepreneurship is a response to land fragmentation due to a process of continuous equalitarian inheritance which has considerably reduced the size of plots to a point where farmers cannot earn their livelihood from cropping anymore. Another possibility is that those who posses enough capital to invest in entrepreneurial activities prefer buying land, considered as one of the safest investment allocations in the rural Ecuadorian context. Instead, home ownership is positively correlated with business ownership; it raises the probability of having a business by almost 4%. As expected, availability of credit is another factor positively correlated with business ownership. Having access to credit increases the odds of owning a home enterprise by almost 6% points.

Regarding services and road infrastructure, the availability of electricity, piped water and indoors piped water increases the probability of business ownership by 7, 7 and 11% respectively. These results are consistent with those reported by Lanjouw (1998) who found that services and access infrastructure are key determinants in the likelihood of owning an enterprise in rural Ecuador. In this study though, road infrastructure, in form of the median of the distance to the closest road and the median of the time needed to reach the closest market, have no effect on the probability of owning a business. In sum, despite of the large volume of remittances flowing into sending regions as a consequence of international migration, such flows have not stimulated entrepreneurship in rural Ecuador neither at household nor at community level. Instead, factors such as education, credit availability and good infrastructure are still key determinants of business ownership.

Table 8 shows the results of the tobit analyses for both the number of family and non-family workers working in a home business. To begin the discussion, it is noteworthy to remember that the data base for these analyses contains only households reporting having businesses (1,425 observations). In the first case, having a migrant abroad is positively correlated with the number of family workers. A possible explanation is that more family work is needed to cover the labor gap left by household members who migrated. Besides this consideration, this finding is consistent with Canales & Montiel Armas (2004) who argue that rather than entrepreneurial initiatives, migrant businesses are livelihood strategies whose survival is based on the exploitation of family labor force.

The number of family employees is also positively influenced by the age of the household head what could reflect that more family labor is needed as the household head gets older.

Instead, having a woman as household head is negatively correlated with the number of business family workers. According to Martínez (2000a) the typical non-agricultural activities carried out by women in rural Ecuador are retailing trade and handicraft manufacturing, activities that probably do not demand high amounts of labor. The number of young men, young women and adult women are positively correlated with the number of family workers while the number of male older that 30 does not have any influence on the output variable. Among the variables accounting for services, only the dummy for indoors piped water has a positive effect on the number family of employees.

Finally, the results for the number of non-family workers are also shown in table 8. Only two variables (average education of the household and the dummy for indoors water system) positively explain the number of non-family workers what makes me suspect that there are other variables besides those included in the model that affect the number of non-family employees in a business. A similar drawback is reported by Massey & Parrado (1998) this time for both the number of family and non-family workers. In any case, neither migration nor remittances have any impact on the outcome variable under study.

6. Conclusions

The results of this paper support the stream of scholars stating that the use of instrumental variables must be preceded by a careful case specific analysis of the extent to what endogeneity may become an important source of bias, and secondly of the validity of the instruments to be used to cope with potential endogeneity problems. In general terms, the findings of this work suggest that migration and remittances, whether at household or community level, have no effects on the likelihood for a household to own a business in rural Ecuador, and rather that education, credit and infrastructure are, as expected, key determinants for rural entrepreneurship. Instead, family labor demand tends to be higher for households having migrants abroad. Besides these findings, this paper also offers some policy recommendations.

The rapid increase that the volume of remittances has experienced in the last decade in total and relative numbers has driven a considerable number of researchers of diverse disciplines, policy makers, development practitioners and international cooperation agencies to consider remittances as an effective weapon to combat underdevelopment, hence they have started a number of projects that have migration and/or remittances as the spearheads of their development strategy. Despite of the good intentions of such initiatives there is the risk of

paying too much attention to remittances and their potential for promoting development, and at the same time neglecting other factors that are at least as important as remittances to prompt local and regional development. There is evidence that remittances have allowed Ecuadorian migrant households to smooth consumption and to improve health status and educational attainment of children. However, they alone cannot correct the effects of decades of lack of investment on education, credit and infrastructure in rural regions. As stated by Taylor et al. (1996) cooperatives, banks and worker's associations specially conceived to fulfill migrants' requirements as well as to direct remittances into productive activities are probable to fail if the conditions that prevent migrants to invest do not change first. Such conditions, as shown in this work, are the same than those that do not allow non-migrant households to engage in entrepreneurial activities. Under these conditions, should not governmental and non-governmental organizations concentrate on providing rural communities with infrastructure, credit and schools before starting projects of co-development or establishing banks or cooperatives specially designed for migrants? These considerations should be analyzed before turning remittances into the core of any development strategy.

This study has analyzed the effects of migration and remittances on household business ownership in rural Ecuador departing from the fact that migrants are still abroad. An extension for this work would be examining the likelihood of business ownership and the employment generation impact of business started by returnees, whose number is expected to grow due to the negative effects that the world financial crisis has had for the economies of the United States and Spain, the two main destination countries for Ecuadorian migrants.

REFERENCES

Acosta, A., Villamar, D., & López, S. (2006). *La migración en el Ecuador: Oportunidades y amenazas*. Quito-Ecuador: Centro Andino de Estudios Sociales.

Adams, R. H. (1991). *The Effects of Remittances on Poverty, Inequality and Development in Rural Egypt*: International Food Policy Research Institute.

Adams, R. H. (1998). Remittances, Income Distribution, and Rural Asset Accumulation. *Economic Development and Cultural Change, 41*(1), 155-173.

Aguirre Vidal, G. (2009). Cuidado y lazos familiares en torno a la (in)movilidad de adolescentes en familias transnacionales. In G. C. Zambrano & K. H. Basante (Eds.), *Miradas transnacionales. Visiones de la migración ecuatoriana desde España y Ecuador* (pp. 17-52). Quito-Ecuador: CEPLAES-SENAMI.

Amuedo-Dorantes, C., & Pozo, S. (2006). Remittance Receipt and Business Ownership in the Dominican Republic. *The World Economy, 29*(7), 939-956.

Antón, J. I. (2009). The Impact of Remittances on Nutritional Status of Children in Ecuador.

Arif, G. M., & Irfan, M. (1997). Return Migration and Occupational Change: The Case of Pakistani Migrants Returned from the Middle East. *The Pakistan Development Review, 36*(1), 1-37.

Black, R., & Castaldo, A. (2009). Return Migration and Entrepreneurship in Ghana and Côte d'Ivoire: the Role of Capital Transfers. *Tijdschrift voor Economische en Sociale Geografie, 100*(1), 44-58.

Caguana, M., Pinguil, M., Tenezaca, Q., Peñafiel, P., & Zaruma, L. (2008). *Migración internacional en la comuna Sisid: Cambios y adaptaciones en el territorio rural y economía local*.

Calero, C., Bedi, A. S., & Sparrow, R. (2008). Remittances, Liquidity Constraints and Human Capital Investments in Ecuador. *World Development*.

Camacho, G., & Hernández, K. (2009). Territorios en movimiento. Suscal: migración y ¿desarrollo? In G. C. Zambrano & K. H. Basante (Eds.), *Miradas transnacionales. Visiones de la migración ecuatoriana desde España y Ecuador* (pp. 177-202). Quito-Ecuador: CEPLAES-SENAMI.

Canales, A. I. (2008). Remesas, Desarrollo y Pobreza. Una Visión Crítica Desde América Latina. In I. Yépez del Castillo & G. Herrera (Eds.), *Nuevas Migraciones Latinoamericanas a Europa. Balances y Desafíos* (pp. 363-389). Quito: FLACSO.

Canales, A. I., & Montiel Armas, I. (2004). Remesas e Inversión Productiva en Comunidades de Alta Migración a Estados Unidos: El Caso de Teocaltiche, Jalisco. *Migraciones Internacionales, 2*(3), 142-172.

Carpio, P. (1992). *Entre Pueblos y Metrópolis: la Migración Internacional en Comunidades Austroandinas del Ecuador*. Cuenca-Ecuador: ABYA-YALA.

de Brauw, A., Taylor, J. E., & Rozelle, S. (1999). The Impact of Migration and Remittances on Rural Incomes in China.

de Haas, H. (2006). Migration, Remittances and Regional Development in Southern Morocco. *Geoforum, 37*(4), 565–580.

Delgado Wise, R., & Márquez Covarrubias, H. (2007). Repensar la relacion entre migracion y desarrollo a partir del caso de Mexico. *Liminar. Estudios Sociales y Humanísticos, 5*(2), 8-25.

Delgado Wise, R., Márquez Covarrubias, H., & Rodríguez Ramírez, H. (2004). Organizaciones transnacionales de migrantes y desarrollo regional en Zacatecas. *Migraciones Internacionales, 2*(4), 159-181.

Durand, J., Kandel, W., Parrado, E. A., & Massey, D. S. (1996). International Migration and Development in Mexican Communities. *Demography, 33*(2), 249-264.

Durand, J., & Massey, D. S. (1992). Mexican Migration to the United States: A Critical Review. *Latin American Research Review, 27*(2), 3-42.

Durand, J., Parrado, E. A., & Massey, D. S. (1996). Migradollars and Development: A Reconsideration of the Mexican Case. *International Migration Review, 30*(2), 423-444.

Dustmann, C., & Kirchkamp, O. (2001). *The Optimal Migration Duration and Activity Choice after Re-migration*: IZA.

Gratton, B. (2006). Ecuador en la historia de la migración internacional ¿Modelo o aberración? In G. Herrera, M. C. Carrillo & A. Torres (Eds.), *La migración ecuatoriana: transnacionalismo redes e identidades*. Quito-Ecuador: FLACSO.

Gray, C. L. (2008). Environment, Land, and Rural Out-migration in the Southern Ecuadorian Andes. *World Development, 37*(2), 457-468.

Gray, C. L. (2009). Rural out-migration and smallholder agriculture in the southern Ecuadorian Andes. *Population Environment, 30*, 193-217.

Hanson, G. H., & Woodruff, C. (2003). Emigration and Educational Attainment in Mexico. University of California, San Diego.

Hildebrandt, N., & McKenzie, D. J. (2005). *The Effects of Migration on Child Health in Mexico*: World Bank Policy Research Working Paper 3573.

Inter-American Development Bank. (2003). *Remittance Recipients In Ecuador A Market Research Study*. Quito-Ecuador: Inter-American Development Bank-Multilateral Investment Fund.

Inter-American Development Bank. (2006). *Las remesas como instrumento de desarrollo*. Washington D.C.: Inter-American Development Bank-Multilateral Investment Fund.

International Monetary Fund. (2005). Two Current Issues Facing Developing Countries. In *World Economic Outlook. Globalization and External Imbalances.* (pp. 69-84). Washington D.C.: International Monetary Fund.

Jokisch, B. (2001). Desde Nueva York a Madrid: tendencias de la migración ecuatoriana. *Ecuador Debate, 54*, 59-84.

Jokisch, B. (2002). Migration and Agricultural Change: The Case of Smallholder Agriculture in Highland Ecuador. *Human Ecology, 30*(4), 523-550.

Jokisch, B., & Pribilsky, J. (2002). The Panic to Leave: Economic Crisis and the "New Migration" from Ecuador". *International Migration, 40*(4), 75-101.

Kilic, T., Carletto, G., Davis, B., & Zezza, A. (2007). *Investing Back Home: Return Migration and Business Ownership in Albania*: ESA Working Paper No. 07-08.

Lanjouw, P. (1998). *Ecuador's Rural Nonfarm Sector as Route out of Poverty*. Washington, D.C.: World Bank Policy Research Working Paper 1904.

Liu, J. (2010). Human Capital, Returning Migration and Rural Entrepreneurship in China. Indiana University, Bloomington.

López-Córdova, E. (2006). *Globalization, Migration and Development: The Role of Mexican Migrant Remittances*. Buenos Aires: INTAL-ITD Working Paper 20.

López, S., & Villamar, D. (2004). El proceso emigratorio en el sur de Quito. In F. Hidalgo (Ed.), *Migraciones. Un juego con cartas marcadas* (pp. 367-388). Quito-Ecuador: Abya-Yala.

Lucas, R. E. B. (1987). Emigration to South Africa's Mines. *The American Economic Review, 77*(3), 313-330.

Lucas, R. E. B., & Stark, O. (1985). Motivations to Remit Evidence from Botswana. *The Journal of Political Economy, 93*(5), 901-918.

Ma, Z. (2001). Urban labour-force experience as a determinant of rural occupation change: evidence from recent urban-rural return migration in China. *Environment and Planning, 33*, 237-255.

Mansuri, G. (2006). *Migration, School Attainment and Child Labor: Evidence from Rural Pakistan*. Washington D.C.: World Bank Policy Research Working Paper 3945.

Márquez Covarrubias, H. (2006). Controversias en el desarrollo económico local basado en las remesas de los migrantes. *Análisis Económico, 21*(2), 308-330.

Martínez, L. (2000a). La especificidad del empleo rural. In A. Torres (Ed.), *Antología de estudios rurales* (pp. 121-150). Quito: FLACSO-ILDIS.

Martínez, L. (2004). El campesino andino y la globalización a fines de siglo (una mirada sobre el caso ecuatoriano). *Revista Europea de Estudios Latinoamericanos y del Caribe, 77*, 25-39.

Martínez, L. (2000b). *Economías Rurales: Actividades no Agrícolas*. Quito-Ecuador: CAAP.

Massey, D. S., Alarcón, R., Durand, J., & González, H. (1987). *Return to Aztlan: The Social Process of International Migration from Western Mexico*. Berkeley: University of California Press.

Massey, D. S., & Parrado, E. A. (1998). International Migration and Business Formation in Mexico. *Social Sciences Quarterly, 79*(1), 1-20.

McCarthy, N., Carletto, G., Davis, B., & Maltsoglou, I. (2006). *Assessing the Impact of Massive Out-Migration on Agriculture*: FAO.

McKenzie, D., & Rapoport, H. (2006). *Can migration reduce educational attainment? Evidence from Mexico*. Washington D.C.: World Bank Policy Research Working Paper 3952.

Miluka, J., Carletto, G., Davis, B., & Zezza, A. (2007). *The Vanishing Farms? The Impact of International Migration on Albanian Family Farming*. Washington D.C.: World Bank Policy Research Working Paper 4367.

Mochebelele, M. T., & Winter-Nelson, A. (2000). Migrant Labor and Farm Technical Eficiency in Lesotho. *World Development, 28*(1), 143-153.

OECD. (2003). *Entrepreneurship and Local Economic Development*: OECD.

OECD. (2006). *The new rural paradigm: policy and governance*: OECD.

Orozco, M. (2006). *Between hardship and hope: Remittances and the local economy in Latin America*. Washington D.C.: Inter-American Development Bank.

Pedone, C. (2006). *Estrategias Migratorias y Poder: Tú Siempre Jalas a los Tuyos* (1 ed.). Quito- Ecuador: ABYA-YALA.

Petrin, T. (1990). *The Potential of Entreprenership to Create Income and New Jobs for Rural Women and Families*. Paper presented at the Fifth Session of the FAO/ECA Working Party on Women and the Agricultural Family in Rural Development .

Petrin, T. (1994). *Entrepreneurship as an economic force in rural development*. Paper presented at the Seventh FAO/REU International Rural Development Summer School.

Ponce, J., Olivié, I., & Onofa, M. (2009). The Role of International Remittances in Health Outcomes in Ecuador: ¿Prevention or Response to Shocks? FLACSO-Elcano Institute.

Quinn, M. A. (2009). Estimating the Impact of Migration and Remittances On Agricultural Technology. *The Journal of Developing Areas, 43*(1), 199-216.

Ramírez Gallegos, F., & Ramírez, J. P. (2005). *La Estampida Migratoria Ecuatoriana, Crisis, Redes Transnacionales y Repertorios de Acción Migratoria*. Quito-Ecuador: CIUDAD.

Ramírez Gallegos, F., & Ramírez, J. P. (2006). Redes Transnacionales y Repertorios de Acción Migratoria: de Quito y Guayaquil para las Ciudades del Primer Mundo. In G. Herrera, M. C. Carrillo & A. Torres (Eds.), *La Migración Ecuatoriana: Transnacionalismo, Redes e Identidades* (2 ed.). Quito-Ecuador: FLACSO.

Ratha, D. (2003). Workers' Remittances: An Important and Stable Source of External Development Finance. In *Global Development Finance. Striving for Stability in Development Finance.* (pp. 157-175). Washington D.C.: World Bank.

Reichert, J. S. (1981). The Migrant Syndrome: Seasonal U.S. Wage Labor and Rural Development in Central Mexico.". *Human Organization, 40*, 56-66

Sánchez, B. (2004). El impacto de la emigración en Loja. In F. Hidalgo (Ed.), *Migraciones. Un juego con cartas marcadas* (pp. 341-365). Quito-Ecuador: Abya-Yala.

Smith, R. J., & Blundell, R. W. (1986). An Exogeneity Test for a Simultaneous Equation Tobit Model with an Application to Labor Supply. *Econometrica, 54*(3), 679-685.

Solimano, A. (2003). *Workers Remittances to the Andean Region: Mechanisms, Costs and Development Impact*. Paper presented at the Multilateral Investment Fund-IDB's Conference on Remittances and Development.

Staiger, D., & Stock, J. H. (1997). Instrumental Variables Regression with Weak Instruments. *Econometrica, 65*, 557 – 586.

Stark, N., & Markley, D. (2008). *Rural Entrepreneurship Development II: Measuring Impact on the Triple Bottom Line*: CFED & RIPRI.

Stuart, J., & Kearney, M. (1981). *Causes and Effects of Agricultural Labor Migration from the Mixteca of Oaxaca to California*: La Jolla: Program in United States Mexican Studies, University of California at San Diego.

Taylor, J. E. (1999). The New Economics of Labour Migration and the Role of Remittances in the Migration Process. *International Migration, 37*(1), 63-88.

Taylor, J. E., Arango, J., Hugo, G., Kouaouci, A., Massey, D. S., & Pellegrino, A. (1996). International Migration and Community Development. *Population Index, 62*(3), 397-418.

Taylor, J. E., & Martin, P. L. (2001). Human Capital: Migration and Rural Population Change. In B. Gardner & G. Rausser (Eds.), *Handbook of Agricultural Economics*. New York: Elsevier Science.

Taylor, J. E., & Mora, J. (2006). *Does Migration Reshape Expenditures in Rural Households? Evidence from Mexico*.

Wahba, J., & Zenou, Y. (2009). *Out of Sight, Out of Mind: Migration, Entrepreneurship and Social Capital*: IZA.

Wiest, R. E. (1979). Implications of International Labor Migration for Mexican Rural Development. In F. Camara & R. Van Kemper (Eds.), *Migration across Frontiers: Mexico and the United States*: Institute for Mesoamerican Studies, State University of New York.

Woodruff, C., & Zenteno, R. (2001). Remittances and Microenterprises in Mexico.

Wooldridge, J. M. (2002a). *Econometric Analysis of Cross Section and Panel Data* (2 ed.). Cambridge, MA: MIT. Press.

Wooldridge, J. M. (2002b). *Introductory Econometrics: a Modern Approach* (2 ed.): South-Western College Pub.

World Bank. (2006). *Global Economic Prospects. Economic Implications of Remittances and Migration*. Washington D.C.: World Bank.

Wouterse, F., & Taylor, J. E. (2008). Migration and Income Diversification Evidence from Burkina Faso. *World Development, 36*, 625-640.

Yang, D. (2005). International Migration, Human Capital, and Entrepreneurship: Evidence from Philippine Migrants' Exchange Rate Shocks. Ford School of Public Policy and Department of Economics, University of Michigan.

Table 1. Definitions and descriptive statistics of the variables.

Variable	Description	Mean	Std. Dev.
Dependent variables			
Business	Business ownership (0/1)	0.299	0.458
Family workers	Number of family workers	2.330	1.355
Non-family workers	Number of non-family workers	0.826	1.896
Treatment variables			
Migrant Household	At least one household member abroad (0/1)	0.064	0.245
Remittances	Monthy amount of remittances	17.684	94.934
Town remittances	Average remittances received by a household at town level	17.684	38.467
Control variables			
Age	Age of householdhead	50.885	16.061
Age squared	Squared age of household head	2,847.218	1,712.567
Sex	Female household head (0/1)	0.163	0.370
Indigenous	Indigenous household head (0/1)	0.212	0.409
Education	Years of education of household head	4.992	3.860
Education squared	Squared years of education of household head	39.827	58.133
Children	Number individuals younger than 16	1.768	1.792
Young men	Number of males ages 16-30	0.491	0.729
Young women	Number of females ages 16-30	0.506	0.687
Adult men	Number of males older than 30	0.855	0.559
Adult women	Number of females older than 30	0.875	0.572
HH education	Average household education	4.992	2.924
Owned land	Number of hectares of owned land	9.832	85.191
Owned land squared	Squared number of hectares of owned land	7,352.802	363,455.5
Owned home	Household owns home (0/1)	0.843	0.363
Electricity	Household has electricity (0/1)	0.869	0.337
Piped water	Household has piped water system (0/1)	0.331	0.470
Indoors water system	Household has indoors water system (0/1)	0.231	0.421
Credit	Household has received credit (0/1)	0.185	0.389
Distance to the closest road	Median of the distance to the closest road at provincial level in 2000	0.432	0.721
Time to the closest market	Median of the time to the closest market at provincial level in 2000	49.058	12.851

Note: The models also include provincial dummies.

Table 2. Explanatory power of instruments for migration for each of the output variables (business ownership, number of family workers and number of non-family workers).

	Migration (Business ownership)	**Migration (Family workers)**	**Migration (Non-family workers)**
Instruments:			
Number of children under grandparental care	0.350*** (0.095)	-	-
Unemployment rate 2001	-5.519*** (1.978)	-	-
Mono-parental household (0/1)	-	1.203*** (0.281)	1.159*** (0.278)
Cell phone availability (0/1)	-	0.441*** (0.135)	-
Migration rate 2001	-	-	4.377*** (0.902)
Joint significance of instruments (χ^2)	21.21***	29.49***	40.97***

Notes: Coefficients are shown with standard errors in parentheses. *, ** and *** stand for significance at the 10, 5, and 1% levels, respectively. Specifications also include all the variables shown in Table 1.

Table 3. Explanatory power of instruments for monthly remittances for each of the output variables (business ownership, number of family workers and number of non-family workers).

	Migration (Business ownership)	**Migration (Family workers)**	**Migration (Non-family workers)**
Instruments:			
Remittances from Spain (0/1)	81.404*** (9.371)	87.963*** (18.488)	153.292*** (23.111)
Remittances from EEUU (0/1)	-	-	95.924*** (17.748)
Gifts-clothes (0/1)	9.859*** (2.733)	20.572*** (5.748)	-
Joint significance of instruments (F)	46.63***	17.58***	35.71***

Notes: Coefficients are shown with standard errors in parentheses. *, ** and *** stand for significance at the 10, 5, and 1% levels, respectively. Specifications also include all the variables shown in Table 1.

Table 4. Explanatory power of instruments for the average remittances at town level for each of the output variables (business ownership, number of family workers and number of non-family workers).

	Town remittances (Business ownership)	**Town remittances (Family workers)**	**Town remittances (Non-family workers)**
Instruments:			
Number of internal migrants 2001	0.0001*** (0.00002)	-	0.0001*** (0.00003)
Average number of women 2001	14.551*** (2.886)	31.865*** (6.148)	-
Average internet users 2001	-	241.673*** (32.576)	-

Average number of absent household members 2001	-	-	98.754*** (16.951)
Joint significance of instruments (F)	43.13***	39.03***	40.82***

Notes: Coefficients are shown with standard errors in parentheses. *, ** and *** stand for significance at the 10, 5, and 1% levels, respectively. Specifications also include all the variables shown in Table 1.

Table 5. Joint significance of instruments for migration, monthly remittances and town remittances, when included as predictors for business ownership and, number of family and non-family workers.

	Business ownership		**Family workers**		**Non-family workers**	
	Joint significance	Prob $\chi^2>0$	Joint significance	Prob F>0	Joint significance	Prob F>0
Instruments for Migration	0.46	0.794	0.12	0.887	0.37	0.693
Instruments for Remittances	1.91	0.384	0.45	0.636	0.29	0.750
Instruments for Town remittances	0.63	0.731	0.66	0.517	1.17	0.312

Notes: Specifications also include all the variables shown in Table 1.

Table 6. Smith-Blundell test of exogeneity for migration, remittances and average town remittances the output variables (business ownership, number of family workers and number of non-family workers) under study.

Specification	**Business ownership**						**Family workers**						**Non-family workers**					
	1st		*2nd*		*3rd*		*1st*		*2nd*		*3rd*		*1st*		*2nd*		*3rd*	
	χ^2	Prob	χ^2	Prob	χ^2	Prob	F	Prob	F	Prob	F	Prob	F	Prob	F	Prob	F	Prob
Suspected endogenous variables:																		
Migration	0.009	0.922	0.864	0.352	0.543	0.461	1.286	0.256	1.424	0.232	0.888	0.346	0.119	0.729	0,071	0.789	0.240	0.623
Remittances	0.005	0.939	0.756	0.384	0.182	0.669	0.303	0.581	0.269	0.603	0.067	0.795	1.255	0.262	0.435	0.509	0.957	0.328
Town remittances	0.552	0.457	0.072	0.788	0.023	0.879	0.329	0.566	1.110	0.292	1.351	0.245	0.034	0.852	0.176	0.674	0.970	0.324

Notes:
1st specification: household and household head characteristics
2nd specification: household and household head characteristics, land and home ownership, credit, services, and road infrastructure
3rd specification: household and household head characteristics, land and home ownership, credit, services, road infrastructure and provincial dummies

Table 7. Impact of migration, remittances and town remittances on the likelihood of business ownership.

	Probit	**Robust S.E.**	**Marginal effects**
Migrant Household	0.0574	0.087	0.019
Remittances	-0.0003	0.0002	-0.0001
Town remittances	0.001	0.0006	0.0003
Age	0.012	0.008	0.004
Age squared	-0.0001**	0.00008	-0.00005
Sex	-0.104	0.072	-0.034
Indigenous	0.020	0.060	0.007
Education	0.033**	0.017	0.011
Education squared	-0.002**	0.0009	-0.0007
Children	0.017	0.013	0.005
Young men	-0.070**	0.029	-0.023
Young women	0.118***	0.031	0.040
Adult men	0.099**	0,050	0.033
Adult women	0.290***	0.042	0.098
HH education	0.066***	0.012	0.022
Owned land	-0.003***	0.001	-0.001
Owned land squared	0.0000***	0.0000	0.0000
Owned home	0.111*	0.058	0.036
Electricity	0.237***	0.077	0.075
Piped water	0.215***	0.050	0.074
Indoors water system	0.325***	0.055	0.114
Credit	0.187***	0.051	0.065
Distance to the closest road	-0.087	0.096	-0.029
Time to the closest market	0.005	0.004	0.001
Number of observations	4,753		
Wald χ^2	555.18		
Pseudo R^2	0.11		

Notes: *, ** and *** stand for significance at the 10, 5, and 1% levels, respectively. Specification also includes provincial dummies

Table 8. Impact of migration, remittances and town remittances on the number of family and non-family workers.

	Number of family workers		**Number of non-family workers**	
	Tobit	Marginal effects	Tobit	Marginal effects
Migrant Household	0.577*	0.279	0.815	0.113
	(0.306)		(0.620)	
Remittances	0.001	0.0005	-0.001	-0.0001
	(0.001)		(0.001)	
Town remittances	-0.001	-0.0008	0.0008	0.0001
	(0.002)		(0.004)	
Age	0.073**	0.033	-0.014	-0.001
	(0.037)		(0.078)	
Age squared	-0.0008**	-0.0003	-0.0002	-0.0002
	(0.0003)		(0.0007)	
Sex	-1.161***	-.450	-2.172***	-0.198
	(0.321)		(0.722)	
Indigenous	-0.076	-0.033	-1.284**	-0.134
	(0.251)		(0.608)	
Education	0.058	0.026	-0.126	-0.015
	(0.069)		(0.175)	
Education squared	-0.001	-0.0008	0.011	0.001
	(0.003)		(0.009)	
Children	0.052	0.023	-0.025	-0.003
	(0.065)		(0.144)	
Young men	0.383***	0.171	-0.243	-0.029
	(0.133)		(0.250)	
Young women	0.291***	0.130	0.318	0.038
	(0.111)		(0.234)	
Adult men	0.249	0.111	0.124	0.015
	(0.202)		(0.413)	
Adult women	0.557***	0.249	-0.367	-0.044
	(0.161)		(0.331)	
HH education	0.054	0.024	0.245**	0.029
	(0.045)		(0.110)	
Owned land	0.003	0.001	0.009	0.001
	(0.003)		(0.006)	
Owned land squared	-0.0000	0.0000	-0.0000	0.0000
	(0.0000)		(0.0000)	
Owned home	0.149	0.065	0.718	0.079
	(0.259)		(0.549)	
Electricity	-0.097	-0.044	1.057	0.107
	(0.030)		(0.909)	
Piped water	0.185	0.083	0.047	0.005
	(0.196)		(0.453)	
Indoors water system	0.351*	0.159	1.696***	0.226
	(0.202)		(0.478)	
Credit	0.174	0.079	0.445	0.056
	(0.189)		(0.449)	
Distance to the closest road	-0.075	-0.034	0.117	0.014
	(0.333)		(0.703)	
Time to the closest market	0.011	0.005	0.016	0.002
	(0.016)		(0.034)	
Number of observations	1425		1425	
Log-likelihood	-1,995.51		-984.08	
σ	2.629		4.218	

Notes: Coefficients are shown with standard errors in parentheses. *, ** and *** stand for significance at the 10, 5, and 1% levels, respectively. Specifications also include provincial dummies. Marginal effects are calculated for the unconditional expected value of the output variable.