



Essays on International Migration

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Introduction

International migration is a phenomenon that has been studied for a long time. In 2013, migrants numbered more than 230 million, representing 3.2 percent of the world population and this percentage is expecting to increase in the next years. The importance in understanding the complexity of this phenomenon is becoming central in the political debate, therefore this thesis would like to contribute in the economic literature exploring determinants and consequences related to the migration process.

In *Education and Migration: Empirical Evidence from Ecuador* I examine how the educational level attained by individuals affects their migration propensity. Using an original 2006 Ecuadorian survey, I implement a Regression Discontinuity Design and I control for potential endogeneity of the education explanatory variable with the 1977 school reform in Ecuador. I find that an increase in the educational level affects positively the migration propensity, consistent with theoretical models related to migrants' positive self-selection.

In *Does the Desire to Remit Foster Integration? Evidence from migrants in Spain* I enquire empirically how migrants' desire to send remittances back home fosters integration at destination. Starting from a model by Stark and Dorn (2013) in which the aspiration to remit is shown to induce migrants to acquire costly host-country specific social and human capital in order to obtain higher income I measure migrants' integration effort by social participation and I confirm the theoretical model.

In *The Less Extreme the More you Leave: Radical Islam and Willingness to Migrate* I present a model to explain how cultural traits affect the willingness to migrate, focusing in particular on the role played by radical Islam. Here, more radical values imply a higher psychological cost of migrating deriving from the fact that connections with socio-religious friends and neighbors are not maintained after migration, thus deterring individuals from migrating. I test the prediction of the model by using micro-level data from the Arab Barometer and I find that, *ceteris paribus*, more radical individuals are less willing to migrate. This finding is robust to alternative specifications of the model and to the use of econometric techniques aimed at addressing the potential endogeneity of radical Islam. The result is also qualitatively unchanged when using aggregate data on actual outflows of migrants.

In *Human capital and Remittances: Evidence from Ecuadorians in Spain* I study how education is related to the probability to remit (i.e., extensive margin) and the level of remittances (i.e., intensive margin). Using the Spanish National Immigrant Survey from 2007 and selecting migrants from Ecuador I find that there exists a negative association between remittances and migrants' educational level both at the extensive and intensive margin.

CHAPTER 1

Education and Migration Empirical Evidence from Ecuador¹

This study examines how the educational level attained by individuals affects their migration propensity. Using an original 2006 Ecuadorian survey, we implement a Regression Discontinuity Design and we control for potential endogeneity of education with the 1977 school reform in Ecuador. We find that an increase in the educational level affects positively the propensity to migrate. Considering both country-specific characteristics and gender differentials is evident a positive and significant effects both for male and for female. The results are consistent with theoretical models related to migrants' positive self-selection.

JEL classification codes: F22, J16, O15, I25

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1.1 Introduction

International migration is a phenomenon that has been studied for a long time. In 2013, migrants numbered more than 230 million, representing 3.2 percent of the world population.² According to the United Nations statistics, with specific reference to worldwide data, the percentages of female migrants rose from 1960 (46.7 percent) to 2013 (48 percent) and, at present, women comprise the majority of international migrants. The increasing participation of women in the process of migration supports specific economic issues related to the gender dimension of the determinants and consequences of migration (Beine and Salomone, 2013; Docquier et al., 2012). In this instance, education can be considered an important variable in deterring and influencing migration behavior, and it can also help in explaining gender differences.

Despite the fact that the literature on the brain drain has significantly evolved, little is known about the role of education in determining the migration propensity by gender Feliciano (2008). Part of the research has focused on the self-selection of male migrants, while a smaller part of the research is devoted to women. Our contribution aims at filling this gap through an analysis of the determinant effects in the migration process, such as education and gender at the micro level.

The literature on the brain drain and self-selection has produced conflicting results in terms of the migrants' educational skills. Migrants are positively selected based on several characteristics, including education (Chiquiar and Hanson, 2005; Feliciano, 2005; McKenzie and Rapoport, 2010). This positive self-selection is due to the fact that highly skilled individuals are more efficient in the migration process because of their higher utility regarding migration costs (Chiswick, 2000), which are decreasing with respect to an increase in educational levels (Chiquiar and Hanson, 2005).

Recently, two new macro level datasets containing information on the gender structure of high-skilled emigration in OECD countries (Docquier et al., 2008; Dumont et al., 2007) have confirmed the increasing participation of women in international migration and indicated that skilled women represent higher emigration rates than skilled men, suggesting that skilled women evidently have a higher propensity to emigrate. Following this ap-

²International Migration report from 2013 by the United Nations Statistics Division (UNSD), Department of Economics and Social Affairs, Population Division.

proach, the evidence indicates that the female migration rate for the non-OECD countries (88 percent of the total number of countries) is higher than that for males and this tendency is most pronounced for the highly skilled individuals. In particular, the migration rates of females with post-secondary education are, on average, 17 percent higher than those of males.³

This study makes the use of the Ecuadorian micro-level survey on employment and unemployment (*Encuesta Nacional sobre el Empleo y Desempleo en el Area Urbana y Rural* - ENEMDU, henceforth). Collected in December 2006, the survey provides data on resident and migrant members of the sampled households. The originality of this dataset is based on the quality of the information about individuals residing abroad for at least six months at the time of the survey. These information are available both for the rural and urban areas, respectively.

The main concern is the potential bias that could arise when considering education as exogenous. The decision to emigrate, in fact, might depend on unobservable factors. Moreover, there may exist confounding factors affecting the likelihood to migrate and education simultaneously. To address this issue, we implement a Regression Discontinuity Design (RDD) and take advantage of the 1977 educational reform in Ecuador that increased the years of compulsory schooling from six to nine years. In more detail, Law n. 1903 of RO 461 November 11, 1977⁴ came into effect on January 12, 1978 and increased the years of compulsory schooling from six years (primary education only) to nine years (six years of primary education and three years of lower secondary education). Therefore, individuals potentially affected by the reform were less than 14 years old in 1978. Indeed, those born in 1964 were required to stay only an additional year in school, while those born in 1965 (1966) had to stay in school for two (three) more years, and so on. Due to the reform, individuals were assigned additional schooling that depended on their date of birth (i.e., randomly with respect to their migration propensity). This enforcement supported the exogeneity of such schooling reform (Acemoglu and Angrist, 1991, 1999).

³Researchers have reported that a higher female educational attainment is related to lower fertility rates and improved health, where infant mortality rates tend to be lower and their children's educational attainment tends to be higher (Behrman and Deolalikar, 1987). Other studies have emphasized the role of female education in raising labor productivity and economic growth, suggesting that educational gender gaps are an impediment to economic development (World Bank, 2001).

⁴This 1977 Law was substituted by Law n.127 on April 15, 1983, but without any change in the years of compulsory school attendance.

Empirically, we find a positive self-selection so that the increase in the level of education can be treated as a ‘migration push factor’.

What is happening in Ecuador is a brain-drain effect, where the increase in the years of compulsory schooling seems to push its citizens toward the Northern countries, where socio-economic conditions are certainly better than in the country of origin. Moreover, analyzing the results by gender, both highly skilled men and women are positively related to the migration propensity underlying a positive and significant effect of an exogenous increase in education to migration behavior. This result is still more accentuated for men which may gain more from overseas economic opportunities.

The remainder of the paper is organized as follows. Section 2 presents a literature review that focuses on the relationship between migration and education, followed by the specific characteristics of migration in Ecuador. Section 3 outlines the data, descriptive statistics, and the identification strategy. Section 4 reports the first-stage, baseline, and RDD results, while Section 5 discusses the findings and concludes.

1.2 Literature Review

1.2.1 Relationship between Migration and Education

The literature on which we focus is related to the determinants of migration, in particular, to the role of education. Self-selection (i.e., how migrants are selected with respect to their educational level) and the brain drain (i.e., the international allocation of highly skilled migrants) are both widely explored topics in the context of development economics and are usually connected with wage differentials between the origin and destination countries.

In this instance, education can be considered as one of the main determinant of wages.⁵ However, the reasons to migrate can also be related to labor market distortions, which are identified as discrimination and gender differences at the individual level. Our study aims to find the main driver in the migration process decision whenever a selection based

⁵See Dustmann and Glitz (2011) for a review of the literature on education and migration when individuals make simultaneous decisions on their level of education and whether to migrate. The level of education attained at home depends on the possibility to migrate in the future (Beine et al., 2001; Mountford, 1997; Stark et al., 1997) The majority of the literature on migrant self-selection and the brain drain with respect to educational attainment analyze the pattern between Mexico and the United States (Chiquiar and Hanson, 2005; Ibarra and Lubotsky, 2007; McKenzie and Rapoport, 2010; Moraga, 2011).

on education emerges.

Starting from the human capital model of investment in migration (Sjaastad, 1962), educational self-selection presents various patterns depending on the migrant's skill profile (wage) both at his/her origin and destination, and whether the migration costs increase or decrease in accordance with individual skill level. In the theoretical model proposed by Sjaastad (1962), self-selection is mainly driven by wage differentials net of migration costs, and investments in human capital are probably as important or even more important than the migration process itself. The age variable influenced Sjaastad's results on earning differentials among occupations and locations. Following Sjaastad (1962), McKenzie and Rapoport (2010) proposed a new theoretical framework by which network effects were the main causes in shaping the self-selection pattern in the Mexico-US migration. They argued that networks act to lower migration costs by providing information that relaxes credit constraints so that there is evidence of negative self-selection in communities with stronger networks. These results also confirm Chiswick's (1999) model, where migration costs are lower for highly than for poorly skilled individuals; the pattern of self-selection should depend on the cost of the migration process for each individual in a given community and, by definition, networks lower the migration costs. Chiquiar and Hanson (2005) present a model where migration costs are assumed to decrease according to the level of schooling, even if the relative returns to skill levels are lower at the point of destination. Following Borjas (1991) theoretical model, they indicate that migrant selection in a country such as Mexico may be negative, intermediate, or positive, depending on the cost of migration and how this varies by skill. They argue that as the return to schooling is higher in Mexico, individuals with higher levels of education are less likely to migrate. One of the limits of their findings is the fact that intermediate or positive selections are only given in terms of observable characteristics, even if there is some evidence of the role of unobservable characteristics in the migration decision. Opposite results are found in Ibarra and Lubotsky (2007). Following Mexican 2000 census data, they found that lower-skilled Mexicans are more likely to migrate than higher-skilled Mexicans, thus supporting the negative self-selection of migrants. This is consistent with the fact that the possibility to obtain greater returns to skill levels in Mexico is an incentive for the better-skilled Mexicans to remain in Mexico and for the less-skilled Mexicans to migrate

to the United States. Borjas (1987) argued that individuals also migrate from countries with high earnings inequality to countries with low earnings inequality, underlining the negative self-selection in countries (whether there is a high return based on skill level or wage dispersion), as in the United States. A pattern of negative selection based on education emerges if the migrants' relative return is lower at their destination than in their country of origin. Using data on emigrant stocks by educational level and country of origin for OECD destinations, Grogger and Hanson (2011) found that a linear income maximization model could explain the relative return to education as a driver of migrant self-selection.

Focusing on the gender dimension, there is limited evidence to suggest that women are more positively selected than men when it comes to education. Kanaiaupuni (2000) shows that higher level of education raises the odds of female migration, but lowers the odds of male migration. Similarly, Feliciano (2008) indicates that female migrants from Mexico for the 1960-2000 period were more highly selected than male migrants. Using the Docquier et al. (2009) dataset, Docquier et al. (2012) find that conventional push factors affect women and men in different ways. As an example, there is a positive (negative) relation between female (male) emigration and the average human capital level in the origin country. Additionally, the distance from the origin country to the OECD country has a positive association with highly skilled female emigration but a negative association with men. Moreover, all of these aspects may be related to gender discrimination (Docquier et al., 2012) .

Following this argument, there is a possibility that women have an increasing propensity to migrate because they may have difficulties finding an adequate job in their original country, even with a college degree. In this case, discrimination would result in a positive selection for women.⁶ Recent literature, such as Bang and Mitra (2011) and Baudassé and Bazillier (2011), tried to aggregate various variables into indices of gender inequality and female economic opportunities related to the propensity for women to migrate. They

⁶As an exercise, following the idea of Borjas (1987) and the argument of Docquier et al. (2012) we can look at the Gender Discrimination Index (GDI), which is a Human Development Index that controls for gender. If women suffer relatively high levels of discrimination in one country (such as Ecuador) and experience relatively lower levels of discrimination in another country (such as the United States, Spain, or Italy), there are reasons to argue that women with a higher education will seek to migrate to places with better opportunities. In our case, GDI is equal to 0.44 in Ecuador, 0.25 in the United States, 0.10 in Spain, and 0.09 in Italy. Therefore, we can support this theoretical idea.

found that fertility rates and gender gaps in schooling are negatively related to female migration. In particular, a decrease in gender inequality is associated with higher female migration rates, especially for the highly skilled. Ferrant and Tuccio (2015) employ measures of discriminatory institutions from the OECD Development Centre. They show that variations in their measures of discriminatory institutions are significantly related to female migration but not to male migration. However, they do not focus on highly skilled individuals who migrate.

Until now, the majority of the literature has proposed analyses about whether education affects the migration propensity through other factors or channels (i.e., expected wage, migration costs, labor market distortions, etc.) or as an exogenous variable. The originality of our study is the fact that we consider education to be endogenous, and we solve the problem of possible bias in the results through the use of Instrumental Variable estimations.

There are few studies on the link between migration and education in Ecuador. However, the relevance in studying the Ecuadorian framework can be related to two main reasons. Ecuador has experienced an exodus of migrants that was driven by several economic crises since the late 1990s. Moreover, since 2000, more than 600,000 Ecuadorians have left the country to migrate to primary destinations that include the United States, Spain, and Italy (Bertoli et al., 2013, 2011; Jokisch and Pribilsky, 2002; Larrea, 2004).

In Bertoli (2010), the variety in the size of established migration networks across destinations, including their geographical variability within Ecuador, provides an important analytical opportunity to assess the role of past migrations in shaping current migration decisions. He supports the theoretical prediction that the increasing size of networks increases the likelihood or the extent of the migrants' negative self-selection with respect to education. Sorting Ecuadorian migrants across multiple destinations, he provides the opportunity to dismiss the concern that migration networks might correlate with unobserved county-specific factors that induce the migrants' negative self-selection based on education. Bertoli and Marchetta (2014) find evidence of a significant impact of migration on poverty among migrant households that is lower than if they had focused on the recipient households.

1.3 Data and Methods

1.3.1 Dataset and Descriptive Statistics

The empirical analysis is based on the ecuadorian labor market survey (*Encuesta Nacional de Empleo, Desempleo y Subempleo-ENEMDU*), collected by the Ecuadorian National Institute of Statistics (*Instituto Nacional de Estadística y Censos-INEC*). Starting in 2005, the INEC adopted a particular definition of household membership that included household members who reside outside the country. More specifically, they consider as (international) emigrant an individual who resides continuously, for more than six months, in another country. The peculiarity of this survey is on demographic information on current migrants which are provided by another household member who is still in Ecuador at the time of the survey. For our empirical analysis, we consider the December 2006 survey, which comprises both the urban and rural areas, and is designed to ensure that all 21 Ecuadorian provinces are represented. The estimation sample includes individuals from a particular age sample (36–48 years) that is minus and plus six years from the 1964 specific cutoff point considering the educational reform treatment.⁷

After accounting for missing values, we end up with a sample of 5573 households and 12122 individuals. Overall, the migrants represent 4.10 percent on the total population; 5.12 percent are men, whereas 3.17 percent are women. Table A.2 reports the general individual characteristics.⁸ 48 percent of individual in the sample have at least a lower secondary level of education with more than 8 years of schooling and, overall, almost 60 percent of individuals have been treated by the educational reform; they are equally distributed between male and female and 77 percent of them are married.⁹

International migrants are, on average, better educated, so they tend to stay in school until their 10th year; i.e., until they are almost 15 years. They have larger families than non-migrants and most of them come from urban areas (62 percent). These preliminary descriptive statistics are consistent with other empirical studies (Bertoli et al., 2013, 2011; Moraga, 2011).

⁷We provide a justification of this age sample in the identification strategy paragraph.

⁸In the Appendix the description of variables included in the analysis (Table A.1).

⁹In the descriptive statistics we include low secondary level of education with secondary level of education due to the low percentage of individuals declaring to have a low secondary school level only.

Table 1.1: Summary statistics: all sample

Variable	Mean	S.D.	N
Low secondary (d)	0.482	0.5	12122
Years of Schooling	8.491	5.071	12122
Female (d)	0.523	0.499	12122
Married (d)	0.771	0.42	12122
Elderly (d)	1.27	0.586	12122
Family size	5.232	2.281	12122
Children 0-5 (d)	0.355	0.479	12122
Children 6-12 (d)	0.582	0.493	12122
Children 13-15 (d)	0.422	0.494	12122
HHSD Log Income (avg)	4.282	0.976	11707
Employed (d)	0.802	0.398	12122
Urban Area (d)	0.579	0.494	12122
Reform 1978 (d)	0.582	0.493	12122

Notes: Authors' elaborations on ENEMDU 2006. (d) for discrete change of dummy variable from 0 to 1. Sample restricted to individuals aged 36-48.

In Table 1.2 we present descriptive statistics considering gender and migration status. In Panel A we describe the migrants' sample while in Panel B characteristics related to non migrants.

In general, both men and women migrants stay at school longer than non-migrants. Men are inclined to finish compulsory school; however, they do not attend additional years of schooling.¹⁰ In contrast, women, on average, stay in school for almost 11 years. Considering differences in marital status, a higher percentage of male and female non-migrants are married and the percentage level decreases substantially in the case of migrant women (59 percent versus 74 percent for non-migrant women). If we consider the household composition, there are no significant differences between migrants and non-migrants with the exception of migrant women who have fewer children within the household than non-migrant women. The coefficients are significant and similar to those for men. Differences emerge, even when considering family size: on average, one more member resides in a migrant household. This could be consistent with the fact that in the absence of one adult member due to migration, children or other family members from the original household

¹⁰To control for the variability of educational levels among migrants, and taking into account the destination countries, migrants to the United States have 10.1 years of education, while migrants to Spain and the rest of the world have 11.2 and 12.8 years of schooling, respectively (Bertoli, 2010).

Table 1.2: Summary Statistics

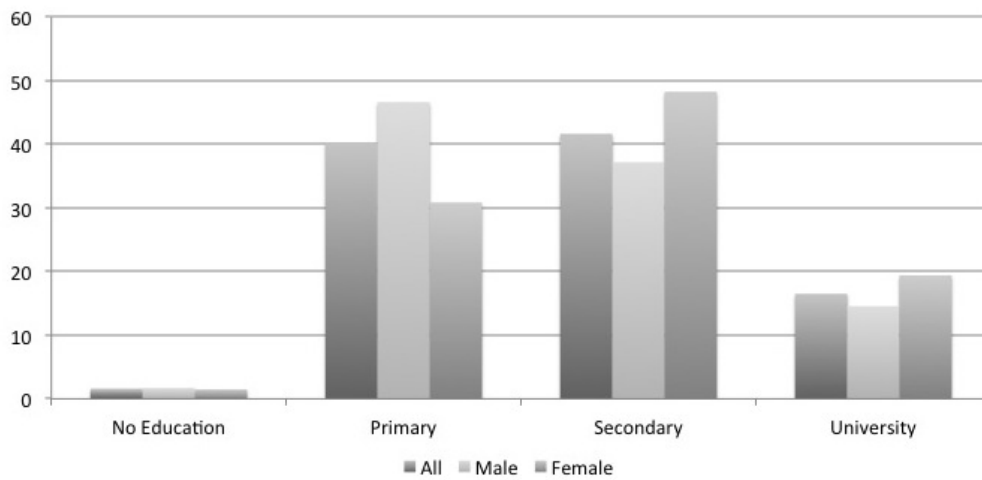
	All		Male		Female	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
<i>Panel A: Migrants</i>						
Low secondary (d)	0.58	0.49	0.52	0.50	0.68	0.47
Years of Schooling	9.65	4.45	9.17	4.35	10.37	4.51
Female (d)	0.40	0.49	0.00	0.00	1.00	0.00
Married (d)	0.68	0.47	0.74	0.44	0.59	0.49
Elderly (d)	1.82	0.84	1.75	0.82	1.94	0.85
Family size	5.99	2.50	5.82	2.22	6.25	2.85
Children 0-5 (d)	0.23	0.42	0.22	0.41	0.23	0.42
Children 6-12 (d)	0.43	0.50	0.46	0.50	0.38	0.49
Children 13-15 (d)	0.35	0.48	0.39	0.49	0.31	0.46
HHSD Log Income (avg)	4.05	1.13	3.97	1.07	4.17	1.21
Employed (d)	0.84	0.37	0.93	0.25	0.70	0.46
Urban Area (d)	0.62	0.49	0.59	0.49	0.66	0.47
Reform 1978 (d)	0.70	0.46	0.69	0.46	0.71	0.45
Obs.	497		296		201	
<i>Panel B: Non Migrants</i>						
Low secondary (d)	0.48	0.50	0.48	0.50	0.47	0.50
Years of Schooling	8.44	5.09	8.57	4.96	8.33	5.20
Female (d)	0.53	0.50	0.00	0.00	1.00	0.00
Married (d)	0.77	0.42	0.81	0.39	0.74	0.44
Elderly (d)	1.25	0.56	1.24	0.57	1.25	0.56
Family size	5.20	2.27	5.17	2.28	5.23	2.25
Children 0-5 (d)	0.36	0.48	0.38	0.49	0.34	0.47
Children 6-12 (d)	0.59	0.49	0.60	0.49	0.58	0.49
Children 13-15 (d)	0.42	0.49	0.41	0.49	0.44	0.50
HHSD Log Income (avg)	4.29	0.97	4.33	0.95	4.25	0.99
Employed (d)	0.80	0.40	0.97	0.17	0.65	0.48
Urban Area (d)	0.58	0.49	0.56	0.50	0.59	0.49
Reform 1978 (d)	0.58	0.49	0.57	0.50	0.59	0.49
Obs.	11625		5486		6139	

Notes: Authors' elaborations on ENEMDU 2006. (d) for discrete change of dummy variable from 0 to 1. Sample restricted to individuals aged 36-48.

join their extended family, which includes parents, grandparents, uncles, cousins, etc.

Figure 1 reports the educational levels attained before migration, differentiated between no education and by primary, secondary, and university educational levels. The percentage of non-educated migrants is similar for men and women, whereas the differences are more evident in terms of primary, secondary, and university educational levels. More than 46 percent of men have primary school level while 37 percent a secondary educational level, and the percentage decreases to 14.5 percent for the university level. Women have more secondary (48 percent) and university (19 percent) level education than men, and are therefore less represented than men in terms of primary education (30 percent).

Figure 1.1: Level of education before migration (% values)



Source: authors' elaborations on ENEMDU 2006. Sample restricted to individuals aged 36-48.

Considering international migrants, we find evidence that women are positively self-selected with respect to their upper educational levels. This is consistent with the fact that migrant women appear to remain at school for more years than men, presumably because, as noted by Docquier et al. (2012), the labor market is not able to absorb them, in particular, when they have attained a higher education.

Table 1.3 presents the difference in education by gender between those who were exposed to the 1977 educational reform and those who were not. We divide the sample into two groups: individuals aged 36-42 years and individuals aged 43-48 years. More specifically, treated migrants are more educated than non migrants expose to the reform. Looking at differences by gender, migrant women are, on average, more educated than

men, in particular, after the implementation of the reform. If we take into consideration non treated migrants, there is a significant difference between the percentage of men with secondary level of education versus women with the same level of education (28 percent and 55 percent respectively) but also in considering those with a university degree (23 percent and 7 percent respectively).

Table 1.3: Educational characteristics for migrants and non migrants

		Treated	Non Treated
<i>Panel A: Migrants</i>			
Male	No education	0.01	0.02
	Primary	0.46	0.47
	Secondary	0.41	0.28
	University	0.11	0.23
Female	No education	0.01	0.03
	Primary	0.29	0.34
	Secondary	0.45	0.55
	University	0.24	0.07
Total	No education	0.01	0.03
	Primary	0.39	0.42
	Secondary	0.43	0.38
	University	0.16	0.17
<i>Panel B: Non migrants</i>			
Male	No education	0.04	0.06
	Primary	0.45	0.48
	Secondary	0.34	0.28
	University	0.16	0.18
Female	No education	0.06	0.11
	Primary	0.43	0.49
	Secondary	0.33	0.24
	University	0.18	0.17
Total	No education	0.05	0.08
	Primary	0.44	0.48
	Secondary	0.34	0.26
	University	0.17	0.18

Notes: Authors' elaborations on ENEMDU 2006. Sample restricted to individuals aged 36-48.

Table 1.4 presents the employment status before migration by gender and by education levels. More than 87 percent of those with no education work and the percentage is even higher for those with a primary school level. Considering individuals with secondary education, almost 74 percent work while 13 percent do home work; more than 7 percent of them still go to school while almost 4 percent is employed and study at the same time. For those with a university level of education, an highest percentage is employed and almost 20 percent still study; however, there is a significant proportion of individuals looking for

a job (3.7 percent). Spitting the sample between men and women, 84.55 percent of men with a secondary level of education is employed, versus only 61 percent women with the same education level. The difference is a little bit smaller but still significant if we look at the university level whether 79 percent of men are employed versus 64 percent of women. However, 4.7 percent of men are looking for a job while only 2.6 percent of women and this is probably due to the fact that a higher percentage of women are studying, studying and working and also 2.6 percent of them are working at home.

Table 1.4: Employment status before migration

		No Education	Primary	Secondary	University
All Sample	Work	87.5	93.5	73.91	71.95
	Work and study	0	0	3.86	3.66
	Study	0	0	7.25	19.51
	Home work	12.5	5.5	13.04	1.22
	Looking for a job	0	1	1.93	3.66
Male sample	Work	100	100	84.55	79.07
	Work and study	0	0	5.45	0
	Study	0	0	6.36	16.28
	Home work	0	0	0.91	0
	Looking for a job	0	0	2.73	4.65
Female sample	Work	66.67	79.03	61.86	64.1
	Work and study	0	0	2.06	7.69
	Study	0	0	8.25	23.08
	Home work	33.33	17.74	26.8	2.56
	Looking for a job	0	3.23	1.03	2.56

Notes: Authors' elaborations on ENEMDU 2006. Sample restricted to individuals aged 36-48. All values are expressed as percentages.

1.3.2 Identification Strategy

As proposed by the literature, migration can be viewed as a selective process in which the decision to migrate is driven by individual and household characteristics that cannot be observed. Moreover, there may exist confounding factors affecting the likelihood to migrate and the individual level of education simultaneously. We address the potential endogeneity bias by using the Instrumental Variable (IV) strategy. We consider the 1977 reform as the IV and follow a RDD approach (Thistlethwaite and Campbell, 1960). Due to the reform, individuals were assigned additional schooling depending on their date of birth; i.e., randomly with respect to their migration propensity. This supports the exogeneity of a schooling reform (Acemoglu and Angrist, 1991, 1999).

The importance of the RDD strategy is that it can be related to all non-experimental settings, where individuals are assigned to a treatment group depending on the value taken by a specific variable (Lee and Lemieux, 2010). The RDD requires that a particular threshold for an observed characteristic defines the treated and non-treated groups. Furthermore, it assumes that individuals close to the cut-off point are identical in all of the characteristics, except for the assignment variable. In this case, the design is fuzzy, since compliance with the reform was not perfect and the reform was implemented gradually and with some difficulties. As proposed by the theoretical literature, the compliers are those individuals who, in the absence of the reform, would have dropped out of school at the age of 11, which was the minimum legal age.

First, we verify the presence of the discontinuity graphically¹¹, hence we implement the fuzzy' RDD strategy as follows:

$$M_g = \alpha_0 + \sigma_1 + \mu Edu_g + \alpha_1 X_g + \varepsilon_g \quad (1.1)$$

$$Edu_g = \beta_0 + \sigma_1 + \gamma Ref_g + \beta_1 X_g + u_g \quad (1.2)$$

Equation (1) is for the outcome variable; i.e., M_g is defined as a dummy variable, which is equal to 1 if an individual is a migrant and is equal to 0 otherwise, where g stands for gender ($g = 1$ for all samples, $g = 2$ for men, and $g = 3$ for women). Edu_g is the endogenous explanatory which assumes a value equal to 1 if a lower secondary school level of education is attained, 0 otherwise in the first part of the empirical analysis while it consists in the maximum number of years of schooling completed by each individual in the second. $Ref_g = I(Y \geq C)$ is a dummy for the reform eligibility with Y as the year of birth and C as the 1964 cut-off year (Duflo, 2001).¹² X_g is a vector of covariates, which includes individual characteristics, household characteristics and wealth controls¹³ while σ_1 is the province fixed effects to control for all unobserved cross-country heterogeneity. ε_g and u_g are two standard errors. As in Bratti and Braga (2013) we also controlled for two terms

¹¹See Figure 1.2 in the Appendix. Figures (2.a) and (2.b) report graphical representations that consider the whole population. Figures (2.d) and (2.f) show the ratio of men and women completing their lower secondary schooling by birth cohort. A discontinuity for the 1964 cohort is evident for both women and men. Figures (2.c) and (2.e) report the same information for years of schooling.

¹²So that if the reform was implemented in 1978 and individuals treated by the reform were 14 in 1978, the cut-off year is 1978-14. Hence, Ref_g is equal to 1 if the year of birth is greater or equal than 1964.

¹³See Table A.1 for a description of the variables included.

aimed to capture trends in the birth cohort related to the distance of the individual birth, to the reform. However, our sample age is more restricted than the one used in Bratti and Braga (plus and minus six years instead of plus and minus ten years), hence these two terms are not strictly necessary anymore.

1.4 Results

1.4.1 First Stage Results and Baseline Model

First, we report the results from our first-stage regressions to examine the effect of the 1977 reform on education in Ecuador. As described in Section 1.3.2, the reform was targeted to those students who would not have continued their education in the absence of the increased compulsory schooling age. Table 1.5 reports the results from equation (2), which is our first stage for the fuzzy RDD. We present estimates setting the pivotal cohort at 1964. We consider the 36–48 age sample and we add controls progressively (from column 1 to 3 and from column 4 to 6) considering individual characteristics, household characteristics and wealth proxy variables.¹⁴

Overall, the reform seems to have produced a significant positive effect on the probability of completing a lower secondary education which accounts for 36.5 percent point for women and 19.5 percent point for men, and also on an increase in years of schooling.¹⁵

Before showing the RDD results, we report Probit estimates with progressively larger sets of control variables as a benchmark for the empirical analysis (Table A.4). We consider the dependent variable to be a dummy equal to 1 if an individual is emigrant and 0 otherwise.¹⁶

Having a lower secondary educational level increases the migration propensity in line with the positive self-selection literature on migration behavior by almost 26 percent (col-

¹⁴The sample age range has been constructed by considering plus or minus six years around the cut-off point, 1964, and this is one of the possible age ranges considered by the literature on educational reforms. Another possibility is plus or minus 5, 10 or 15 years; in this case results are still robust to our specification and they are available upon request.

¹⁵The magnitude of the effect is higher if we compare our results with the reforms used by Lleras-Muney (2005) for the United States and the reform used by Braga and Bratti (2013) for Italy.

¹⁶From Pane A.1 to Panel C.1 the education explanatory variable is having at least a lower secondary level of education while from Panel A.2 to Panel C.2 is the maximum number of years of schooling completed. In Panel A.1 and Panel A.2 coefficients relative to all sample while in Panel B.1 and Panel B.2 we restrict the analysis on men only and on women in Panel C.1 and Panel C.2.

Table 1.5: First Stage Results

	Dependent variables					
	Low secondary			Years of Schooling		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: All sample</i>						
Reform 1978	0.246*** (0.025)	0.252*** (0.026)	0.706*** (0.081)	0.707*** (0.084)	0.710*** (0.085)	0.706*** (0.081)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
HHSD controls	No	Yes	Yes	No	Yes	Yes
Wealth controls	No	No	Yes	No	No	Yes
Obs.	12122	12122	11707	12122	12122	11707
<i>Panel B: Male sample</i>						
Reform 1978	0.177*** (0.036)	0.164*** (0.037)	0.421*** (0.115)	0.400*** (0.119)	0.339*** (0.121)	0.421*** (0.115)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
HHSD controls	No	Yes	Yes	No	Yes	Yes
Wealth controls	No	No	Yes	No	No	Yes
Obs.	5782	5782	5608	5782	5782	5608
<i>Panel C: Female sample</i>						
Reform 1978	0.314*** (0.035)	0.345*** (0.036)	0.995*** (0.114)	0.976*** (0.118)	1.065*** (0.120)	0.995*** (0.114)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
HHSD controls	No	Yes	Yes	No	Yes	Yes
Wealth controls	No	No	Yes	No	No	Yes
Obs.	6340	6340	6099	6340	6340	6099

Notes: Marginal effects. Robust standard errors in parentheses. (d) for discrete change of dummy variable from 0 to 1. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Individual controls: female, married, urban. HHSD controls: elderly, children 0-5 (d), children 6-12 (d), children 13-15 (d). Wealth controls: HHSD Log Income (avg), employed (d). Probit estimates in column 1-3 and Ordinary Least Squares estimates in column 4-6. All specifications include province FE.

Table 1.6: Probit estimates of the relationship between education and the likelihood to migrate

	Dependent variable Likelihood to Migrate		
	(1)	(2)	(3)
<i>Panel A.1: All sample</i>			
Low secondary edu. (d)	0.215*** (0.050)	0.167*** (0.053)	0.259*** (0.062)
Individual controls	Yes	Yes	Yes
HHSD controls	No	Yes	Yes
Wealth controls	No	No	Yes
Obs.	12034	12034	11619
<i>Panel B.1: Male sample</i>			
Low secondary edu. (d)	0.045 (0.069)	-0.001 (0.072)	0.116 (0.083)
Individual controls	Yes	Yes	Yes
HHSD controls	No	Yes	Yes
Wealth controls	No	No	Yes
Obs.	5733	5733	5170
<i>Panel C.1: Female sample</i>			
Low secondary edu. (d)	0.392*** (0.077)	0.340*** (0.083)	0.398*** (0.097)
Individual controls	Yes	Yes	Yes
HHSD controls	No	Yes	Yes
Wealth controls	No	No	Yes
Obs.	6208	6208	5968
<i>Panel A.2: All sample</i>			
Years of Schooling	0.023*** (0.004)	0.018*** (0.005)	0.031*** (0.006)
Individual controls	Yes	Yes	Yes
HHSD controls	No	Yes	Yes
Wealth controls	No	No	Yes
Obs.	12034	12034	11619
<i>Panel B.2: Male sample</i>			
Years of Schooling	0.009 (0.006)	0.005 (0.007)	0.024*** (0.009)
Individual controls	Yes	Yes	Yes
HHSD controls	No	Yes	Yes
Wealth controls	No	No	Yes
Obs.	5733	5733	5170
<i>Panel C.2: Female sample</i>			
Years of Schooling	0.034*** (0.006)	0.025*** (0.007)	0.032*** (0.008)
Individual controls	Yes	Yes	Yes
HHSD controls	No	Yes	Yes
Wealth controls	No	No	Yes
Obs.	6208	6208	5968

Notes: Marginal effects. Robust standard errors in parentheses. (d) for discrete change of dummy variable from 0 to 1. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Individual controls: female, married, urban. HHSD controls: elderly, children 0-5 (d), children 6-12 (d), children 13-15 (d). Wealth controls: HHSD Log Income (avg), employed (d). Probit estimates. All specifications include province FE.

umn 3 Panel A.1). A different behavior emerges between men and women: for the former, the effect is positive while not significant; for the latter is positive and significant at the 1 percent. Considering family characteristics, being married has a negative impact on the women's migration behavior. In contrast, being married can be viewed as a push factor for the men to improve their overall family wealth. A large family has a positive and greater effect on the probability that women will migrate rather than men because the Ecuadorian family structure is male-based. We disaggregate the number of children in the household into three groups (children younger than 4 years old, children between 5 and 12 years old, and children between 13 and 15 years old) to analyze different child care costs and the opportunity costs of migration. Our results indicate that having young children (from 0 to 5 years old and from 6 to 12 years old) within the household decrease the probability to migrate and this effect is even higher for women. Another aspect to consider is the negative coefficient of the income variable: the richer is the household, the less is the likelihood to migrate for members of that household and the magnitude of the coefficient is greater for women than for men.¹⁷

1.4.2 Education and Migration Propensity: RDD implementation

Although we have checked the robustness of our results according to the introduction of a number of control variables, the simple way to estimate the migration-education relationship through a linear analysis will be biased if our empirical model is affected by endogeneity concerns; therefore, it would not provide a consistent estimate of the impact of education on the emigration propensity by gender. To address the causal relationship, we estimate the system of equations (1) and (2) through the RDD strategy and implement a 2SLS-IV. As highlighted in the identification strategy paragraph, our IV is the 1977 Ecuadorian educational reform.

Table 1.7 shows the results when the explanatory variable is having at least a lower secondary education while Table 1.8 when we look at the number of years of schooling

¹⁷As a robustness check, we computed a measure of household assets by aggregating seven variables that provide information on the ownership of goods and characteristics of the household through principal component analysis (PCA) to convert a set of correlated variables into a set of uncorrelated variables called the Principal Component, i.e., the number of rooms in the house, including bathrooms; dummies signaling whether the household owns a motorbike, bicycle, or car and the number of personal computers that are in the house. Results are qualitatively identical. Extended results in the Appendix A.2.

as a measure of the acquisition in human capital. Both tables take into account gender differentials and area of origin. Results show the expected sign confirming the positive relationship that has been found in the baseline regression. An exogenous increase in human capital increases the propensity to migrate by 24 percent if the individual has at least a lower secondary level of education and, for one additional year of schooling, the likelihood to migrate increase by almost 3 percent. The effect is even higher and still significant at the 1 percent significance level for men. Splitting the sample between individuals coming from different areas, men from cities have a higher propensity to migrate with respect those from rural areas (44 percent and 27 percent respectively).

Looking at the control variables, it is interesting to notice that the household composition affects the behavior of men and women differently. Having children within the household has a higher negative impact on men than on women.¹⁸ Having elderly parents at home increases the probability of migration for women and the effect is significant at 1 percentage point while it is not significant for men. An opposite sign is found in the case of married status despite a non significativity of the coefficients: it is negative for men but positive for women. Finally, the more the household is rich, the less an individual will be incentivate to incur in the migration process and the relationship between the household wealth measure and the likelihood to migrate is more negative for men than for women.

¹⁸In the male case, it decreases the migration propensity by 4.4 percent if a child's age is between 0 and 5, while it is even higher if a child's age is in the range of 6 to 12 years old and it decreases which the increase in the child's age.

Table 1.7: RDD
 Estimates of the impact of having at least a low secondary level of education on the likelihood to migrate

	Dependent variable: Likelihood to Migrate											
	All						Men			Women		
	All (1)	Urban (2)	Rural (3)	All (4)	Urban (5)	Rural (6)	All (7)	Urban (8)	Rural (9)	All (7)	Urban (8)	Rural (9)
Low secondary	0.239*** (0.046)	0.236*** (0.064)	0.236*** (0.063)	0.368*** (0.111)	0.437** (0.209)	0.269** (0.111)	0.161*** (0.043)	0.165*** (0.055)	0.161** (0.066)	0.161*** (0.043)	0.165*** (0.055)	0.161** (0.066)
Female	-0.021*** (0.004)	-0.021*** (0.006)	-0.021*** (0.006)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Married	0.004 (0.006)	0.001 (0.008)	0.009 (0.009)	-0.015 (0.016)	-0.026 (0.027)	-0.003 (0.019)	0.005 (0.006)	0.004 (0.008)	0.005 (0.011)	0.005 (0.006)	0.004 (0.008)	0.005 (0.011)
Elderly	0.020*** (0.007)	0.014 (0.010)	0.026*** (0.010)	0.005 (0.016)	-0.014 (0.030)	0.023 (0.017)	0.026*** (0.008)	0.020* (0.011)	0.032*** (0.011)	0.026*** (0.008)	0.020* (0.011)	0.032*** (0.011)
Family size	0.016*** (0.002)	0.020*** (0.003)	0.012*** (0.002)	0.018*** (0.003)	0.026*** (0.009)	0.011*** (0.003)	0.015*** (0.002)	0.018*** (0.004)	0.012*** (0.003)	0.015*** (0.002)	0.018*** (0.004)	0.012*** (0.003)
Children 0-5 (d)	-0.033*** (0.004)	-0.033*** (0.006)	-0.034*** (0.006)	-0.044*** (0.008)	-0.043*** (0.013)	-0.047*** (0.011)	-0.024*** (0.005)	-0.027*** (0.008)	-0.021*** (0.007)	-0.024*** (0.005)	-0.027*** (0.008)	-0.021*** (0.007)
Children 6-12 (d)	-0.049*** (0.006)	-0.053*** (0.009)	-0.041*** (0.008)	-0.063*** (0.012)	-0.080*** (0.023)	-0.037*** (0.013)	-0.039*** (0.006)	-0.039*** (0.009)	-0.038*** (0.009)	-0.039*** (0.006)	-0.039*** (0.009)	-0.038*** (0.009)
Children 13-15 (d)	-0.022*** (0.004)	-0.029*** (0.006)	-0.015** (0.006)	-0.020** (0.008)	-0.027** (0.013)	-0.016* (0.009)	-0.024*** (0.005)	-0.031*** (0.007)	-0.014** (0.007)	-0.024*** (0.005)	-0.031*** (0.007)	-0.014** (0.007)
HHSD Log Income (avg)	-0.045*** (0.007)	-0.047*** (0.011)	-0.039*** (0.007)	-0.072*** (0.016)	-0.088** (0.035)	-0.054*** (0.013)	-0.027*** (0.007)	-0.029*** (0.010)	-0.023*** (0.008)	-0.027*** (0.007)	-0.029*** (0.010)	-0.023*** (0.008)
Employed	-0.011* (0.006)	-0.016* (0.009)	-0.004 (0.007)	0.002 (0.024)	-0.012 (0.035)	0.071*** (0.027)	-0.004 (0.006)	-0.009 (0.008)	0.003 (0.008)	-0.004 (0.006)	-0.009 (0.008)	0.003 (0.008)
Urban Area	-0.065*** (0.016)	0.000 (.)	0.000 (.)	-0.104*** (0.037)	0.000 (.)	0.000 (.)	-0.042*** (0.015)	0.000 (.)	0.000 (.)	-0.042*** (0.015)	0.000 (.)	0.000 (.)
Obs.	11707	6758	4949	5608	3170	2438	6099	3588	2511	6099	3588	2511

Notes: Marginal effects. Robust standard errors in parentheses. (d) for discrete change of dummy variable from 0 to 1. * p<0.10, ** p<0.05, *** p<0.01. 2SLS-IV estimates. All specifications include province FE.

Table 1.8: RDD
Estimates of the impact of an increase in years of schooling on the likelihood to migrate

	Dependent variable: Likelihood to Migrate											
	All						Men			Women		
	All (1)	Urban (2)	Rural (3)	All (4)	Urban (5)	Rural (6)	All (7)	Urban (8)	Rural (9)	All (7)	Urban (8)	Rural (9)
Years of Schooling	0.027*** (0.005)	0.037*** (0.012)	0.020*** (0.005)	0.052*** (0.018)	0.163 (0.215)	0.025** (0.010)	0.017*** (0.005)	0.021*** (0.007)	0.013** (0.005)	0.017*** (0.005)	0.021*** (0.007)	0.013** (0.005)
Female	-0.021*** (0.004)	-0.030*** (0.008)	-0.015** (0.006)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Married	-0.002 (0.007)	-0.009 (0.011)	0.005 (0.009)	-0.045* (0.026)	-0.220 (0.319)	-0.005 (0.018)	0.004 (0.006)	0.005 (0.008)	0.001 (0.010)	0.004 (0.006)	0.005 (0.008)	0.001 (0.010)
Elderly	0.011 (0.008)	-0.013 (0.019)	0.027*** (0.009)	-0.019 (0.025)	-0.210 (0.339)	0.025 (0.016)	0.021** (0.008)	0.009 (0.014)	0.031*** (0.011)	0.021** (0.008)	0.009 (0.014)	0.031*** (0.011)
Family size	0.018*** (0.002)	0.027*** (0.006)	0.013*** (0.002)	0.024*** (0.006)	0.077 (0.089)	0.012*** (0.003)	0.016*** (0.002)	0.021*** (0.004)	0.012*** (0.003)	0.016*** (0.002)	0.021*** (0.004)	0.012*** (0.003)
Children 0-5 (d)	-0.034*** (0.005)	-0.039*** (0.008)	-0.032*** (0.006)	-0.049*** (0.010)	-0.090 (0.084)	-0.044*** (0.010)	-0.024*** (0.005)	-0.028*** (0.008)	-0.022*** (0.007)	-0.024*** (0.005)	-0.028*** (0.008)	-0.022*** (0.007)
Children 6-12 (d)	-0.055*** (0.007)	-0.072*** (0.015)	-0.040*** (0.008)	-0.081*** (0.019)	-0.213 (0.231)	-0.040*** (0.014)	-0.041*** (0.007)	-0.046*** (0.011)	-0.037*** (0.008)	-0.041*** (0.007)	-0.046*** (0.011)	-0.037*** (0.008)
Children 13-15 (d)	-0.022*** (0.005)	-0.034*** (0.009)	-0.012** (0.006)	-0.020** (0.009)	-0.057 (0.065)	-0.013 (0.009)	-0.024*** (0.005)	-0.033*** (0.008)	-0.013* (0.007)	-0.024*** (0.005)	-0.033*** (0.008)	-0.013* (0.007)
HHSD Log Income (avg)	-0.061*** (0.010)	-0.092*** (0.027)	-0.039*** (0.007)	-0.115*** (0.033)	-0.390 (0.495)	-0.056*** (0.013)	-0.035*** (0.009)	-0.048*** (0.017)	-0.022*** (0.007)	-0.035*** (0.009)	-0.048*** (0.017)	-0.022*** (0.007)
Employed	-0.019*** (0.007)	-0.040*** (0.016)	-0.002 (0.006)	-0.008 (0.029)	0.075 (0.173)	0.041 (0.029)	-0.009 (0.006)	-0.022* (0.012)	0.003 (0.007)	-0.009 (0.006)	-0.022* (0.012)	0.003 (0.007)
Urban Area	-0.072*** (0.017)	0.000 (.)	0.000 (.)	-0.137** (0.054)	0.000 (.)	0.000 (.)	-0.043*** (0.015)	0.000 (.)	0.000 (.)	-0.043*** (0.015)	0.000 (.)	0.000 (.)
Obs.	11707	6758	4949	5608	3170	2438	6099	3588	2511	6099	3588	2511

Notes: Marginal effects. Robust standard errors in parentheses. (d) for discrete change of dummy variable from 0 to 1. * p<0.10, ** p<0.05, *** p<0.01. 2SLS-IV estimates. All specifications include province FE.

We find similar results looking at the individual number of years of schooling (Table 1.8). The relationship is positive implying that an increase in the number of years at school increases the probability to migrate, more for men than women. The reason for this may lie in the fact that overseas economic opportunity are still more male oriented and the cost of migration is still too high for women, even if their probability to migrate is positively related to an increase in education.

1.5 Conclusions

The idea of this study starts considering the literature on migrants' self-selection. Therefore, we explore the direction of the relationship between the individual level of education and the likelihood to migrate and hence, we try to go one step further giving a causal interpretation on such relationship. Even if the literature on the determinants of migration and brain drain has been widely explored, as far as we know there are no research works that aim to address the endogeneity of education. In fact, the decision to migrate may depend on different unobservable motivations. Using an original Ecuadorian survey conducted in 2006, we implement a Regression Discontinuity Design (RDD) and we explore the 1977 educational reform that increased the years of compulsory schooling from six to nine years exogenously so that ecuadorians were assigned additional schooling randomly, only with respect to their date of birth.

Empirically, we find that increasing the level of education can be treated as a migration push factor for individuals. Splitting the sample between men and women, and differentiating between urban and rural areas, the effect of additional schooling is positive and significant both for man and for women and this phenomenon is even accentuated for men implying that migration is still male oriented.

What is happening in Ecuador is a brain-drain effect, where the increase in the years of compulsory schooling seems to push its citizens toward the Northern countries, where socio-economic conditions are certainly better than in the country of origin.

Appendix

Table A.1: Variables description

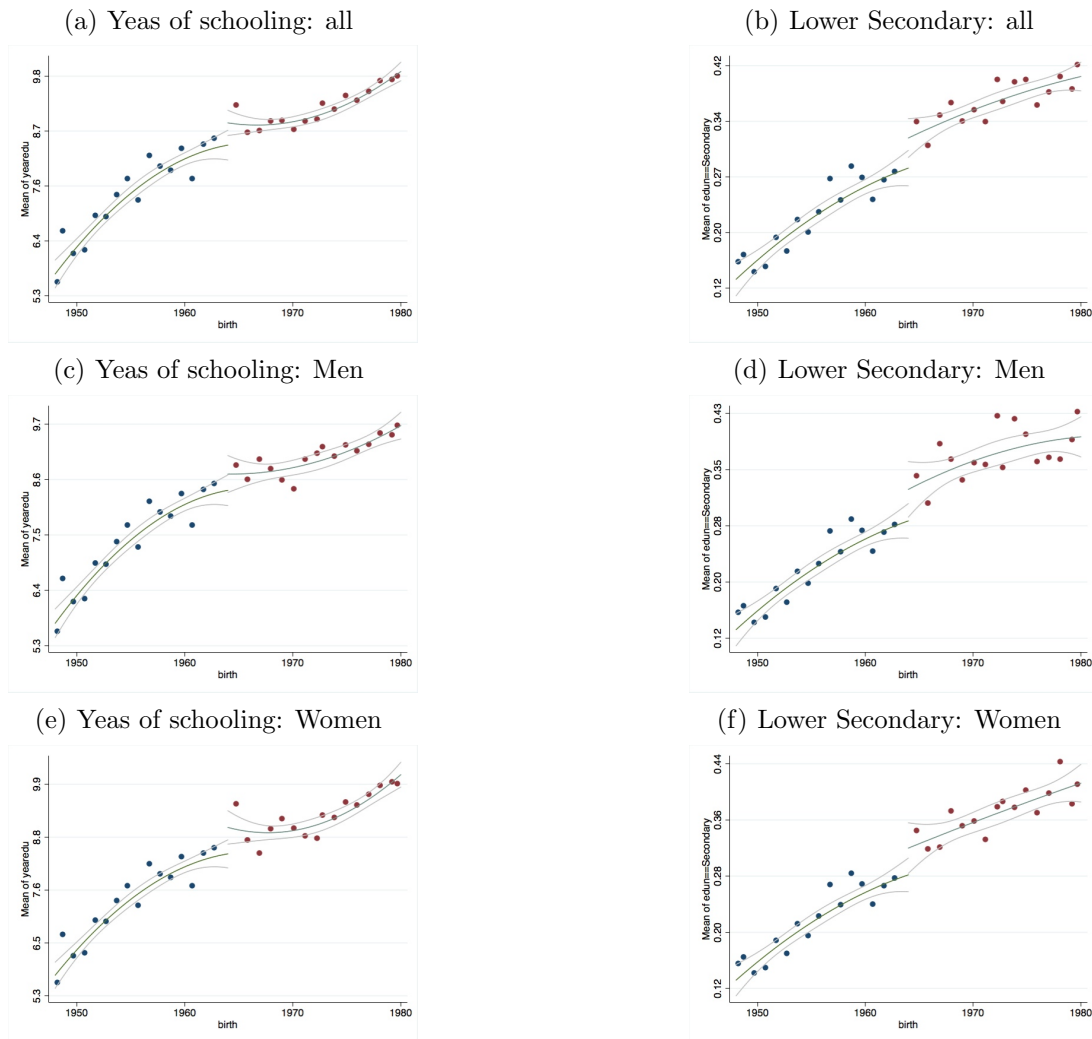
Variable	Description
Years of schooling	Maximum years of formal education of each individual in the household
Female (d)	dummy variable equal to 1 if the individual is woman, 0 if man
Married (d)	dummy variable equal to 1 if the individual is married, 0 if single
Elderly (> 60)	number of individuals with age > 60 within the household
Family size	number of household members
Children 0-5 (d)	dummy variable equal to 1 if there is a child with age 0-5 in the household, 0 otherwise
Children 6-12 (d)	dummy variable equal to 1 if there is a child with age 6-12 in the household, 0 otherwise
Children 13-15 (d)	dummy variable equal to 1 if there is a child with age 13-15 in the household, 0 otherwise
Employed (d)	dummy variable equal to 1 if the individual is employed, 0 if unemployed
HHSD Log Income (avg)	Log. of the average income at the household level
Urban Area (d)	dummy variable equal to 1 if the individual comes from urban area, 0 if rural area

Table A.2: Baseline estimates: extended results

	Dependent variable: Likelihood to Migrate					
	All	Men	Women	All	Men	Women
	(1)	(2)	(3)	(4)	(5)	(6)
Low secondary	0.259*** (4.19)	0.116 (1.40)	0.398*** (4.12)			
Years of Schooling				0.031*** (5.25)	0.024*** (2.75)	0.032*** (3.86)
Female	-0.277*** (-4.74)			-0.281*** (-4.80)		
Married	0.128* (1.66)	0.136 (1.13)	0.082 (0.79)	0.127 (1.64)	0.125 (1.03)	0.087 (0.84)
Elderly	0.383*** (9.36)	0.376*** (6.42)	0.399*** (7.02)	0.371*** (9.02)	0.363*** (6.15)	0.391*** (6.87)
Family size	0.145*** (10.75)	0.130*** (6.56)	0.167*** (8.61)	0.147*** (10.90)	0.134*** (6.73)	0.168*** (8.60)
Children 0-5 (d)	-0.464*** (-6.45)	-0.517*** (-5.21)	-0.421*** (-3.83)	-0.463*** (-6.47)	-0.521*** (-5.27)	-0.418*** (-3.83)
Children 6-12 (d)	-0.511*** (-8.14)	-0.494*** (-5.51)	-0.561*** (-6.21)	-0.519*** (-8.27)	-0.504*** (-5.65)	-0.563*** (-6.20)
Children 13-15 (d)	-0.197*** (-3.27)	-0.125 (-1.47)	-0.343*** (-3.80)	-0.196*** (-3.24)	-0.122 (-1.43)	-0.339*** (-3.77)
HHSD Log Income (avg)	-0.183*** (-5.54)	-0.277*** (-5.93)	-0.103** (-2.09)	-0.199*** (-5.87)	-0.298*** (-6.22)	-0.107** (-2.12)
Employed	0.011 (0.14)	-0.020 (-0.11)	0.052 (0.56)	-0.010 (-0.13)	-0.025 (-0.14)	0.033 (0.35)
Urban Area	0.139** (2.21)	0.219*** (2.58)	0.078 (0.79)	0.126** (1.99)	0.185** (2.17)	0.103 (1.06)
Obs.	11619	5170	5968	11619	5170	5968

Notes: Marginal effects. *t* statistics in parentheses. (d) for discrete change of dummy variable from 0 to 1. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Probit estimates in column 1-3 and Ordinary Least Squares estimates in column 4-6. All specifications include province FE.

Figure 1.2: RDD graphical representation



Notes: The sample includes observation from ENEMDU 2006. The left-hand side graphs includes observations born between 1950 and 1963 as non treated group; the right-hand side from 1964 to 1980 as treated group. 1964 is the cut-off year of birth as defined by the compulsory schooling reform - any individual born before this date is allow to drop out after 6 years of school, while anyone born after this year is required to complete 9 years of school. 95% confidence intervals are plotted with a gray lines around the mean level. Variables of interest: yeas of schooling that is the is the number of completed years of schooling; low secondary that is a dummy variable equal to 1 if the respondent has completed a lower secondary level of education.

Table A.3: RDD estimates: extended results

	All								
	Men					Women			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Low secondary	0.240*** (0.048)	0.289*** (0.053)	0.239*** (0.046)	0.404*** (0.124)	0.521*** (0.162)	0.368*** (0.111)	0.154*** (0.044)	0.193*** (0.045)	0.161*** (0.043)
Female	-0.018*** (0.004)	-0.018*** (0.004)	-0.021*** (0.004)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Married	-0.016*** (0.005)	0.004 (0.007)	0.004 (0.006)	-0.023** (0.010)	-0.010 (0.020)	-0.015 (0.016)	-0.016*** (0.006)	-0.001 (0.007)	0.005 (0.006)
Urban Area	-0.098*** (0.022)	-0.111*** (0.023)	-0.065*** (0.016)	-0.167*** (0.054)	-0.206*** (0.068)	-0.104*** (0.037)	-0.060*** (0.020)	-0.071*** (0.020)	-0.042*** (0.015)
Elderly		0.030*** (0.007)	0.020*** (0.007)		0.013 (0.019)	0.005 (0.016)		0.034*** (0.008)	0.026*** (0.008)
Family size		0.019*** (0.002)	0.016*** (0.002)		0.025*** (0.006)	0.018*** (0.003)		0.017*** (0.002)	0.015*** (0.002)
Children 0-5 (d)		-0.036*** (0.005)	-0.033*** (0.004)		-0.052*** (0.011)	-0.044*** (0.008)		-0.026*** (0.006)	-0.024*** (0.005)
Children 6-12 (d)		-0.037*** (0.005)	-0.049*** (0.006)		-0.042*** (0.012)	-0.063*** (0.012)		-0.035*** (0.006)	-0.039*** (0.006)
Children 13-15 (d)		-0.017*** (0.005)	-0.022*** (0.004)		-0.003 (0.010)	-0.020** (0.008)		-0.024*** (0.005)	-0.024*** (0.005)
HHSD Log Income (avg)			-0.045*** (0.007)			-0.072*** (0.016)			-0.027*** (0.007)
Employed			-0.011* (0.006)			0.002 (0.024)			-0.004 (0.006)
Obs.	12122	12122	11707	5782	5782	5608	6340	6340	6099

Notes: Marginal effects. t statistics in parentheses. (d) for discrete change of dummy variable from 0 to 1. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. 2SLS-IV estimates. All specifications include province FE.

Table A.4: RRD estimates: extended results

	All								
	Men					Women			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Years of Schooling	0.028*** (0.006)	0.033*** (0.006)	0.027*** (0.005)	0.059*** (0.022)	0.080** (0.033)	0.052*** (0.018)	0.016*** (0.005)	0.020*** (0.005)	0.017*** (0.005)
Female	-0.013*** (0.005)	-0.014*** (0.005)	-0.021*** (0.004)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Married	-0.016*** (0.005)	-0.005 (0.008)	-0.002 (0.007)	-0.031*** (0.012)	-0.061 (0.043)	-0.045* (0.026)	-0.015** (0.006)	-0.003 (0.007)	0.004 (0.006)
Urban Area	-0.118*** (0.027)	-0.132*** (0.028)	-0.072*** (0.017)	-0.248*** (0.095)	-0.319** (0.134)	-0.137** (0.054)	-0.068*** (0.023)	-0.078*** (0.022)	-0.043*** (0.015)
Elderly		0.022** (0.009)	0.011 (0.008)		-0.019 (0.036)	-0.019 (0.025)		0.029*** (0.008)	0.021** (0.008)
Family size		0.023*** (0.003)	0.018*** (0.002)		0.039*** (0.013)	0.024*** (0.006)		0.018*** (0.003)	0.016*** (0.002)
Children 0-5 (d)		-0.035*** (0.005)	-0.034*** (0.005)		-0.057*** (0.014)	-0.049*** (0.010)		-0.025*** (0.006)	-0.024*** (0.005)
Children 6-12 (d)		-0.037*** (0.005)	-0.055*** (0.007)		-0.048*** (0.016)	-0.081*** (0.019)		-0.034*** (0.006)	-0.041*** (0.007)
Children 13-15 (d)		-0.013*** (0.005)	-0.022*** (0.005)		0.013 (0.015)	-0.020** (0.009)		-0.022*** (0.005)	-0.024*** (0.005)
HHSD Log Income (avg)			-0.061*** (0.010)			-0.115*** (0.033)			-0.035*** (0.009)
Employed			-0.019*** (0.007)			-0.008 (0.029)			-0.009 (0.006)
Obs.	12122	12122	11707	5782	5782	5608	6340	6340	6099

Notes: Marginal effects. t statistics in parentheses. (d) for discrete change of dummy variable from 0 to 1. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. 2SLS-IV estimates. All specifications include province FE.

Does the Desire to Remit Foster Integration?

Evidence from migrants in Spain¹

We enquire empirically how migrants' desire to send remittances back home fosters integration at destination. Starting from a model by Stark and Dorn (2013) in which the aspiration to remit is shown to induce migrants to acquire costly host-country specific social and human capital in order to obtain higher income, we measure migrants' integration effort by social participation. Our results confirm the theoretical model.

Keywords: Migration, Remittances, Integration

JEL classification: F22, F24, D64

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2.1 Introduction

The world's economies have become more integrated, and the number of migrants is increasing continually. Spain received massive migration in the past decades. When being almost a closed economy during the Franco regime and the following years, the foreign-born population constituted only 1 percent in 1990. Upon opening up, migration started and in 20 years the corresponding percentage rose to reach over 12 percent in 2010. In the aftermath of the financial crisis and the current recession, migration decreased slightly, leading to a ratio of foreign-born population of 10 percent in 2014. Migrants come from all over the world especially from Romania, Morocco, and Ecuador. Hence, the integration of migrants into the host country is an important challenge for Spain as well as for other European countries. Taking into account that integration has several positive impacts for the migrants as well as for the receiving country, an important question is then: what fosters integration? Evidence concerning the integration of migrants suggests that in a good number of cases, migrants earn little in the early years after their arrival, but experience income growth and catch up with the natives after some years. Yet, while some migrants integrate and even outperform the natives, others do not. Strong family ties to the home country are often considered to hamper integration. Migrants may perceive their stay in the host country as temporary, and consequently expend little effort to integrate (Huntington (2004); Stark and Dorn (2013)). However, these ties also increase the desire to send remittances. Stark and Dorn (2013) develop a framework in which the opportunity to send remittances induces migrants to generate more income. The incentives to build up host country specific social capital increase which fosters integration. The higher the level of altruism of the migrant, the greater the desire to remit, and hence the effort to acquire social capital. In fact, migration is often at least partly motivated by the desire to remit to household members.

Integration is an outcome of a process. An important determinant is intercultural contact which can be viewed as a measure of migrants' integration effort (Achakra and Leon-Gonzalez (2015), Constant and Massey (2002), Nekby and Rödin (2010), Danzer and Ulku (2008)). Active social life can have positive spillovers not only on the employment

outcomes of individuals. It also reveals migrants ability to integrate socially.² However, the empiric evidence suggests that migrants are at a disadvantage in terms of social relations and tend to socialize less than natives (De Palo et al., 2006). It involves interaction within public and private spheres and these activities foster personal and collective identities (Couton and Gaudet (2008), Stark and Jakubek (2013)). Hence, it matches our understanding of integration as a process by which an immigrant acquires the culture and norms of the host country as well as destination specific social capital.

We seek to contribute both to the acculturation literature and to the remittances literature that, by and large, have been studied independently of each other. The theoretical foundation of our inquiry is the model by Stark and Dorn (2013) in which the aspiration to remit is shown to impact on economic behaviour at destination. The paper is organized as follows. The next section reviews the relevant theoretical and empirical literature. In Section 3 we describe our dataset and the main variables considered in the empirical analysis. Section 4 presents our empirical strategy and results. Section 5 concludes.

2.2 Literature Review

Although integration is often considered as a migrant optimal choice, it may be difficult to achieve. Integration increases migrants' productivity and earnings, and consequently affects positively their well-being. Yet, building up host-country specific social capital is costly. Integration may also increase immigrant's relative deprivation (Stark and Fan, 2007). If migrants compare themselves more with wealthy natives and less with other migrants upon integration, this reduces their satisfaction and hence the effort extended to integrate will decrease. Therefore, a strong link with the country of origin is perceived as a hindrance to integration. There is a growing empirical literature on the outcomes of integration positively associated with labour market performance (?) and psychological well-being (Phinney et al., 2001).

Empirical studies that examine the determinants of integration have commonly identified some relevant demographical features of migrants which, however, are impossible to

²Social integration may be defined as the acquisition of host country specific social capital due to interactions with the native population in the social sphere (Stark and Jakubek, 2013).

alter by the migrant.³

The literature related more specifically to our work is very limited. Using German data, Berger et al. (2004) provide evidence that participation in voluntary organisations is associated positively with integration. Yet, they do not analyse the determinants of social participation. Only a descriptive sociologic study by Castles and Miller (2003) focuses on the impact of ties to the home country on integration. The authors provide evidence that cross-border engagement may foster integration as migrants are induced to obtain higher income in order to remit. Our work contributes to the integration and remittances literature by testing a new theory among the relationship between them. Using social participation as a measure of migrants' integration effort, and in accordance to the Stark and Dorn (2013) model, our hypotheses are that (1) social ties with the home country should decrease social participation generally, but (2) the desire to remit should increase it. To the best of our knowledge, we are the first to evaluate empirically a new channel that may foster integration, namely the desire to send remittances.

2.3 Data and Descriptive Statistics

We use the Spanish National Immigrant Survey 2007 (Encuesta Nacional de Inmigrantes 2007, henceforth ENI) which is a retrospective micro database on non-native current residents of Spain.⁴ After accounting for missing observations and restricting the sample to individuals aged 18-65 and to those who arrived in Spain before 2006 we end up with a sample of 12,207 migrants. Migrants are on average 37 years old, their educational level is rather high with 75 percent have at least secondary education and 27 percent have obtained Spanish citizenship. Nevertheless, ties with the source country are strong. Almost 53 and 41 percent have left their mother or father, respectively, in the origin country, and 11 percent have at least one child left at home (Table A.2).

The two main variables of interest are remittances and social participation. The former is a dichotomous variable equal to one if the migrant has sent remittance in the year preceding the survey and zero otherwise. The latter is an aggregate variable equal to one

³For example, a higher education level and a longer time spend in the host country are associated with a higher integration probability while age has a U-shape impact.

⁴The survey was proposed by a university-based research team within the context of the Population and Society Research Network for the Spanish Statistical Office (INE) in July 2004.

Table A.1: Summary statistics by groups

	Full sample		Social Part.		Remit	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
<i>Controls</i>						
Female	0.54	0.49	0.53	0.49	0.53*	0.49
Age	37.3	10.76	39.7*	11.05	35.5*	9.2
Secondary Education	0.53	0.499	0.49*	0.50	0.55*	0.49
Tertiary Education	0.21	0.41	0.38*	0.48	0.15*	0.36
Years Abroad	12.2	11.7	16.1*	13.2	6.8*	4.8
Married	0.55	0.49	0.57	0.49	0.53*	0.49
Income	734.7	785.6	881.6*	1036.2	752.2*	614.2
Spouse at Origin	0.04	0.21	0.02*	0.14	0.09*	0.29
Child at Origin	0.10	0.31	0.06*	0.24	0.19*	0.39
Mother at Origin	0.52	0.49	0.41*	0.49	0.73*	0.44
Father at Origin	0.41	0.49	0.33*	0.47	0.55*	0.49
Brother at Origin	0.44	0.49	0.40*	0.49	0.55*	0.49
Number of Children at Home (Spain)	0.30	0.80	0.18*	0.63	0.55*	1.02
Employed	0.88	0.31	0.89	0.31	0.95*	0.21
<i>Instruments</i>						
Change in Income	0.21	0.77	0.20	0.91	0.22	0.55
Change in Unemployment	-0.08	0.08	-0.08	0.08	-0.08*	0.08
Number of Obs.	12207		1724		4928	

Notes: * Individuals belonging to the stated group (i.e. migrants who participate in the social activities or remit) are significantly different from those not belonging to these groups (two-sample t test, significance level 0.05).

if any of the following questions is answered affirmative: “Do you participate in any of the following groups or associations that are not specifically dedicated to foreigners? (1) NGO; (2) religious groups; (3) educational/ cultural groups; (4) sporting associations; (5) other social groups”.

Table A.2: Social participation by groups (in percent)

	(1)	(2)	(3)	(4)	(5)	SP
All migrants	3.70	2.20	3.68	5.03	2.80	14.12
Remitting migrants	2.31	2.37	2.08	2.82	1.90	9.74

For group definition see main text. SP is the aggregate variable of social participation.

Migrants who participate in the social activities or who send remittances differ significantly from those that do not (Table A.2 column 4 and 6). While the migrants belonging to the former group have spend on average a longer time in the host country and have less ties with the source country, the opposite holds true for remitting migrants.

2.4 Methodology

We seek to test an implication derived from Claim 1 in Stark and Dorn (2013): “A migrant who is altruistic enough to remit exerts more effort to assimilate than a non-remitting migrant”. Stark and Dorn (2013) propose to approximate integration⁵ by the extent to which migrants learn and acquire the culture, norms, and customs of the host country, hence the extent of social participation. The baseline model is specified as follows:

$$SP_i^* = \beta X_i + \alpha R_i + \sigma_r + \varepsilon_i, \quad (2.1)$$

where X_i refers to migrant characteristics that may affect integration behaviour. The level of education has an important impact and its quality depends on the country of origin. Hence, we include dummy variables for secondary and tertiary education but also its interaction with the classification of the country of origin.⁶ Moreover, X_i includes

⁵I.e., assimilation in Stark and Dorn (2013).

⁶The countries are classified as follows: “Developed countries”, “Andean countries”, “other Latin American countries”, “Africa”, “Rest of Europe, Asia and Oceania.”

ties to the home country as dummy variables indicating whether the mother, the father, children, brothers live in the home country. The term R_i measures the likelihood to remit. The vector σ_r are region of origin fixed effects, and ε_i is the standard error term. The dependent variable SP_i^* measures the extent of social participation. We construct a dichotomous variable SP_i capturing all possible forms of social participation. The term SP_i^* is a continuous underlying or latent variable. We do not observe it directly, but it has an observable realization of one if SP_i takes on a positive value, and zero otherwise:

$$SP_i = \begin{cases} 1 & \text{if } SP_i^* > 0 \\ 0 & \text{if } SP_i^* \leq 0 \end{cases} \quad (2.2)$$

In the absence of a random assignment, we use an instrumental variable approach (IV) that allows for identification of the effect of the aspiration to remit as follows:

$$R_i = \beta X_i + \gamma Z_i + \sigma_r + \epsilon_i, \quad (2.3)$$

where Z_i is a vector of instrumental variables. Here, identification of the causal effect (the local average treatment effect) relies on instruments that exploit information on the country of origin. As first instrument we use changes between 2007 and 2006 of the adjusted net national income per capita (current US\$) obtained from the WDI. As second instrument we create a variable measuring changes between 2007 and 2006 of total unemployment (% of total labour force) which refers to the share of the labour force that is without work but available for and seeking employment.⁷ A drop in the income level as well as a higher unemployment rate should induce altruistic migrants to send (more) money to their families.

2.5 Results

The probability of sending remittances is estimated in the first stage (column 1, Table A.3). The key instruments, “Change in Income (current)” and “Unemployment Change” are significant at the 0.05 and 0.01 percent level suggesting that instruments provide strong

⁷Sources: ILO, Key Indicators of the Labour Market database. We measure both instruments by changes from 2006 to 2007, namely $\frac{\text{var in 2007}}{\text{var in 2006}} - 1$.

support for identification. This suggests that the instruments provide strong support for identification. An endogeneity test confirms the necessity to identify causal effects: remittances are highly correlated with the error term in the main equation. The Hansen test does not reject that the error term is uncorrelated with the instruments, which suggests that our instruments are valid.

The second column of Table A.3 presents our main results. The larger the number of relatives who are left in the home country, the less likely the migrant participates socially. This is in line with the literature: strong ties to the home country reduce migrants' effort to integrate. Yet, the impact of remittances is positive. As predicted by Stark and Dorn (2013), the desire to remit induces migrants to participate socially.

If the first instrument "Change in Income" decreases by one standard deviation ($=0.77$) the likelihood to remit increases by 0.62 percentage points. An increase in the second instrument "Change in Unemployment" by one standard deviation (0.087) increases the likelihood to remit by 2.05 percentage points. This results in an increase in the likelihood to participate socially by 0.264 and 0.878 percentage points, respectively, which corresponds to an increase of 1.872 and 6.214 percent in relative terms. If the instruments are both altered by one standard deviation the increase is $1.872 + 6.214 = 8.086$ percent.

Social integration should be more relevant for younger and less educated migrants. We included interaction terms of "Remit" with "Age", a dummy indication old migrants (older than 45 years), and with secondary and tertiary education ("S" and "T"), respectively. Results provide weak support: the remittance coefficient is significant and larger in each regression indicating a stronger impact on the young and low educated. The interaction terms are - as predicted - all negative but not significant.⁸ As further robustness checks we added "Spanish Citizenship" as a control and additionally focused on non-citizen immigrants. Magnitude and significance are highly robust to the inclusion of the control. Focusing on this group reduces the sample by 27 percent. Results remain similar, but the impact of remittances is lower and less significant.⁹

⁸Regression results in the Appendix A.1, A.2 and A.3

⁹Regression results in the Appendix A.4 ($\hat{b}=0.263$, robust p-value= 0.070).

Table A.3: Integration and Remittances

	Dependent variables	
	Remit	Social Participation
Remit		0.429** (0.205)
Change in Income	-0.008*** (0.002)	
Change in Unemployment	0.234*** (0.051)	
Female	0.003 (0.007)	-0.017** (0.007)
Age	0.012*** (0.002)	-0.007** (0.003)
Age ²	-0.000*** (0.000)	0.000** (0.000)
Secondary Education (S)	-0.011 (0.012)	0.115*** (0.017)
Tertiary Education (T)	-0.058*** (0.014)	0.274*** (0.025)
Years Abroad	-0.008*** (0.001)	0.009*** (0.002)
Years Abroad ²	0.000*** (0.000)	-0.000*** (0.000)
Married	-0.017** (0.008)	0.016* (0.008)
Log Income	0.004*** (0.001)	-0.001 (0.001)
Spouse at Origin	0.155*** (0.018)	-0.085** (0.035)
Child at Origin	0.095*** (0.017)	-0.056** (0.024)
Mother at Origin	0.146*** (0.010)	-0.081*** (0.032)
Father at Origin	0.017* (0.009)	-0.012 (0.009)
Brother at Origin	0.043*** (0.008)	-0.016 (0.011)
Number of Children at Home (Spain)	0.067*** (0.007)	-0.036** (0.015)
Employed	0.173*** (0.013)	-0.086** (0.038)
R ²	0.362	-0.172
Obs.	12207	12207

Notes: Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. $F(2, 12176) = 15.43$; Hansen P-val = 0.266; Endogeneity P-val = 0.007. Regressions include a constant, region of origin dummies as well as its interactions with S and T.

2.6 Conclusions

Our study contributes both to the acculturation literature and to the remittances literature. Starting from the model of Stark and Dorn (2013), we test empirically how the desire to remit could become a new channel for fostering integration. Our results are in line with theoretical predictions, confirming that as the desire to send remittances induces migrants to obtain higher income, their incentive to build up host country specific social capital is strengthened, and integration is thereby intensified. Our results suggest that this channel is not only significant but relevant: if our two instruments are both altered by one standard deviation the likelihood to participate socially increases by 8.1 percent.

Appendix

Table A.1: IV Results: Second Stage with Interactions

<i>Interaction terms</i>	Dependent variable: Social Participation			
	None (1)	Age (2)	Age ₄₅ (3)	Education (4)
Remit	0.429** (0.205)	0.490* (0.252)	0.581** (0.258)	0.765** (0.369)
Female	-0.017** (0.007)	-0.016** (0.008)	-0.013 (0.008)	-0.016* (0.010)
Age	-0.007** (0.003)	0.006 (0.005)	0.002 (0.005)	-0.006* (0.003)
Age ²	0.000** (0.000)		-0.000 (0.000)	0.000** (0.000)
Secondary Education (S)	0.115*** (0.017)	0.123*** (0.022)	0.133*** (0.021)	0.145*** (0.029)
Tertiary Education (T)	0.274*** (0.025)	0.284*** (0.031)	0.288*** (0.028)	0.276*** (0.038)
Years Abroad	0.009*** (0.002)	0.011*** (0.004)	0.012*** (0.003)	0.008*** (0.003)
Years Abroad ²	-0.000*** (0.000)	-0.000* (0.000)	-0.000*** (0.000)	-0.000** (0.000)
Married	0.016* (0.008)	0.008 (0.008)	0.012 (0.009)	0.020** (0.010)
Log Income	-0.001 (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Spouse at Origin	-0.085** (0.035)	-0.087** (0.039)	-0.078** (0.037)	-0.119** (0.048)
Child at Origin	-0.056** (0.024)	-0.074** (0.035)	-0.084** (0.033)	-0.053* (0.029)
Mother at Origin	-0.081*** (0.032)	-0.105** (0.046)	-0.104*** (0.039)	-0.079** (0.034)
Father at Origin	-0.012 (0.009)	-0.023 (0.015)	-0.025* (0.013)	-0.013 (0.011)
Brother at Origin	-0.016 (0.011)	-0.023 (0.016)	-0.023* (0.014)	-0.018 (0.013)
Number of Children at Home (Spain)	-0.036** (0.015)	-0.031* (0.016)	-0.025 (0.016)	-0.043** (0.018)
Employed	-0.086** (0.038)	-0.104** (0.048)	-0.088** (0.040)	-0.104** (0.048)
Age ₄₅			0.257* (0.143)	
Age × Remit		-0.013 (0.015)		
Age ₄₅ × Remit			-0.586* (0.336)	
S × Remit				-0.601 (0.406)
T × Remit				0.191 (0.807)

Notes: Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.2: IV Results: First Stage with Interactions

Regression (as in Table 3)	(1)	(2)	(3)	(4)	(2)	(3)	(4)	(4)	(4)
	Remit	Remit	Remit	Remit	Age \times Remit	Age ₄₅ \times Remit	S \times Remit	T \times Remit	
Female	0.003 (0.007)	0.004 (0.007)	0.003 (0.007)	0.003 (0.007)	0.150* (0.091)	0.008** (0.004)	0.004 (0.006)	0.007* (0.004)	
Age	0.012*** (0.002)	-0.001 (0.001)	0.010*** (0.002)	0.012*** (0.002)	0.299*** (0.009)	0.016*** (0.002)	0.009*** (0.002)	0.001 (0.001)	
Age ²	-0.000*** (0.000)		-0.000*** (0.000)	-0.000*** (0.000)		-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	
Age ₄₅			-0.054*** (0.017)			0.375*** (0.016)			
Secondary Education (S)	-0.011 (0.012)	-0.007 (0.012)	-0.013 (0.012)	-0.003 (0.014)	0.751*** (0.211)	0.025*** (0.009)	0.068*** (0.009)	0.000 (0.002)	
Tertiary Education (T)	-0.058*** (0.014)	-0.055*** (0.014)	-0.059*** (0.014)	-0.063*** (0.016)	0.630*** (0.230)	0.005 (0.010)	-0.021*** (0.006)	0.041*** (0.010)	
Years Abroad	-0.008*** (0.001)	-0.007*** (0.001)	-0.008*** (0.001)	-0.008*** (0.001)	0.178*** (0.014)	0.003*** (0.001)	-0.007*** (0.001)	-0.002*** (0.001)	
Years Abroad ²	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	-0.006*** (0.000)	-0.000*** (0.000)	0.000*** (0.000)	0.000 (0.000)	
Married	-0.017** (0.008)	-0.010 (0.008)	-0.018** (0.008)	-0.017** (0.008)	-0.236*** (0.090)	-0.012*** (0.004)	-0.003 (0.006)	-0.005 (0.004)	
Log Income	0.004*** (0.001)	0.005*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.037*** (0.011)	0.002*** (0.000)	0.002*** (0.001)	-0.000 (0.000)	
Spouse at Origin	0.155*** (0.018)	0.154*** (0.018)	0.155*** (0.018)	0.154*** (0.018)	0.467* (0.267)	0.050*** (0.013)	0.035** (0.014)	0.015* (0.008)	
Child at Origin	0.095*** (0.017)	0.097*** (0.017)	0.094*** (0.017)	0.095*** (0.017)	-0.811*** (0.282)	-0.024* (0.014)	0.064*** (0.013)	0.018** (0.008)	
Mother at Origin	0.146*** (0.010)	0.154*** (0.009)	0.147*** (0.010)	0.146*** (0.010)	-0.662*** (0.114)	-0.001 (0.005)	0.091*** (0.007)	0.018*** (0.004)	
Father at Origin	0.017* (0.009)	0.019** (0.009)	0.017* (0.009)	0.017* (0.009)	-0.598*** (0.102)	-0.017*** (0.004)	0.011 (0.007)	0.007* (0.004)	
Brother at Origin	0.043*** (0.008)	0.043*** (0.008)	0.043*** (0.008)	0.043*** (0.008)	-0.310*** (0.100)	-0.000 (0.004)	0.022*** (0.006)	0.004 (0.004)	
Number of Children at Home (Spain)	0.067*** (0.007)	0.067*** (0.007)	0.067*** (0.007)	0.067*** (0.007)	0.726*** (0.116)	0.037*** (0.006)	0.029*** (0.005)	0.006** (0.003)	
Employed	0.173*** (0.013)	0.185*** (0.013)	0.173*** (0.013)	0.173*** (0.013)	0.064 (0.180)	0.042*** (0.007)	0.076*** (0.010)	0.031*** (0.006)	

Notes: Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3: IV Results: First Stage with Interactions - Continued

Regression (as in Table 3)	(1)	(2)	(3)	(4)	(2)	(3)	(4)	(4)	(4)
	Remit	Remit	Remit	Remit	Age \times Remit	Age ₄₅ \times Remit	S \times Remit	T \times Remit	T \times Remit
Change in Income (current)	-0.008*** (0.002)	-0.007*** (0.002)	-0.008** (0.003)	-0.007*** (0.001)	-0.010 (0.068)	-0.003** (0.001)	0.003*** (0.001)	0.001** (0.000)	0.001** (0.000)
Change in Unemployment	0.234*** (0.051)	0.229*** (0.051)	0.271*** (0.057)	0.175* (0.106)	1.073* (0.613)	0.136*** (0.017)	-0.076*** (0.029)	-0.023*** (0.009)	-0.023*** (0.009)
Age \times Change in Income		0.000 (0.000)			0.002 (0.007)				
Age \times Change in Unemployment		-0.005 (0.004)			-0.296*** (0.068)				
Age ₄₅ \times Change in Income			0.003 (0.003)			0.003 (0.008)			
Age ₄₅ \times Change in Unemployment			-0.164* (0.099)			-0.347*** (0.094)			
S \times Change in Income				-0.003 (0.003)			-0.014*** (0.001)	-0.000 (0.000)	-0.000 (0.000)
S \times Change in Unemployment				0.126 (0.128)			0.374*** (0.078)	0.013 (0.010)	0.013 (0.010)
T \times Change in Income				0.005 (0.004)			-0.009*** (0.001)	0.009* (0.005)	0.009* (0.005)
T \times Change in Unemployment				-0.025 (0.144)			0.079** (0.036)	0.156 (0.099)	0.156 (0.099)
R ²	0.362	0.360	0.362	0.362	0.364	0.785	0.489	0.489	0.419

Notes: Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4: IV Results: Second Stage

	Dependent variable: Social Participation		
	(1)	(2)	(3)
Remit	0.429** (0.205)	0.427** (0.205)	0.263* (0.145)
Female	-0.017** (0.007)	-0.017** (0.007)	-0.010 (0.008)
Age	-0.007** (0.003)	-0.007** (0.003)	-0.007** (0.003)
Age ²	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)
Secondary Education (S)	0.115*** (0.017)	0.112*** (0.017)	0.082*** (0.024)
Tertiary Education (T)	0.274*** (0.025)	0.273*** (0.025)	0.243*** (0.030)
Years Abroad	0.009*** (0.002)	0.008*** (0.002)	0.010*** (0.002)
Years Abroad ²	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Married	0.016* (0.008)	0.015* (0.008)	0.012 (0.008)
Log Income	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)
Spouse at Origin	-0.085** (0.035)	-0.084** (0.035)	-0.052** (0.025)
Child at Origin	-0.056** (0.024)	-0.056** (0.024)	-0.041** (0.020)
Mother at Origin	-0.081*** (0.032)	-0.079** (0.031)	-0.056** (0.023)
Father at Origin	-0.012 (0.009)	-0.011 (0.009)	-0.007 (0.008)
Brother at Origin	-0.016 (0.011)	-0.015 (0.011)	-0.008 (0.009)
Number of Children at Home (Spain)	-0.036** (0.015)	-0.036** (0.015)	-0.021** (0.010)
Employed	-0.086** (0.038)	-0.085** (0.038)	-0.063** (0.031)
Spanish Citizenship		0.023* (0.013)	
R ²	-0.172	-0.169	-0.060
Obs.	12207	12207	8860

Notes: Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Regressions include a constant, region of origin dummies as well as its interactions with S and T.

The Less Extreme the More you Leave Radical Islam and Willingness to Migrate¹

This paper presents a model to explain how cultural traits affect the willingness to migrate, focusing in particular on the role played by radical Islam. In our model, more radical values imply a higher psychological cost of migrating deriving from the fact that connections with socio-religious friends and neighbors are not maintained after migration, thus deterring individuals from migrating. We test the prediction of the model by using micro-level data from the Arab Barometer. We find that, *ceteris paribus*, more radical individuals are less willing to migrate. This finding is robust to alternative specifications of the model and to the use of econometric techniques aimed at addressing the potential endogeneity of radical Islam. The result is also qualitatively unchanged when using aggregate data on actual outflows of migrants.

Keywords: Migration, Culture and Economics, Radical Islam

JEL classification: F22, O15, C71, Z12

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3.1 Introduction

On January 7, 2015, 12 people were killed in a terrorist attack in Paris in the offices of *Charlie Hebdo*, a satirical French magazine well-known for its provocative cartoons lampooning politicians and religions. The political reaction from leaders around Europe and the international community was unanimous in condemning the terrorist attacks. At the same time, an anti-immigrant sentiment has spread around Europe, supported by populist and right-wing parties, who found in the attacks an opportunity to reclaim the need of closing borders to immigrants.

This paper studies radical Islam as a determinant of individuals' willingness to migrate. Surprisingly, despite its relevance in the political debate, this topic has not been investigated empirically in the literature. In order to fill this gap, we develop a model of the decision to migrate focusing on the role played by economic motives and cultural traits. We then test empirically the predictions of the model, using individual-level data from the second (2010-2011) and third (2012-2014) waves of the Arab Barometer.

Following Berman (2003), we define radical Islam as a set of ideologies, also referred to as *Political Islam*, holding that Islam should guide not only personal life, but also social and political life. In our model, more radical values imply a higher psychological cost of migrating. This cost derives from the fact that connections with socio-religious friends and neighbors are generally not maintained after migration, thus deterring individuals from migrating (Mayers, 2000).

Our work contributes to the literature on the individual-level determinants of the willingness to migrate (Borjas, 1987; Hagen-Zanker, 2008; Mayda, 2010) and the cultural determinants of economic outcomes (Fogli and Fernandez, 2009; Guiso et al., 2006, 2009; Tabellini, 2010). Although the literature on migration has studied extensively several economic factors affecting the individual willingness to migrate (i.e., employment and educational opportunities, expected income, relative deprivation, etc.), other non-pecuniary and cultural motivations, such as religion and religiosity, have been almost completely ignored. In fact, while some studies have looked at religiosity among migrants in their host country, there is little evidence about the association between migration aspirations and religiosity in the migrants' native country (Hoffman et al., 2015; Mayers, 2000; Stinner

et al., 1992). According to the migration literature, however, migration motivations can be described as a combination of push and pull factors.² While pull factors are those in the destination country attracting the individual to leave his home, such as prospects of net economic advantages, employment, family reunification (Harris and Todaro, 1970; Massey, 1994; Mayda, 2010; Sjaastad, 1962), push factors are forces driving the individual to move voluntarily from his own country, including conflict, drought, famine, or extreme religious activity. We consider radical Islam as a push factor affecting migration behavior in the Arab world.

One limitation of our empirical analysis is that we do not consider actual migration decisions, but individual willingness to migrate. Although other papers in the literature have already used this measure (Hoffman et al., 2015; Otrachshenko and Popova, 2014; Stinner et al., 1992), emphasizing the importance of studying its determinants (e.g., Berra, 2012), we are aware of the fact that willingness to migrate is not equivalent to the decision to migrate. Nevertheless, from an economic perspective, migration is often the result of a process involving several steps, that ends with the matching between individual willingness and actual opportunities to migrate (Docquier et al., 2014). Migration flows are therefore determined by the interaction between the pool of would-be migrants, i.e. people exerting a preference for migration, and actual migration opportunities. Unfortunately, the Arab Barometer does not contain measures of actual migration at the individual level. Therefore, we also provide evidence, at the aggregate level, indicating that radical Islam is correlated with actual migration. This additional evidence helps us to bridge the theoretical model of migration decisions with the empirical analysis of the effects of radical Islam on the willingness to migrate.

Our findings indicate that, controlling for a wide set of individual characteristics, more radical individuals are less willing to migrate. This result is robust to alternative specifications of the model and to the use of econometric techniques aimed at addressing the potential endogeneity of radical Islam. The key findings are also robust to the use of aggregate data on actual migrants' outflows.

The rest of the paper is organized as follows. Section 2 reviews the related literature.

²See among others Berger and Blomquist (1992); Dustmann (2003); Gibson and McKenzie (2012); Stark and Bloom (1985); Stark and Taylor (1991); Stark and Wang (2002).

Section 3 presents the theoretical framework. Sections 4 and 5 describe the data and methods, respectively. Section 6 presents the results. Section 7 concludes.

3.2 Related Literature

In the economic literature there is a growing body of research indicating that cultural factors play an important role for economic behavior (Fogli and Fernandez, 2009; Guiso et al., 2006, 2009; Tabellini, 2010). Recently, part of this literature has shown how religiosity affects, among other things, school attendance (Freeman, 1986), educational attainment of women (Lehrer, 2004), tax-morale (Torgler, 2006), corruption (Sommer et al., 2013), well-being (Gundlach and Opfinger, 2013; Opfinger, 2010), health (Ellison, 1991) and, most importantly, wages (Chiswick, 1983), income and growth (Barro and McCleary, 2003; Guiso et al., 2003).³

So far, the link between religion and migration has mainly focused on the effects of migration on religiosity at individual level (Bosswick and Husband, 2005; Connor, 2008; Smith et al., 1998). While Finke and Stark (1992) suggest that migration lowers religious participation, other studies emphasize the fact that migration increases an immigrant's spiritual consciousness and participation (Hagan and Ebaugh, 2003; Warner, 1998). Religion and religiosity among migrants in their home country can be considered a push factor influencing their willingness to migrate. The literature on this topic is relatively underdeveloped. Stinner et al. (1992) analyze how factors related to Mormon beliefs influence migration aspirations in Utah, finding that church-active individuals are less likely to migrate. Mayers (2000) finds that religious networks may not persist after migration, deterring individuals from migrating. Using data collected in 2007 among students enrolled in a high school program located in the state of Guanajuato (Mexico), Hoffman et al. (2015) focus on the extent to which internal and external religiosity influence migration aspirations of young individuals. Their findings indicate that, as external religiosity rises, the desire to work or live in the US falls. Furthermore, higher internal religiosity increases the desire to work or live in the US and plans to migrate.

³Weber (1930) started the discussion about religion and income, showing that the attitudes of protestants resulted in higher income growth.

3.3 Theory

In our theoretical framework, risk-neutral agents from country 0 (the source country)⁴ have to choose between migrating to country 1 (the host country), or staying in country 0. If an agent stays in country 0 he enjoys a (log) income w_0^s , where s are the years of schooling (with $\frac{\partial w_0}{\partial s} > 0$). If the agent chooses to move to country 1 he will enjoy a (log) income w_1^s (with $w_1^s > w_0^s$ and $\frac{\partial w_1}{\partial s} > 0$), but will face a cost C . This cost is composed of a material component (c_f , e.g., travel expenses) and a psychological component (c_p) deriving from experiencing a loss of cultural and religious customs determined by the adjustment to a new culture (Mayers, 2000). As in Akerlof (1980), this cost depends not only on the importance of values for the agent (V), but also on his sensitivity to the social norm imposing the respect of these values (ε), and on how much these values are widespread in the source country (β with $0 < \beta \leq 1$). c_p is therefore given by:

$$c_p = \beta\varepsilon V \quad (3.1)$$

with $\frac{\partial c_p}{\partial \beta} > 0$, $\frac{\partial c_p}{\partial \varepsilon} > 0$ and $\frac{\partial c_p}{\partial V} > 0$. The density function of ε , denoted by $f(\varepsilon)$, is assumed to be uniform with support on $[0, 1]$.

An agent will choose to migrate if the net benefit from migration is higher than income in the home country:

$$w_1^s - c_f - c_p > w_0^s \quad (3.2)$$

Therefore, given $c_p(\varepsilon, V, \beta)$, agents with a lower value of ε are more likely to emigrate. The critical ε which makes an agent just indifferent between emigrating or not is given by:

$$\varepsilon^* = \frac{w_1^s - w_0^s - c_f}{\beta V} \quad (3.3)$$

Denoting by α the willingness to migrate, and given the assumption that ε has a uniform distribution between 0 and 1, we have:

$$\varepsilon^* = \int_0^{\varepsilon^*} f(\varepsilon) d\varepsilon = \alpha \quad (3.4)$$

⁴With the population of the country normalized to unity.

Equation (3.3) indicates that the higher the (log) income in the source/host country, the lower/higher the willingness to migrate ($\frac{\partial\alpha}{\partial w_0^s} < 0$ and $\frac{\partial\alpha}{\partial w_1^s} > 0$); the higher the level of education, the higher the willingness to migrate ($\frac{\partial\alpha}{\partial s} > 0$, under the condition $w_1^s > w_0^s$); the higher the fixed cost of migration, the lower the willingness to migrate ($\frac{\partial\alpha}{\partial c_f} < 0$); and, finally, the higher the importance of values for the agent in the home country, the lower the willingness to migrate ($\frac{\partial\alpha}{\partial V} < 0$), with this effect being higher/lower, the higher/lower the share of agents adhering to these values (β).

It is reasonable to assume that an individual cultural value becomes a pull factor, rather than a push factor, when migration occurs towards countries where this value is more widespread than in the home country. In this case, an agent would compare the strength or the diffusion of the value in both countries and, on the basis of this comparison, he will choose whether to migrate or not. This is equivalent to assuming the presence of two psychological costs born by the agent when he chooses to migrate or not to migrate, respectively.⁵

The model also provides an explicit prediction on how the willingness to migrate is affected by the share of agents adhering to a specific value in the source country. Taking the partial derivative of (3.3) with respect to V , we obtain:

$$\frac{\partial\alpha}{\partial V} = -\frac{w_1^s - w_0^s - c_f}{\beta V^2} \quad (3.6)$$

The expression in (3.6) indicates that the effect of individual values on the probability to migrate is higher when these values are more widespread in the source country ($\frac{\partial^2\alpha}{\partial V\partial\beta} = \frac{w_1^s - w_0^s - c_f}{\beta^2 V^2}$).

3.4 Data

Our micro-level empirical analysis is based on the second (2010-2011) and third (2012-2014) waves of the Arab Barometer, a project developed by a network of regional barome-

⁵ Assuming that the psychological costs born by the agent when he chooses not to migrate is $c_{pnm} = \gamma\varepsilon V$ (where γ indicates how much radical values are widespread in the host country), the critical ε which makes an agent just indifferent between emigrating or not is given by:

$$\varepsilon^* = \frac{w_1^s - w_0^s - c_f}{(\beta - \gamma)V} \quad (3.5)$$

With: $\frac{\partial\alpha}{\partial\beta} < 0$ and $\frac{\partial\alpha}{\partial\gamma} > 0$

ters in Latin America, Sub-Saharan Africa, East and South Asia.⁶ The sample includes 9 countries⁷, covering 11,378 individuals for 2010-2011 and 11,425 individuals for 2012-2014, respectively. Face-to-face interviews were conducted using multistage random sampling. The questionnaire in the Arab Barometer included, among others, items on citizens' attitudes about public affairs and governance, religion and religiosity, social capital, family status, employment and economic morality. One key question on the intention to migrate was also included in the questionnaire ("Do you think about emigrating from your country?"). For ease of interpretation, we re-coded the original four-item migration variable into a dummy variable, with "I think about emigrating from my country" =1 and "I do not think about emigrating from my country" =0. Table A.2 reports summary statistics for all variables used in the empirical analysis.

Table A.1: Summary statistics, individual level

Variable	Mean	S.D.	Min.	Max.	N
Willingness to migrate	0.335	0.472	0	1	20971
Radical Islam	7.587	2.564	1	10	20133
Male	0.502	0.5	0	1	21614
Age	36.026	12.005	18	64	21614
Primary Education	0.303	0.46	0	1	21614
Secondary Education	0.479	0.5	0	1	21614
Tertiary Education	0.126	0.332	0	1	21614
Employed	0.474	0.499	0	1	21553
Log income US dollars	5.651	1.686	-2.289	14.33	18596
Internet Use	1.373	1.706	0	4	21331
Time West 1	0.032	0.175	0	1	21188
Time West 2	0.027	0.162	0	1	21188
Time West 3	0.017	0.131	0	1	21188
Time West 4	0.027	0.161	0	1	21188
General Trust	0.27	0.444	0	1	20889
Government Satisfaction	3.883	2.39	1	10	15584
Political interest	2.728	0.978	1	4	21425
Islamic Finance	3.104	0.913	1	4	19275
Religious Plurality	2.451	1.827	0	8	21614

Source: Author's elaboration on Arab Barometer. See Section 4 for a description of the variables.

Table 2 reports average willingness to migrate by country, gender, and educational level. For the 9 countries in the sample, 32% of the individuals report having thought

⁶<http://www.globalbarometer.net>.

⁷Algeria, Egypt, Iraq, Jordan, Lebanon, Palestine, Sudan, Tunisia and Yemen.

about emigrating from their country. There is substantial variability across countries, with Sudan having the highest score (54%) and Egypt the lowest one (16%).

Table A.2: Average willingness to migrate, by sub-sample

	Willingness to migrate
<i>Panel A: by country</i>	
Algeria	0.36
Egypt	0.16
Iraq	0.22
Jordan	0.30
Lebanon	0.42
Palestine	0.26
Sudan	0.54
Tunisia	0.21
Yemen	0.41
Total	0.32
<i>Panel B: by gender</i>	
Female	0.25
Male	0.39
Total	0.32
<i>Panel C: by educational level</i>	
No Education	0.18
Primary	0.29
Secondary	0.38
Tertiary	0.31
Total	0.32

Source: Author's elaboration on Arab Barometer.

We define radical Islam as a set of ideologies holding that Islam should guide social, political, as well as personal life. We measure radical Islam on the basis of three questions regarding subjects' opinion (on a scale from 1 to 4) about the use of Islamic law in the formulation of (1) penal laws, (2) personal status laws and (3) inheritance laws in their countries.⁸ Based on these three items, we created an additive scale index, ranging from 1 to 10, indicating the degree of individual radicalization. Principal component analysis was also conducted on the three items listed above, and the first component was extracted and used to assess the robustness of our results.

⁸“To what extent do you agree or disagree with each of the following principles in the formulation of your country's laws and regulations? The government and parliament should enact penal laws in accordance with Islamic law (1), The government and parliament should enact personal status laws (marriage, divorce) in accordance with Islamic law (2), The government and parliament should enact inheritance laws in accordance with Islamic law (3).”

In our empirical specifications we included among control variable individual socio-demographic characteristics (i.e., gender, age, etc.), the respondent's subjective evaluation of family income (Borjas, 1987; Chiquiar and Hanson, 2005; Gibson et al., 2011; Graves and Linnerman, 1977; Lauby and Stark, 1988; Massey et al., 1993; Stillman et al., 2015), employment status (Beine et al., 2001; Dustmann et al., 2015; Dustmann and Preston, 2011), education (Beine and Salomone, 2013; Dustmann and Fabbri, 2005; Dustmann and Glitz, 2011; Stark and Dorn, 2013), internet use (Castles and Miller, 2003; Hiller and Franz, 2004; Wellman et al., 2001) and trust. The estimated specifications also include a variable accounting for the time spent in Western countries ("During the past five years, did you spend time in a Western country?") and a variable accounting for subjective satisfaction with the government ("Suppose that there was a scale from 1-10 to measure the extent of your satisfaction with the government, in which 1 means that you were absolutely unsatisfied with its performance and 10 means that you were very satisfied, to what extent are you satisfied with the government's performance?") in order to control for systematic effects of institutional context.

Due to the fact that willingness to migrate does not necessarily imply actual migration, we conduct a secondary analysis using an original dataset composed by aggregate variables that are proxies of those used at the micro level. The sample includes 8 countries for 2010 and 2013.⁹ Table A.3 reports summary statistics.

In order to measure international migration outflows we use the percentage of actual migrants in 2010 and 2013 for the countries considered in the micro analysis.¹⁰ Radical Islam is the same variable presented above aggregated at the country level. We include among control variables per capita GDP (current US\$) in the country of origin,¹¹ life

⁹Algeria, Egypt, Iraq, Jordan, Lebanon, Sudan, Tunisia and Yemen. We do not include Palestina, as in the individual micro-level analysis, due to the lack of comparable macro-data among different data sources.

¹⁰United Nations, Department of Economic and Social Affairs (2010-2013). Trends in International Migrant Stock: Migrants by Destination and Origin (United Nations database, POP/DB/MIG/Stock/Rev.2010, POP/DB/MIG/Stock/Rev.2013).

¹¹Source: World Bank and OECD national accounts data files. GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

expectancy at birth¹² and the unemployment rate.¹³ Years of schooling is the average number of years of education received by people aged 25 and above.¹⁴ As an indicator of the level of democracy in these countries, we use the Democracy Index, based on 60 indicators grouped in five different categories measuring pluralism, civil liberties and political culture, calculated by the Economist Intelligence Unit for the period 2010-2013.

Table A.3: Summary statistics, aggregate level

Variable	Mean	S.D.	Min.	Max.	N
Outflow	0.359	0.197	0.12	0.76	16
AVG Radical Islam	7.461	1.686	3.472	8.952	16
Log GDP per capita (current US\$)	7.949	0.703	6.61	9.077	16
Life Expectancy	71.049	5.231	62.04	80.13	16
Unemployment	13.181	4.467	6.2	23.7	16
Mean years of schooling	6.188	2.376	2.5	9.9	16
Fractionalization	0.407	0.229	0.012	0.666	15
Democracy Index	3.775	1.073	2.38	5.82	16

Source: Author's elaboration using different dataset.

3.5 Methods

The theoretical model presented in Section 3 provides several testable predictions. First, being more radical decreases the willingness to migrate. Second, a higher income in the source country or a higher level of education leads to a lower willingness to migrate. Third, focusing on moderating factors, the effect of radical Islam on the intention to migrate is stronger in countries where this cultural trait is more widespread. Given these predictions, our empirical model can be specified as follows:

$$Emi_{ijt} = \alpha_0 + \alpha_1 S_{ijt} + \alpha_2 X_{ijt} + \sigma_c + \delta_t + \varepsilon_{ijt} \quad (3.7)$$

¹²Source: Derived from male and female life expectancy at birth from sources such as: (1) United Nations Population Division. World Population Prospects, (2) United Nations Statistical Division. Population and Vital Statistics Report (various years), (3) Census reports and other statistical publications from national statistical offices, (4) Eurostat: Demographic Statistics, (5) Secretariat of the Pacific Community: Statistics and Demography Programme, and (6) U.S. Census Bureau: International Database. Catalog Sources World Development Indicators.

¹³Source: International Labour Organization, Key Indicators of the Labour Market database. Catalog Sources World Development Indicators.

¹⁴Source: Barro and Lee (2013), UNESCO Institute for Statistics (2013b) and HDRO estimates based on data on educational attainment from UNESCO Institute for Statistics (2013b) and on methodology from Barro and Lee (2013).

with Emi_{ijt} equal to 1 if individual i has the intention to migrate or 0 otherwise, taking into account his country of origin j and the wave t (Drinkwater, 2003; Hoffman et al., 2015; Kule et al., 2002). S_{ijt} is an indicator of radical Islam ranging between 1 and 10. X_{ijt} is a vector of covariates including individual and household characteristics.¹⁵ σ_c and δ_t are country and time fixed effects, respectively, and ε_{ijt} is the individual-specific error term. The inclusion of country fixed effects allows us to hold constant institutional features such as labor market institutions and macroeconomic conditions.

First, we implement a Probit estimation due to the dichotomous structure of the dependent variable. However, Probit coefficients are likely to be biased since radicalism is potentially endogenous due to unobserved heterogeneity or simultaneity. It is possible, for instance, that when individuals face adverse life events that reduce their well-being, they are more willing to leave their home country and, at the same time, they become more radical in an effort to overcome such events. Therefore, we apply Instrumental Variable estimation (henceforth IV) in order to assess the causal interpretation of our results.

The identification strategy is based on the following two equations:

$$Emi_{ijt} = \alpha_0 + \alpha_1 S_{ijt} + \alpha_2 X_{ijt} + \sigma_c + \delta_t + \varepsilon_{ijt} \quad (3.8)$$

$$S_{ijt} = \alpha_0 + \alpha_1 Z_{ijt} + \alpha_2 X_{ijt} + \sigma_c + \delta_t + \varepsilon_{ijt} \quad (3.9)$$

where the outcome equation (3.8) describes the willingness to migrate Emi_{ijt} , as defined in (3.7), while equation (3.9) is the first step in the IV strategy and includes our selected instrumental variables Z_{ijt} .

The two instruments included in equation (3.9) refer to individuals' agreement (from 1 to 4) on the fact that (1) banks charging interest contradict the teachings of Islam, and (2) that difference and variation between Islamic scholars with regard to their interpretation of religious topics is not acceptable. The first instrument deals with the so-called "Islamic finance", a financial system that operates according to Islamic law (*Sharia*). The main principle of Islamic finance is its adherence to interest-free financial transactions. According to *Sharia*, money itself has no intrinsic value but it is simply a medium of exchange. This means that earning interests (*Riba*) is not allowed. We assume that the more

¹⁵See Section 4 for a detailed description of the variables.

radical people are, the more they agree with the principles of Islamic finance. The second instrument regards the very common controversy on religious pluralism in Islam. The *Qur'an* (the main religious text of Islam) and the *Hadiths* (the collections of the reports of the teachings, deeds and sayings of the Islamic prophet Muhammad), offer contradictory positions on religious pluralism. While some verses support religious pluralism, others discourage it. Traditionally, more radical people are less likely to accept religious pluralism. Both instruments are theoretically unrelated and empirically uncorrelated with willingness to migrate.¹⁶ The correlation between the instruments and the endogenous regressor is positive and the instruments are not perfectly collinear.

As suggested in Section 2, the economic literature closer to our work is the one that uses religiosity as a cultural trait determining several economic outcomes. This literature has either ignored the problem of endogeneity, or addressed it by using religious density at the country level (Gruber, 2005) as an instrument for individual religious participation. We do not use this instrument for two reasons. First, the level of radical Islam does not display much variation at country level. Second, for a cultural trait such as radical Islam, the link between the fraction of people adhering to a religion in a country and individual religiosity cannot be taken for granted. In a prominent paper, Durlauf et al. (2012) try to replicate the results of Barro and McCleary (2003) using, as instruments for religiosity, the following three indicators: a dummy variable for the presence of a State Religion in 1970, a dummy variable for the presence of State Regulation of religion in 1970, and a measure of Religious Plurality defined as 1 minus the Herfindahl index constructed from the Religion (adherence) Shares in 1970. Unfortunately, we cannot use these instruments, since they are available only for countries of Christian tradition.¹⁷

As an additional way of addressing the potential endogeneity of radical Islam, we implement Propensity Score (PS) matching estimations (Rosenbaum and Rubin, 1983). These are obtained by using either the Nearest Neighbor method, which selects the comparison units whose propensity scores are closest to the treated unit in question, or the

¹⁶In order to assess the robustness of our results, we have replicated the Instrumental Variable regression using as an instrument a dummy variable equal to 1 when respondents think that not praying is among the obstacles to accept their son/daughter/sister/brother's marriage. The results, available upon request, are qualitatively unchanged.

¹⁷As suggested by Barro and McCleary (2003) we could exploit the Religion and State (RAS) project dataset to use "Having an official Religion in 1990 or before" as an instrument for Religiosity. However, we would not have enough variability in our sample.

Kernel method, whereby every treated subject is matched with the weighted average of the control subjects, with weights being inversely proportional to the distance between the treated and the control group's propensity scores.¹⁸ In both cases, the computation of the ATT was restricted to the region of common support. Following Bryson et al. (2002), we preferred to estimate a more conservative model with a short list of covariates described in the Appendix. Sample balancing appears satisfactory. Results are reported in table A.2 in the Appendix and appear to be in line with Probit estimation results.

3.6 Results

3.6.1 The determinants of the willingness to migrate

Table A.4 (column 1-5) reports Probit estimation results¹⁹ considering five different specifications, with progressively larger sets of control variables. The first specification includes only standard socio-demographic characteristics, namely gender and age while the second accounts also for education and employment status. Model (3) includes income while model (4) the intensity of Internet use and the time spent abroad. Model (5) adds generalized trust, government satisfaction and political interest. In all specifications time and country dummies are included.²⁰ Consistently with theoretical predictions, radical Islam is negatively and significantly related to the willingness to migrate and the size of the coefficient for radical Islam is virtually unchanged across all five specifications. This result is robust to the use of an alternative indicator of radical Islam as described in Section 4 (see Table A.4 column (6)).

Males are more willing to migrate compared to females confirming that migration from the Arab world is male-dominated (Bommes et al., 2014). As we may expect, being employed is negatively related to the willingness to migrate (Fargues, 2004) whereas a positive relationship is found for the intensity of Internet use and the time spent abroad (Hiller and Franz, 2004). The coefficients for political and institutional outcomes are negative and significant, suggesting that the more satisfied people with the government or

¹⁸See Caliendo and Kopeinig (2008) for a discussion of trade-off among different matching algorithms

¹⁹Marginal effects multiplied by 100.

²⁰The use of larger sets of control variables reduces the sample size. However, it allows us to obtain a more complete characterization of the determinants of the willingness to migrate.

the more interested in politics, are the less willing to migrate (Stinner and Van Loon, 1992). Generalized trust is negatively and significantly related to the willingness to migrate. Interestingly, the level of education does not seem to have a clear effect on the willingness to migrate. This result seems to confirm the striking pattern underlined in Fargues (2013). According to this paper, current would-be migrants from the Arab world choose their destination according to their educational level. In particular, students and high-skilled workers consider predominantly as destinations French-speaking Canada and the United States while the less skilled, headed for Arab oil states in the Gulf. In fact, anticipating here the results in Table A.6, the effect of tertiary education on the willingness to migrate is negative and significant only in countries where actual migration outflows are directed towards the Gulf.

Table A.4 column (7) reports results of equation (3.7), while also adding an interaction term between radical Islam and its diffusion in the source country. In contrast with the theoretical model, the estimated coefficient is negative and not statistically significant.

Heterogeneous effects

Table A.5 reports Probit estimation results²¹ by sub-samples. The data-set is split according to respondents' gender and according to their educational level.

Analyzing the results by gender, the effect of radical Islam on the willingness to migrate is lower for women than for men. Employment status and monthly income are significant determinants of the willingness to migrate only for men. Intuitively, this result can be explained by the fact that Arab women are less active in the labor market with respect to their male counterparts.²² Women willingness to migrate is therefore likely to be driven by factors other than employment status. *Log income* can be interpreted as women empowerment suggesting therefore that richest women tend to think about migration as a possible way to further improve their social status. When considering the heterogeneous effect of radical Islam across educational levels a U-shape relationship between radical Islam and willingness to migrate is found.

As suggested by our theoretical model, radical Islam may be a pull factor, rather than

²¹Marginal effects multiplied by 100.

²²In our sample, only 23% of females declare to be employed (compared to 67% of men).

Table A.4: Determinants of the willingness to migrate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Radical Islam	-2.803*** (0.5)	-2.834*** (0.5)	-2.971*** (0.5)	-2.561*** (0.5)	-2.974*** (0.6)		-0.960 (0.7)
Radical Islam (2)						-4.961*** (1.1)	
Rad. Islam*Diffusion							0.006 (0.1)
Male (d)	46.902*** (1.9)	49.461*** (2.2)	49.545*** (2.5)	46.747*** (2.5)	49.129*** (3.1)	49.143*** (3.1)	15.843*** (1.0)
Age	-0.637 (0.5)	-0.146 (0.6)	-0.548 (0.6)	-0.246 (0.6)	-0.403 (0.8)	-0.403 (0.8)	-0.250 (0.2)
Age square	-0.020*** (0.0)	-0.024*** (0.0)	-0.018** (0.0)	-0.019** (0.0)	-0.017* (0.0)	-0.017* (0.0)	-0.003 (0.0)
Primary education (d)		1.169 (4.3)	1.583 (4.9)	1.926 (5.0)	-5.018 (6.1)	-5.002 (6.1)	-3.566** (1.7)
Secondary education (d)		19.560*** (4.2)	20.907*** (4.8)	13.285*** (4.9)	0.011 (6.2)	0.021 (6.2)	-1.974 (1.8)
Tertiary education (d)		11.052** (5.4)	20.545*** (6.2)	9.911 (6.4)	-6.141 (8.3)	-6.127 (8.3)	-4.376* (2.6)
Employed (d)		-7.357*** (2.4)	-7.594*** (2.6)	-10.164*** (2.7)	-10.850*** (3.2)	-10.841*** (3.2)	-4.014*** (1.0)
Log income US dollars			-1.611** (0.8)	-1.737** (0.8)	-1.532 (1.0)	-1.546 (1.0)	-0.424 (0.3)
Internet Use				7.668*** (0.7)	7.257*** (0.9)	7.264*** (0.9)	2.516*** (0.3)
Time west 1 (d)				13.130** (6.5)	16.687** (7.8)	16.683** (7.8)	6.547*** (2.5)
Time west 2 (d)				13.957** (7.1)	14.185 (8.8)	14.171 (8.8)	5.234* (2.8)
Time west 3 (d)				47.365*** (8.6)	45.900*** (10.4)	45.865*** (10.4)	16.298*** (3.4)
Time west 4 (d)				35.330*** (6.6)	35.606*** (7.9)	35.577*** (7.9)	12.779*** (2.6)
General Trust (d)					-32.122*** (3.1)	-32.127*** (3.1)	-9.399*** (0.9)
Government Satisfaction					-5.233*** (0.6)	-5.235*** (0.6)	-1.698*** (0.2)
Political interest					-5.615*** (1.5)	-5.617*** (1.5)	-1.702*** (0.5)
Obs.	19581	19533	16147	15824	11094	11094	11094

Note: Probit estimates (marginal effects multiplied by 100) from column 1 to 6. OLS estimate in column 7. Dependent variable: Willingness to Migrate. Standard errors in parentheses. (d) for discrete change of dummy variable from 0 to 1. * denotes significance at 0.10 level (** at 0.05, *** at 0.01). All specifications include time and country FE.

Table A.5: Determinants of the willingness to migrate

	Gender		Educational Levels			
	Female	Male	No Education	Primary	Secondary	Tertiary
Radical Islam	-1.274*** (0.3)	-0.811** (0.3)	-1.650*** (0.6)	-1.120*** (0.4)	-0.862*** (0.3)	-2.013** (1.0)
Male (d)			15.606*** (3.5)	17.850*** (1.9)	13.873*** (1.4)	35.167*** (3.4)
Age	-0.239 (0.3)	0.150 (0.4)	0.802 (0.7)	0.044 (0.4)	-0.027 (0.4)	-1.016 (1.0)
Age square	-0.000 (0.0)	-0.012** (0.0)	-0.013 (0.0)	-0.006 (0.0)	-0.009 (0.0)	-0.000 (0.0)
Primary Education (d)	1.703 (2.7)	-5.260 (3.2)				
Secondary Education (d)	6.002** (2.7)	-6.011* (3.3)				
Tertiary Education (d)	-1.627 (3.5)	-3.405 (4.2)				
Employed (d)	-0.165 (1.4)	-8.886*** (1.7)	1.481 (3.2)	-4.871** (2.0)	-4.816*** (1.6)	0.310 (4.2)
Log income US dollars	0.177 (0.4)	-1.337*** (0.5)	0.804 (0.9)	-0.564 (0.5)	0.443 (0.5)	-1.724 (1.7)
Internet Use	2.472*** (0.4)	2.232*** (0.4)	1.357 (1.2)	2.107*** (0.6)	2.273*** (0.4)	4.020*** (1.2)
Time west 1 (d)	5.242 (4.1)	6.145 (4.0)	8.556 (10.2)	-0.512 (5.5)	7.766* (4.0)	2.853 (8.5)
Time west 2 (d)	2.573 (4.3)	6.505 (4.5)	25.295 (20.0)	-1.260 (5.2)	5.546 (4.6)	10.774 (9.9)
Time west 3 (d)	17.415*** (5.9)	14.361** (5.6)	3.228 (11.8)	22.868*** (7.9)	11.450** (5.8)	30.624*** (10.0)
Time west 4 (d)	9.556** (4.7)	14.696*** (3.9)	-0.954 (9.9)	19.163*** (5.5)	12.499*** (4.5)	0.906 (8.0)
General Trust (d)	-9.489*** (1.2)	-11.528*** (1.5)	-14.168*** (2.6)	-9.016*** (1.6)	-10.739*** (1.5)	-15.735*** (3.4)
Government Satisfaction	-1.532*** (0.3)	-1.995*** (0.3)	-1.409** (0.6)	-1.889*** (0.4)	-1.991*** (0.3)	-0.782 (0.9)
Political interest	-3.633*** (0.7)	-0.278 (0.7)	-3.315** (1.4)	-1.587* (0.9)	-1.714** (0.7)	-1.288 (1.8)
Obs.	5333	5761	847	3669	5628	940

Note: Probit estimates (marginal effects multiplied by 100). Dependent variable: Willingness to Migrate. Standard errors in parentheses. (d) for discrete change of dummy variable from 0 to 1. * denotes significance at 0.10 level (** at 0.05, *** at 0.01). All specifications include time and country FE.

a push factor, when migration is directed to countries where this value is more widespread than in the home country.²³ Even though in our data there is no indication of the actual migration status of respondents and of their country of destination, we know that the individual willingness to migrate represents the first step in the migration process and, therefore, we can assume that the destinations of would-be migrants are the same as those of actual migrants. We expect a positive or negligible effect of radical Islam on the willingness to migrate when the destination country is more or equally radical than the home country and *vice versa*. Thus, by gathering information from the United Nations data on actual migration, we can see whether there are heterogeneous effects of radical Islam on the willingness to migrate according to the destination countries. In particular, we split the sample into two groups: the first includes countries for which a consistent actual migration outflow is directed towards the Gulf Cooperation Council countries (GCC)²⁴ which historically has been characterized by high levels of radicalism (Dekmejian, 1994), while the second includes countries for which a consistent actual migration outflow is directed towards Western Countries.²⁵

Table A.6 reports the results of the analysis described above. As predicted by our theoretical model, radical Islam has a significant negative effect on willingness to migrate. This effect is higher when the destination country is less radical than the source country with respect to the case where the destination country is more or equally radical than the source country.

3.6.2 Addressing causality

Table A.7 reports the IV estimation results. The instrumental variables are both jointly and individually significantly related to radical Islam. As expected, the first instrument (*Financial Islam*) is positively related to radical Islam, while the second (*Religious pluralism*) is negatively related to the dependent variable. In addition, the validity of the

²³Radical Islam becomes a pull factor also when it is used as transnational tie to connect people sharing the same ideology while residing in different countries (Gul, 2010). Given the nature of our data, we are not able to identify the latter effect. However, with the following exercise, we can empirically disentangle the former by looking at the historical patterns of migration in the area under consideration.

²⁴The Gulf Cooperation Council is composed by: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates (UAE).

²⁵This classification is consistent with Fargues (2013). According to UN data, in 2013 14% of the total outflow from Egypt, 13% from Jordan and 15% from Yemen was directed to GCC countries.

Table A.6: Determinants of the willingness to migrate by destinations

	Not to Gulf Countries	To Gulf Countries
Radical Islam	-1.557*** (0.4)	-0.839*** (0.3)
Male (d)	16.550*** (2.0)	17.046*** (1.3)
Age	-0.067 (0.4)	0.271 (0.3)
Age square	-0.011** (0.0)	-0.010*** (0.0)
Primary Education (d)	1.299 (4.0)	-2.823 (2.5)
Secondary Education (d)	2.820 (4.2)	-0.727 (2.5)
Tertiary Education (d)	8.005 (6.4)	-6.299** (3.0)
Employed (d)	-9.812*** (2.2)	-1.115 (1.4)
Log income US dollars	-3.382*** (0.6)	-1.263 (0.8)
Internet Use	0.859 (0.6)	3.205*** (0.4)
Time west 1 (d)	1.716 (4.5)	9.569** (4.4)
Time west 2 (d)	-1.155 (5.5)	7.843 (4.9)
Time west 3 (d)	12.314* (6.4)	25.691*** (5.9)
Time west 4 (d)	17.129*** (4.7)	10.271** (4.3)
General Trust (d)	-8.200*** (2.3)	-11.522*** (1.2)
Government Satisfaction	0.371 (0.5)	-2.360*** (0.3)
Political interest	0.927 (1.0)	-3.432*** (0.6)
Obs.	2856	6960

Note: Probit estimates (marginal effects multiplied by 100). Dependent variable: Willingness to Migrate. Standard errors in parentheses. (d) for discrete change of dummy variable from 0 to 1. * denotes significance at 0.10 level (** at 0.05, *** at 0.01). All specifications include time and country FE.

instruments is not rejected by a Sargan test of over-identifying restrictions. In the first column we report first-stage estimation results. We are able to reject the null hypothesis of the Wald test of excluded instruments. Moreover, we can exclude that our instruments are weak.²⁶

The results of IV estimation are statistically significant and in line with our theoretical prediction: more radical values reduce the willingness to migrate by almost 2% and the effect can be comparable with other works related to the use of cultural values to explain economic outcomes.²⁷ Indeed, the size of the estimated effect is reduced when using IV. Estimates for the control variables are qualitatively consistent with Probit estimation results.

3.6.3 Radical Islam and actual migration outflows

Table A.8 reports the results of the analysis conducted at the aggregate level, as described in Section 5. Controlling for a similar set of variables as in the analysis at the individual-level, we find a negative and significant relationship between radical Islam and actual migration outflows. Countries with higher radical Islam have, on average, a lower migration outflow. This relationship is significant also when controlling for human capital, as measured by the average schooling years in the total population over age 15.²⁸ Although the cross-sectional correlations leave open the possibility that other omitted variables explain both radical Islam and differences in migration outflows, this result corroborates the findings of the micro-level analysis.

3.7 Conclusions

In this paper, we analyzed theoretically and empirically the effects of radical Islam on the willingness to migrate from the Arab world. Although such relationship is central in the contemporary political debate, as far as we know, there are no empirical studies addressing this issue.

We adopted a definition of radical Islam as a set of ideologies holding that Islam should

²⁶F-test for the first stage regression: $F(2,10233) = 177.21$.

²⁷See, among others, Tabellini (2010) and Lee and Guven (2013).

²⁸Note that by adding this variable, we might be overestimating the effect of educational choices, since they might be themselves an outcome of radical Islam.

Table A.7: Determinants of the willingness to migrate: Instrumental Variable Estimation

	First Stage	IV
Radical Islam		-2.345** (1.0)
Islamic Finance	46.229*** (2.3)	
Religious Plurality	-9.745*** (1.4)	
Male (d)	-6.557 (4.5)	16.055*** (1.1)
Age	1.186 (1.1)	-0.137 (0.2)
Age square	-0.023 (0.0)	-0.005* (0.0)
Primary education (d)	-13.182 (8.4)	-2.978* (1.6)
Secondary education (d)	-8.187 (8.4)	-1.700 (1.6)
Tertiary education (d)	-1.400 (12.0)	-4.164 (2.6)
Employed (d)	1.238 (4.8)	-4.421*** (1.1)
Log income US dollars	-9.779*** (1.5)	-0.624* (0.4)
Internet Use	0.666 (1.3)	2.606*** (0.3)
Time west 1 (d)	-57.405*** (11.4)	7.527*** (2.7)
Time west 2 (d)	-30.794** (13.0)	5.110* (3.0)
Time west 3 (d)	-74.620*** (15.8)	13.906*** (4.0)
Time west 4 (d)	-41.851*** (12.1)	12.059*** (3.0)
General Trust (d)	1.892 (4.5)	-9.773*** (1.0)
Government Satisfaction	0.737 (0.9)	-1.682*** (0.2)
Political interest	5.788*** (2.1)	-1.485*** (0.5)
R^2	0.328	0.147
Obs.	10515	10261

Note: OLS estimates (coefficients multiplied by 100). Dependent variable: Willingness to Migrate. Standard errors in parentheses. (d) for discrete change of dummy variable from 0 to 1. * denotes significance at 0.10 level (** at 0.05, *** at 0.01). All specifications include time and country FE.

Table A.8: Determinants of the willingness to migrate: aggregate analysis

	Dependent variable: Outflow (%)			
	(1)	(2)	(3)	(4)
Radical Islam (mean)	-7.2** (2.4)	-13.4*** (1.5)	-7.1* (3.2)	-11.7*** (1.7)
Log GDP per capita (current US\$)	6.6 (14.4)	-4.9 (8.2)	6.3 (15.5)	-13.3 (8.3)
Life Expectancy	-1.2 (1.6)	0.3 (0.9)	-1.1 (1.7)	1.1 (0.9)
Unemployment rate	-0.2 (1.1)	0.6 (0.7)	-0.2 (1.2)	0.5 (0.7)
Years of schooling (mean)	3.7* (1.8)	5.5*** (0.9)	3.7 (2.2)	5.2*** (0.8)
Fractionalization		71.2*** (16.0)		72.7*** (14.1)
Democracy Index			0.3 (7.0)	5.3* (2.3)
Constant	95.7 (87.7)	85.4 (59.3)	95.2 (96.2)	79.6 (60.3)
R^2	0.692	0.935	0.692	0.949
Obs.	16	15	16	15

Note: OLS estimates. All coefficients are multiplied by 100. Standard errors in parentheses. * denotes significance at 0.10 level (** at 0.05, *** at 0.01). All specifications include time FE.

guide social and political life as well as personal life (Berman, 2003) and we considered radical Islam as a push factor affecting migration behavior in the Arab world. As predicted by the theory, we found that more radical individuals are less willing to migrate. This relationship can be given a causal interpretation, as indicated by IV estimation results and confirmed by Propensity Score matching estimations. Being aware of the fact that the willingness to migrate does not imply actual migration, we provided a further analysis at the macro-level through UN data on actual migration outflows. A negative and significant correlation between radical Islam and actual migration outflows is found, supporting our micro-level empirical results.

Despite the relevance of this topic, some methodological issues limit the implementation of empirical researches. Certainly, data availability is the first main problem concerning the study of radical Islam and its effects. Even if data on actual migration outflows are readily available, they can not be easily matched with data on cultural values since surveys do not often contain such questions. Moreover, the measurement of radicalism is challenging and the use of alternative definitions is not an easy task.

This paper is a first step in the study of cultural traits, in particular, radical

Islam, as determinants of the willingness to migrate. Several other aspects regarding the interconnections between culture and economics have still to be analyzed. With this work we leave the door open for further applications.

Appendix

Table A.1: Determinants of the willingness to migrate by country of origin

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Radical Islam	Algeria -3.588*** (1.2)	Lebanon -1.350*** (0.4)	Tunisia -0.744 (0.9)	Egypt -0.365 (0.4)	Iraq 0.358 (0.6)	Jordan -0.683 (0.6)	Sudan -3.266*** (1.0)	Yemen -1.859*** (0.9)	Palestine -0.480 (0.6)
Male (d)	23.791*** (4.7)	10.524*** (3.0)	18.871*** (3.3)	9.229*** (2.3)	11.497*** (2.4)	18.177*** (2.5)	10.181*** (3.8)	33.813*** (3.0)	12.472*** (2.9)
Age	-3.086** (1.3)	0.148 (0.8)	-1.190 (0.9)	-0.469 (0.5)	0.511 (0.6)	0.338 (0.6)	-0.586 (1.1)	-0.587 (0.9)	-0.456 (0.7)
Age square	0.017 (0.0)	-0.011 (0.0)	0.008 (0.0)	0.001 (0.0)	-0.007 (0.0)	-0.013 (0.0)	0.001 (0.0)	-0.002 (0.0)	-0.003 (0.0)
Primary education (d)	-8.817 (9.2)	-12.507* (7.3)	8.093 (5.8)	5.367 (3.8)	-7.637* (4.5)	0.513 (7.8)	-4.298 (6.0)	5.599 (10.3)	-3.771 (8.7)
Secondary education (d)	-16.335 (10.1)	-6.980 (7.6)	8.754 (6.4)	2.877 (2.4)	-4.611 (4.4)	4.185 (7.5)	-6.229 (6.2)	6.227 (9.0)	-3.295 (9.2)
Tertiary education (d)	-23.032* (12.4)	-10.236 (9.4)	30.734*** (11.8)		-14.515** (6.4)	18.152 (12.9)	-13.901 (11.7)	-2.547 (13.7)	-0.811 (12.2)
Employed (d)	-10.924** (5.3)	-4.446 (3.3)	-7.935** (3.7)	-0.758 (2.3)	-2.502 (2.6)	-3.317 (2.7)	4.212 (4.6)	-1.313 (3.7)	-2.445 (3.1)
Log income US dollars	-1.362 (3.9)	-10.401*** (2.4)	-5.072** (2.3)	-1.491 (1.2)	-1.893 (1.2)	1.849 (1.9)	-0.671 (1.9)	-1.673 (2.3)	-6.236*** (1.7)
Internet Use	0.485 (1.7)	0.546 (0.9)	1.986* (1.2)	0.338 (0.6)	1.320* (0.8)	3.591*** (0.7)	6.549*** (1.2)	3.375*** (1.1)	2.595*** (0.8)
Time west 1 (d)	-4.809 (8.1)	3.343 (6.9)	18.681 (12.7)	-1.060 (6.1)	18.324 (12.1)	-4.838 (6.4)	33.332*** (9.0)	20.083** (10.0)	12.081 (7.6)
Time west 2 (d)	-7.474 (9.0)	10.639 (9.3)	6.158 (18.1)		-10.474 (8.0)	20.973** (9.2)	1.276 (12.8)	16.504 (10.4)	13.007* (7.4)
Time west 3 (d)	4.902 (10.8)	20.579** (9.1)			21.817 (21.3)	16.523 (10.9)	34.579*** (6.9)	30.051*** (10.2)	25.141** (12.3)
Time west 4 (d)	15.918 (10.3)	18.124*** (6.1)	13.775 (10.8)		22.773* (12.3)	2.688 (6.1)	8.717 (10.0)	16.369 (11.2)	22.696** (10.6)
General Trust (d)	-10.911* (5.8)	-5.011 (3.8)	-7.702** (3.2)	-6.281*** (1.9)	-13.670*** (2.0)	-5.817** (2.5)	-21.492*** (4.0)	-14.044*** (3.0)	-10.458*** (2.4)
Government Satisfaction	-4.650*** (1.4)	1.637** (0.7)	0.475 (1.2)	0.217 (0.5)	-3.330*** (0.5)	-2.605*** (0.5)	-1.976*** (0.7)	-2.260*** (0.7)	-1.783*** (0.5)
Political interest	4.610 (3.2)	-0.393 (1.4)	0.198 (1.9)	-0.694 (1.1)	-7.227*** (1.3)	-2.111* (1.2)	0.229 (2.0)	-4.977*** (1.6)	-1.409 (1.2)
Obs.	682	1361	680	935	1684	1967	908	1264	1570

Note: Probit estimates (marginal effects multiplied by 100). Dependent variable: Willingness to Migrate. * denotes significance at 0.10 level (** at 0.05, *** at 0.01). All specifications include time FE.

Table A.2: Propensity Score Matching Estimation

	Nearest Neighbor	Kernel
Willingness to migrate		
PS1	-2.3*** (0.6)	-2.3*** (0.6)
PS2	-1.8*** (0.7)	-2.3*** (0.7)

Note: All coefficients are multiplied by 100. Standard errors in parenthesis. The first estimated Propensity Score includes indicators of gender, age and employment status (PS1) while the second adds the use of internet. Radical Islam is equal to 1 when individual radical Islam is greater than the median of the sample. ATT regressions include the set of controls as described in Section 4. * denotes significance at 0.10 level (** at 0.05, *** at 0.01).

CHAPTER 4

Human Capital and Remittances Evidence from Ecuadorians in Spain¹

This paper aims to find how education is related to the probability to remit (i.e., extensive margin) and the level of remittances (i.e., intensive margin) using the Spanish National Immigrant Survey from 2007 and selecting migrants from Ecuador. Our findings indicate that, after controlling for a wide set of individual covariates, there exists a negative association between remittances and migrants' educational level both at the extensive and intensive margin.

Keywords: Migration, Remittances, Education

JEL classification: F22, F24, O15

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4.1 Introduction

Remittances and the flow of skilled migrants are rising considerably. According to 2011 World Bank data, remittances were equal to more than 10 percent of gross domestic product (GDP) in 24 countries; in nine countries they were equal to more than 20 percent of GDP underling the relevance of remittances as a mechanism for poverty alleviation and their importance as direct investment flow, with the advantage of being more stable than other types of external funding.² And, until the end of 2015, worldwide remittance flows are expected to grow at an average of 8.8 percent annual rate. On the other hand, the proportion of skilled migrants is increasing sharply, in particular in OECD countries whether the number of immigrants with tertiary education showed an unprecedented increase in the past decade. Between 2000 and 2005/06, the proportion of high-educated persons living in OECD countries increased by 3 percentage points for the native-born and by 5 percentage points for immigrants. In 2005/06, there were about 25.7 million immigrants living in the OECD (25 countries) holding a university degree and among recent immigrants more than 5.2 million (32%) were highly educated. This level represents an unprecedented increase of 70% over the past ten years and this growth is mainly driven by migrants originating from Asia (79%), Africa (80%) and Latin America (84%).³

Therefore, the relationship between remittances and migrants' level of education is important also because the increasingly quality-selective nature of immigration policies in many destination countries, which are favouring immigration of highly educated workers and, at the same time, discouraging immigration of low skilled workers. The tacit view is that the educated migrants remit less (Docquier et al. 2011). Nevertheless, *a priori*, it is not clear theoretically whether the highly skilled will remit more or less on average. The aim of this paper is to test empirically which can be the direction of the relationship between education and remitting behaviour (i.e., positive or negative) exploiting an exogenous variation in the migrants' school level as an instrument for the educational level attained by the migrants.

At the micro level, researchers have used surveys on migrants or surveys on households

²In 2013, international migrants were remitting more than US\$550 billion in earnings, of which US\$414 billion were destined to developing countries (World Bank statistics, Migration and Remittances Unit).

³Source: DIOC 2010/11 <http://www.oecd.org/els/mig/dioc.htm>.

in the origin country to examine individual factors influencing the decision to remit. Overall, there are two main motivations that can drive remitting behaviour, namely individual motivations and familial arrangements. The first is based on the fact that remittances may be determined by a purely individual strategy (i.e., self-interest or altruistic behaviour). The second focuses on an implicit agreement between the family and the migrant. This arrangement may take the form of insurance; in this case, migration is considered a possible economic strategy that aims to minimize risks through income sources diversification. But it could also be a loan repayment for costs (in migration or education) supported by the original family (exchange motive). Within this framework, education could enter either in a positive and in a negative way. At the macro level, the motivation pattern is similar; if the cross-country macroeconomic analyses proposed by Faini (2007) and Niimi and Schiff (2010) present results supporting that more educated migrants' remit less, other studies emphasize the opposite association between remittances and education (i.e., Holst and Schrooten, 2006).

Despite the vast majority of studies which look at the relationship between remittances and education, results are still controversial, not defining the sign of the relationship (Acemoglu and Angrist, 1991; Becker, 1962; Ben-Porath, 1967; Schultz, 1961). We improve the research on this topic using the Spanish National Immigrant Survey (2007), a retrospective micro database on non-native current resident in Spain, and we select Ecuadorians migrants. This is mainly for two reasons. Primarily, because in Ecuador remittances are considered a way to alleviate poverty; in fact, since the 1990s, the country has experienced a massive exodus to Spain, as well as to US and Italy⁴ and, with more than 8 percent of Ecuadorian population abroad, inward remittance flows have been increased from US\$1,633 millions to US\$2,548 millions from 2003 to 2010, confirming remittances as the main motive for migration for about 80 percent of Ecuadorian migrants.⁵ Second, because we take the advantages of an educational reform as exogenous variation in education. More specifically, in the microeconomic analysis we will consider the Ecuadorian educational reform implemented in the 1977 that increased the length of compulsory schooling from 6 (primary education) to 9 years (6 of primary education and 3

⁴The exodus to Spain was driven also by the 1963 bilateral visa program that have been reduced the cost of migration between these two countries (Bertoli et al., 2013).

⁵The Migration and Remittances Factbook 2011; Migration and Remittances Unit, World Bank.

years of lower secondary education); this will help us to address the causal relationship.

Bearing in mind that we should have different remitting motivations, we test positive and negative hypothesis to deeply analyse the behaviour of educated migrants. There are many reasons to expect a negative relationship between remittances and migrants' education. First of all, more educated migrants often come from wealthier families; therefore remittances are not needed to alleviate liquidity constraints in their home country (Niimi and Schiff, 2010; Faini, 2007). Second, they usually migrate with their entire household and hence, they have less need to share their earnings with someone left behind at origin (Agarwal and Horowitz, 2002; Banerjee, 1984; Johnson and Whitelaw, 1974; Stark, 1991, 1995; Stark and Lucas, 1988). Third, they might have a lower propensity to return back at the origin country; hence remittances are not necessary to maintain ties to the home country (Stark and Lucas, 1985; Steiner and Velling, 1992; Stark, 1995; Rapoport and Docquier, 2006). On the other hand, better-educated migrants have a higher potential income (Stark and Lucas, 1988; Hoddinott, 1994; Funkhouser, 1995; Bollard et al. 2011). Moreover, they are less likely to be illegal at destination, hence they can have bank accounts easily, and therefore they can remit more due to lower transaction costs (Stark and Lucas, 1985). Third, the positive relationship between remittances and the educational level of the migrant can be view as a possible repayment to compensate the family for the additional education expenditures incurred (investment motive).

Our findings indicate that, controlling for a wide set of individual characteristics, there exists a negative association between remittances and migrants' educational level: the more the migrant is educated, the less he remits, both at the extensive (probability to remit) and intensive margin (amount remitted). Moreover, including variables related to the intention to return in the origin country and a measure of wealth status of the family left behind, the effect of education decrease both at the extensive and intensive margin, implying that these factors may be related to migrants' remitting behaviour as better educated migrants tend to return less in the origin country (i.e., brain drain effect) (Stark and Lucas, 1985; Steiner and Velling, 1992; Stark, 1995; Rapoport and Docquier, 2006) and, because they have wealthier families left behind, remittances are not needed to smooth earning shocks in their country of birth (Stark and Lucas, 1988; Gubert 2002).

The rest of the paper is organised as follows. The next section presents the literature

review and theoretical background starting from a description of the main motivations to remit to a specific focus on the empirical evidence of the relationship between education and remittances. Section 4.3 presents methodological issues related to potential endogeneity of education and different econometric models in accordance with the nature of the outcome variables. Section 4.4 describes data used and presents descriptive evidences. Section 4.5 reports results at the extensive and intensive margin while section 4.6 concludes.

4.2 Literature Review and Theoretical Background

Remittances are one of the main income resources in many developing countries. They can be considered an instrument to achieve mutual insurance, to smooth consumption and to alleviate liquidity constraints.

The literature presents several motivations related to remittances. The main motivation is that the migrant cares for who is left behind: spouse, children, parents or other family or non-family members in the origin country (altruism motive); thus exists an intrinsic motivation, which is unobservable, that drives the intention to remit. However, there are additional motives primarily driven by other (economic) factors that might play a role in the decision to remit and on the amount remitted. First of all, remittances can be used to insure other family members at origin against income shocks such as unemployment or drops in rural incomes (insurance motive). Secondly, remittances can buy services at origin and the size and the likelihood depend on the timing of the migrant return at origin (exchange motive). We can also distinguish on investment motive whenever remittances can be used to repay investments such as migration or educational costs, which have been held by the family at origin before migration.

Nevertheless, it is difficult to discriminate among all these motivations (Docquier and Rapoport, 2006). As regards to the main relationship we analyse in this paper (i.e., education and remittances), it is not clear *a priori* which direction dominates in the education and remitting process and thus whether the more educated will remit more or less than low educated migrants.

On the one side, more educated migrants are likely to earn more and this will po-

tentially increase the amount they can remit. Secondly, family members in the home country may have funded their education and, in this case remittances are considered as a repayment of previous investment in education. Thirdly, more educated migrants are less likely to be illegal migrants and more likely to have bank accounts, lowering the financial transaction costs of remitting. However, on the other hand, several other factors might lead highly educated migrants to be less likely to remit and to remit a low amount of money. Firstly, they more often migrate with the entire family, so they do not need to send remittances and share their earnings with those who are left in the country of origin (i.e., other family members or friends). Secondly, they might come from richer households and thus remittances are not needed to alleviate liquidity constraints. Thirdly, they might have less intention to return to their home country, reducing the role of remittances as a way of maintaining prestige and ties to the home community (Bollard et al., 2011).

In the section below we present possible motives for remittances: altruism, insurance and exchange (and, in this last case, we will describe also investment and inheritance as particular exchange of services). Then, we will describe the main empirical evidence on the determinants of remittances and we will conclude the literature review with a focus on what has been found until now on the relationship between education and remittances.

4.2.1 The determinants of remittances: an overview

Altruism

The literature defines altruism as one of the first motivation to remit (Agarwal and Horowitz, 2002; Banerjee, 1984; Johnson and Whitelaw, 1974; Stark, 1991, 1995; Stark and Lucas, 1988). The main assumption is that the migrant, who cares on those left behind, includes the utility of households members at origin in his own utility function (Stark and Lucas, 1988). In this case, the altruistic individual maximizes his utility by transferring (remitting) income so as to reach the desired distribution of income between himself and the beneficiaries of his altruism. In the Stark (1995) theoretical model, the migrant utility function is defined as:

$$U^m(C^m, C^h) = (1 - \gamma^m)V(I^m - T) + \gamma^mV(I^h + T) \quad (4.1)$$

whether m indicates the migrant and h the recipient household; γ is a term that includes altruism parameter β^6 , C is the consumption, I is pre-transfer income and T are remittances. Maximizing the utility function with respect to remittances we obtain:

$$T^* = \text{Max}\{\gamma^m I^m - (1 - \gamma^m)I^h, 0\} \quad (4.2)$$

Hence, remittances increase with migrant income and the degree of altruism, while they decrease with the increase in the recipient income and the degree of altruism ($\frac{\partial T^*}{\partial I^m} > 0$ and $\frac{\partial T^*}{\partial \beta^m} > 0$; $\frac{\partial T^*}{\partial I^h} < 0$ and $\frac{\partial T^*}{\partial \beta^h} > 0$). Therefore, due to the fact that more educated migrants might earn more, they might remit more in the case of altruism.

As outlined in the detailed literature survey proposed by Docquier and Rapoport (2006), the altruistic motive for remittances has been more commonly assumed than empirically tested. For instance, Funkhouser (1995) proposed a behavioural model based on altruism to analyse if the remitting behaviour can be predicted by migrants' characteristics, or if there is something beyond that. Comparing the two capital cities of El Salvador and Nicaragua, he noted that even if the number of migrants and the general economic conditions among the two countries during the 1980s were quite similar, twice as many households in San Salvador received remittances from relatives abroad than in Managua; moreover, for those who received remittances, the average transfer received in San Salvador was twice as high as that in Managua. The author concluded in favour of the fact that differences in remitting behaviour could not be accounted for by differences in households' or migrants' observed characteristics, including the timing of migration while differences in unobserved characteristics (i.e., how remitters self-select from the pool of migrants) are central to explain inter-country differences in remitting behaviour.

Insurance

The remitting process can be driven by the decision of the migrant to insure other family members at origin against income shocks such as unemployment or drops in rural incomes. In this case, the predicting time of remittances is more strictly defined than in the altru-

⁶ U^i is assumed to be affected by the felicity derived from own consumption, $V(C^i)$ and the utility of the other. Therefore, utility can be expressed as a weighted average of these two elements: $U^m(C^m, C^h) = (1 - \beta^m)V^m(C^m) + \beta^m U^h(C^h, C^m)$ and $U^h(C^h, C^m) = (1 - \beta^h)V^h(C^h) + \beta^h U^m(C^m, C^h)$ with $0 \leq \beta^i \leq 1/2$ as the individual level of altruism. Hence, $\gamma^m = \frac{\beta^m(1-\beta^h)}{1-\beta^m\beta^h}$; $\gamma^h = \frac{\beta^h(1-\beta^m)}{1-\beta^m\beta^h}$

istic motive so that, it is subsequent to a specific point in time; and second, the size of remittances may vary depending on the agreement between the migrant and the household at origin (Rapoport and Docquier, 2006). Therefore, if in the altruistic motivation the amount to remit is fixed by the migrant in accordance with his intrinsic motivation, in the case of insurance the amount derives on a mutual agreement between the migrant and the family left behind.⁷

Exchange (Investment and Inheritance)

In the exchange motive (Cox, 1987), transfers are made up to repay services provided in the origin countries such as parents' investment in children's education before their migration or repayment of migration costs and as pointed out by Poirine (1997), this is the case especially for temporary migration and hence for those who have intention to return. If in the altruistic case the probability to remit decreases with recipient income, in the case of exchange motive there is the opposite relationship. This is because richer family provides more assets to increase children education, and due to higher education, migrants can improve their economic situation abroad, achieving better jobs and sending more remittances at home to repay for previous investments. Here, migration is considered an informal familial agreement whether remittances are a key element (or main motivation for migration) of such a contract. Another motive that may justify remitting behaviour is inheritance as a particular way of exchange between the migrant and the family. In this case, the amount remitted increases with the increase in household assets and income at origin, available to the migrants as inheritance. On the contrary, remittances decrease with the increase of migrants' risk aversion as inheritance, which can be considered a particular form of savings, is, instead, more risky (de la Briere et al., 2002).

As we shall see, remittances may combine an altruistic component and an exchange of a variety of services. This complex mixture of motives has being described by concepts such as "impure altruism" (Andreoni, 1995) or "enlightened selfishness" (Lucas and Stark, 1985). However, it is extremely difficult to empirically discriminate between these different

⁷There exist a premium which can be represented by migration costs repayment by the family at origin as a response to possible income shocks.

motives (Docquier and Rapoport, 2006).

4.2.2 Empirical evidence on the determinants of remittances

Starting from theoretical models, the literature has proposed empirical analysis of the determinants of remittances both in the case of the likelihood to remit and on the amount remitted. In this section we will suggest a review of the main empirical results highlighting the role of a number of critical variables at the individual and household level.

One of the first empirical research on the determinants of remittances is the one by Banerjee (1984) in which the author analysed rural-urban migration in the city of Delhi in India in order to compare results with those from Kenya from Knowles and Anker (1981). He used data taken from October 1975 to April 1976 and the empirical exercise was primarily to estimate the probability of sending remittances to the place of origin and then to explain the amount remitted. Thus, he applied a Probit model in the first part of the analysis and the Heckman model in the second part. *Ceteris paribus*, migrants with wives or children or other relatives living with them are less likely to remit and they remit less than migrants living alone confirming the altruistic hypothesis where remittances depend on how much the migrants care for relatives left behind.

Another important empirical work that discriminate between different motivations to remit was the one proposed by Lucas and Stark (1985). Analysing data on Botswana they found that remittances rise steadily with the migrants' earnings, which is consistent with altruism, insurance and exchange motives. However, pure altruism would imply that remittances are primarily directed to low-income households, while Lucas and Stark's estimates show a positive relationship between the level of remittances received and households' pre-transfer income therefore arguing that the main motivation is exchange. Other specific results are related to individual characteristics of the migrant; they found a positive relationship between remittances and female status also confirmed in the work by Kaufmann and Lindauer (1986) and an increase in remittances with the increase in years of schooling as a repayment of educational investment made by the family at origin (see also Poirine, 1997). The latter results were supported also by Cox et al. (1998) in their study on private transfers in Perù. They concentrated on altruism versus exchange and they tested the effect of recipient households' pre-transfer incomes on the size and probability

of remittances. Probit results for transfers from child-to-parent (which consist mostly of remittances) indicate that the probability of transfer is inversely related to parental income, a finding that is consistent with both altruism and exchange. But the effect of income on the amount transferred, on the condition that a transfer is made, is first positive, then negative (i.e., inverse-U shaped). The same pattern applies to parent-to-child transfers. Moreover, they found that being unemployed raises the probability of transfer receipt by over 13 percent while illness raises it by over 5 percent confirming remittances as intra-household insurance.

Following the exchange-investment motivation behind the determinants of remittances, also the Pakistan study by Ilahia and Jafarey (1999) additionally found that remittances are an instrument to repay migration costs provided by the household in the origin country.

A number of empirical studies have also focused on inheritance motives, a particular way of exchange between the migrant and the family. Hoddinott (1994) provides strong evidence supporting this theory. Using data from Nairobi (Kenya) the author controlled for two sources of selection bias through the Heckman procedure in order to demonstrate that both individual and household characteristics could influence the migration decision. In this framework, remittances need to be included into the model of migration due to the fact that can be part of a long-term implicit contract between parents and their children through inheritance agreements.

The study by de la Brière et al. (2002) attempted to understand the differences between insurance contracts (between parents and migrant children) and inheritance motive such as investment in potential bequests. They investigated remittances to a rural region of the Dominican Republic following four estimation procedures: OLS, a random-effect model (to account for the clustering effect of the presence of a sibling from the same household), a standard Tobit, and a censored remittance model. Analysing data from 1994, results support insurance as the main motivation to remit for women migrants, particularly among those with no intention to return to their birthplace. On the contrary, investment toward inheritance is the main motivation to remit for men, young migrants, and migrants intending to return. How much each motive is determinant in the decision to remit is driven also by other elements such as migrant's destination, gender and household composition.

Taking into account the fact that remittances may vary with respect to the needs of those left behind, the work proposed by Johrison and Whitelaw (1974) found that remittances tend to be greater the lower the earnings of family at origin are. However, the survey on which this paper is based does not collect data on earnings, so they used land ownership as a proxy measure of rural earnings. On the contrary, Knowles and Anker (1981) found that land ownership in rural areas was not important in explaining either the decision to remit or the size of remittances.

We are aware that the literature on the determinants of remittances we have presented above is not exhaustive. We aimed to collect main results arguing which are the relevant variables that have been used to explain motivations to remit. In the next paragraph we will describe other relevant empirical results on the link between education and remitting behaviour in order to more specifically collocate our work in the existing literature.

Education and Remittances: what has been found until now

Overall, there are mixed evidences on the link between the level of migrant education and remitting behaviour both at the extensive (i.e., likelihood to remit) and at the intensive margin (i.e., amount remitted), and patterns among these main variables can be positive (Holst and Schrooten, 2006; Knowles and Anker, 1981), or negative (Faini, 2006; Niimi et al., 2009), or positive and negative depending on the outcome variable (Bollard et al., 2011; Funkhouser, 1995; Osaki, 2003) or there can be no impact at all (Hoddinott, 1994; Naufal, 2008; Oberai and Singh, 1980; Rodriguez, 1998).

Holst and Schrooten (2006) found a positive relation between education and remittances. This study was based on German SOEP data and the authors did not restrict the sample only on migration with a foreign citizenship, but they focused the research on all individuals with a migration background. As econometric technique they applied a Probit model in the extensive case while a Tobit model in the intensive case. Using years of schooling to measure education, results suggest that having more years of education is positively related to the amount transferred by the migrant confirming altruistic as well as intra-family investment motives.⁸

⁸Other important results are on the degree of integration that matters in the remitting process as well as being married, employed and have the intention to return in the country of birth. On the contrary, income does not affect the likelihood to remit contrasting theoretical models based on altruism as well as

Positive effect of education on the probability to remit has been found also in Knowles and Anker (1981) while a negative impact of migrant's income and receiving household income on the likelihood to remit. The dataset they used was a large nation-wide survey of household in Nairobi (Kenya) which collects information on household members that are not in the country at the time of the survey. Applying OLS estimation both at the extensive and intensive margin, the significant and positive relationship between education and remittances was consistent with the idea that children use transfers to compensate parents past costs in education incurred on their behalf. In general, it seems that in the case of transfers from urban area, remittances are independent to economic status of the migrant confirming the temporary nature of the rural-urban migration while in the case of remittances from rural area, it appears that remitting behaviour is driven by economic status in accordance with the redistributing income mechanism.

In the Niimi and Schiff (2010) macro-level study, the educational variable was represented by the ratio of migrants with tertiary education to the total number of migrants. Focusing on 82 countries and using the IMF Balance of Payments and OECD data in 2000, they found that remittances decrease with the share of migrants with tertiary education while they increase with source countries level and rate of migration, size of financial sector and population. They argued first, that skilled migrants could come from richer families and they do not need remittances and second, that commonly wealthier migrants tend to migrate with the entire family and they do not have family ties left behind.

Similar negative result have been found in Faini (2006) whether migrants' remittances decrease with the proportion of skilled individuals among emigrants. However, any correlation between remittances and the skill level observed across countries may be spurious due to the fact that they do not control for the potential endogeneity of migrants' education.

If some researches confirm a positive relationship between the migrant level of education and remitting behaviour, as outlined above, other empirical studies find the opposite pattern. Moreover, there is still a possibility to find positive or negative effects with respect to the outcome considered (i.e., the likelihood to remit or the amount remitted) as in Funkhouser (1995) and Bollard et al. (2011).

those on family contracts whether the income situation is crucial for remittances. We will consider these control variables in the empirical analysis.

The first compares Nicaragua and El Salvador finding an adverse effect on the likelihood while a positive effect on the level of remittances both in Nicaragua and in the El Salvador sample; age and gender do not have effects on both outcomes in El Salvador while age negatively affects the probability to remit; gender has no significant effect on remittances in the Nicaragua case. In the empirical research, *Bollard et al. (2011)* took the advantages of a comprehensive household survey on immigrants from eleven destination countries. They investigated why the more educated remit more and they found that what really explains this behaviour was the higher income earned by migrants rather than households characteristics at origin or their intention to return. However, the limit of this work is that these results hold for most but not all surveys in the sample (i.e., in the German SOEP case, results are with opposite sign. See also *Dustmann and Mestres, 2010*) so that results can not be generalizable.

Furthermore, there are framework whether there is no effect of the educational level of migrants on their remitting behaviour. For instance, in *Hoddinott (1994)* the relationship between education and earning was relevant as education captures migrant potential earning. However, in this empirical study, education does not have a direct significant impact on remittances. In *Naufal (2008)* what really matters was the household head labour status and educational level and the likelihood to remit seems to be positively related among migrants within the same receipt household. Other works obtain similar results. Among others *Rodriguez (1998)* and *Oberai and Singh (1980)*: in the former case age and years since migration positively affect the likelihood to remit and the relationship with the household at origin while they have negative effect on the level of remittances; in the latter case all effects are captured by the income variable.

According to the literature, we test positive and negative hypothesis to deeply analyse the behaviour of educated migrants. There are many reasons to expect a negative relationship between remittances and migrants' education. Primarily, more educated migrants often come from wealthier families, therefore remittances are not needed to alleviate liquidity constraints (*Niimi and Schiff, 2010; Faini, 2007*); as proposed by *Johnson and Whitelaw (1974)* and in *Knowles and Anker (1981)*, we include land ownership in the country of origin as a measure of earnings at origin. Better educated individuals usually migrate with their entire household and hence, they have less need to share their earn-

ings with someone left behind (Agarwal and Horowitz, 2002; Banerjee, 1984; Johnson and Whitelaw, 1974; Stark, 1991, 1995; Stark and Lucas, 1988); in this case, we control for having household members in Spain and for having family ties in Ecuador. Additionally, it is well-known that more educated migrants might have a lower propensity to return back in the origin country; hence remittances are not necessary to maintain ties to the home country (Stark and Lucas, 1985; Steiner and Velling, 1992; Stark, 1995; Rapoport and Docquier, 2006), for this reason, we include the *intention to return* variable as a dummy equal to 1 if the migrant declares to have the intention to return back at origin in the next few years.

However, on the other hand, better-educated migrants have a higher income potential so they conceivably remit more (Stark and Lucas, 1988; Hoddinott, 1994; Funkhouser, 1995; Bollard et al. 2011); hence we include income as a control. They are less likely to be illegal at destination, hence they can have bank accounts easily and therefore they can remit more due to lower transaction costs (Stark and Lucas, 1985); we look at this effect adding a dummy for spanish citizenship as a proxy for being legal at destination. Moreover, the positive relationship between remittances and the educational level of the migrant can be viewed as a possible repayment to compensate the family for the additional education expenditures incurred in the past (investment motive). However, this latter motivation can not be tested easily since usually surveys do not contain this specific information (Rapoport and Docquier, 2006).

4.3 Methodological Issues

Among several migrant characteristics, the educational level is considered as one of the main drivers in the decision making process both in the case of the likelihood to remit and in the amount remitted as it can be viewed as one of the powerful determinants of earnings which are strictly related to remittances.

The empirical analysis we are going to implement is twofold. Firstly, we look at the impact of migrants education on the likelihood to remit. Secondly, we study the correlation between education and the amount remitted. Moreover, we deal with the potential endogeneity of the educational level attained by the migrants due to the fact

that there can be unobservable characteristics, such as individual ability, which can affect migrant's remitting behaviour and education.⁹ We exploit educational reforms that were implemented in Ecuador and in Spain as exogenous variation in the individual school level.

The model is specified by the following equation:

$$R_i = \alpha_0 + \alpha_1 Edu_i + \alpha_2 X_i + \varepsilon_i \quad (4.3)$$

with

$$R_i = \begin{cases} Rem_i & \text{if } R_i=(0,1) \\ LogRemittance_i & \text{if } R_i=\log(\text{amount remitted}) \end{cases}$$

In the case of $R_i = Rem_i$ the outcome is a dummy variable which captures the likelihood to remit and it assumes a value equal to 1 if a migrant remits in the year preceding the survey (2006) and 0 otherwise (i.e., extensive margin). In the case of $R_i = LogRemittance_i$ the outcome is the logarithm of the amount of remittances sent in the year preceding the survey (2006) (i.e., intensive margin).¹⁰ Edu_i is the education explanatory variable equal 1 if at least a low secondary level of education is attained by the migrant and 0 otherwise.¹¹ X_i is a vector of covariates among which we include individual, household and other characteristics of the migrants.¹² ε_i is a standard error assumed to be normally distributed.

Different econometric methodologies have been applied to find the determinants of migrants' remittances and these analytical methods depend on the definition, hence the structure, of the outcome variables. If the analysis is restricted to the decision to send remittances, a Probit model is applied, accounting for the bivariate structure of the variable. Whenever the focus is on the amount remitted an OLS (Bollard et al., 2011; Johnson and Whitelaw, 1974; Stark and Lucas, 1988), or a Tobit model (Agarwal and Horowitz, 2002; de la Briere et al., 2002; Faini, 2006), or an Heckman's two-step procedure (Cox

⁹As an example, more educated migrants may have an unobservable ability so that they can easily understand how to remit once they are in the new destination country.

¹⁰From now on, we will use *extensive margin* and *intensive margin* interchangeably with likelihood or probability to remit in the first case, and amount of remittances in the second case.

¹¹As a robustness check we consider as the education explanatory variable a dummy equal 1 if the migrant declares to have attained a secondary level of education and 0 otherwise. Results are in the Appendix A.6.

¹²See paragraph 4.4.2 for a detailed description of variables included.

et al., 1998; Funkhouser, 1995; Hoddinott, 1994) are used. More specifically, both a Tobit model and the Heckman's two-step procedure account for left censoring of the dependent variable. The Tobit model is sufficient when there is a one-stage simultaneous process in the decision to remit, because it assumes that the decision to remit and to determine how much to remit are taken at the same time and are influenced by the same explanatory variables.¹³ The Heckman model accounts for the possibility of different mechanisms influencing the decision to remit and the amount of remittances.¹⁴ In our data, 70 percent of migrants do remit and 18 percent do not have relatives in Ecuador. Therefore, the selection on the decision to remit that is controlled through Tobit or Heckman's two-step procedures can not be considered. As in (Bollard et al., 2011) and (Niimi and Schiff, 2010), we can take the advantages of linear probability estimations.

Another important issue we look at is the possibility of having the educational explanatory variable endogenous due to unobservable characteristics at the individual level that may affect both the educational level of the migrant and his remitting behaviour.¹⁵ We deal with the potential endogeneity through the Instrumental Variable (IV) approach and we follow a Regression Discontinuity (henceforth RD) design (Thistlethwaite and Campbell, 1960). This framework will give us the chance to exploit an exogenous variation in education. The importance of RD is that it can be related to all non-experimental settings, where individuals are assigned to a treatment group depending on the value taken by a specific variable (Lee and Lemieux, 2010). It requires that a particular threshold for an observed characteristic defines the treated and non-treated groups. Furthermore, it assumes that individuals close to the cut-off point are identical in all of the characteristics, except for the assignment variable.

We consider as IV the fact that a migrant could be treated by the Ecuadorian ed-

¹³The model supposes that there is a latent (i.e. unobservable) variable y_i^* which linearly depends on x_i through a vector β that determines the relationship between the independent variable x_i and the latent variable y_i^* . The observable variable y_i is defined to be equal to the latent variable whenever the latent variable is above zero and zero otherwise. $y_i = \begin{cases} y_i^* & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases}$ where y_i^* is a latent variable: $y_i^* = \beta x_i + u_i, u_i \sim N(0, \sigma^2)$. In our case, the amount remitted by the migrant is the latent variable y_i^* .

¹⁴The Type II Tobit model (Heckman, 1987) introduces a second latent variable: $y_{2i} = \begin{cases} y_{2i}^* & \text{if } y_{1i}^* > 0 \\ 0 & \text{if } y_{1i}^* \leq 0. \end{cases}$ which is conditionally defined with respect to the first selection derived from the y_{1i}^* latent variable.

¹⁵As an example, a more educated migrant can have an higher ability in finding the way to remit (i.e., how to create bank accounts or how to manage Western Union systems).

educational reform that increased his/her level of human capital. Within this framework, individuals were assigned to additional years of schooling exogenously, depending on their date of birth, implying no correlation with remitting behavior (Acemoglu and Angrist, 1991, 1999).

More in details, we deal with the 1977 Ecuadorian educational reform which increased the length of compulsory schooling from 6 (primary education) to 9 years (6 of primary education and 3 years of lower secondary education).¹⁶ Whenever individuals were migrated before the implementation of the Ecuadorian reform, we control for the possibility to be treated by the 1970 Spanish educational reform having the same structure as the Ecuadorian one (see Figure 1).¹⁷ In Figure 4.1 a focus on the Ecuadorian educational systems and characteristics of the reform.

Figure 4.1: Ecuadorian Educational Systems

	Age	Years of Schooling
Basic	3	:
	4	:
	5	:
	6	1*
Primary	7	2*
	8	3*
	9	4*
	10	5*
	11	6*
Low Sec.	12	7**
	13	8**
	14	9**
High Sec.	15	:
	16	:
	17	:
Univ.	18	:

Notes: * is the compulsory level before the educational reform. ** are the additional years of schooling after the implementation of the reform

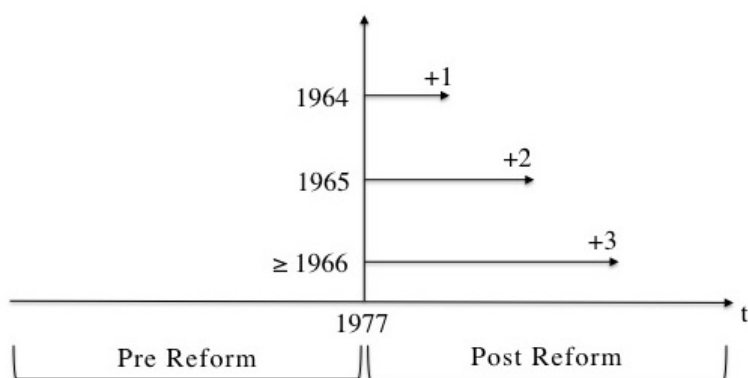
¹⁶In January 12, 1978 Law n. 1903 of RO 461 November 11, 1977 came into effect; the 1977 Law was substituted by Law n.127 April 15, 1983 but without any change in the length of compulsory school attendance.

¹⁷However, in our sample, migrants potentially treated by the Spanish reform are a very small percentage of the population so we drop them from our sample in order to avoid possible measurement errors.

Since the implementation of the reform, the Ecuadorian educational system is composed by a pre-school level with a duration of three years and it is not compulsory, then six years of primary school level, compulsory both before and after the 1977 reform; three years of low secondary level and just after, the high school until the 18 age when the bachelor starts.

In Figure 4.2 the timeline of the educational reform. Individuals potentially affected by the reform were less than 14 years old in 1978. Indeed, those born in 1964 were required to stay one additional year in education, those born in 1965 two years and those born later than 1966 three years and more. Therefore, our cut-off point has a threshold that defines who may be considered treated by the educational reform is 1964, which is the birth year for those with 14 years old in 1977.

Figure 4.2: Ecuadorian Educational Reform Timeline



The design is ‘fuzzy’ since compliance with the reforms was not perfect and the reforms were implemented gradually. As proposed by the theoretical literature on the RD design, the compliers are those individuals who, in the absence of the reform, would have dropped out of school at the age of 11, which was the minimum legal age. To apply a formal RD we should restrict the sample in cohorts taking into account specific age interval (i.e., +5 years and -5 years around the cutoff; +10 years and -10 years around the cutoff). However, we have two limitations. First, the dataset we use has a small number of observations available so that, a sample restriction on age can not be applied otherwise we will lose too many observations. Second, we deal with two different reforms and hence we have two cutoff points; to circumvent this problem, we may restrict the sample age as much as possible,

however estimations results are not qualitatively different.¹⁸ As the fuzzy RDD is defined, we consider both educational reforms as simple Instrumental Variables.

The ‘fuzzy’ RD can be described by a two-equations’ system, the first for the outcome variables while the second for the endogenous variable:

$$\begin{cases} R_i = \alpha_0 + \alpha_1 Edu_i + \alpha_2 X_i + \varepsilon_i \\ Edu_i = \beta_0 + \beta_1 Ref_i + \beta_2 X_i + u_i \end{cases} \quad (4.4)$$

with R_i as the extensive and intensive margin as in equation (1). $Ref_i \equiv I(B \geq c|a)$ is a dummy for the reform eligibility (with B as years of birth, c as the cut off year and a as a threshold with respect to the age at the arrival in Spain)¹⁹. Edu_i and X_i are identified as in equation (1). ε_i and u_i are standard errors assumed to be normally distributed.

As a remark, the first part of the analysis has a dichotomous dependent variable equal to 1 if the migrant remits and 0 otherwise; therefore a Probit model is applied as a benchmark while, to study the causal effect of an increase in migrant educational level on his likelihood to remit we implement a *seemingly unrelated Bivariate Probit regression* due to the fact that both the outcome variable and the instrumental variable are dichotomous. The second part of the analysis aims to find how the amount remitted by each migrant could change, considering the exogenous variation in the educational level attained; in this case the dependent variable is the logarithm of the amount remitted in the year preceding the survey (2006). In this case we apply a Probit model in the first stage of the analysis while a Linear Instrumental Variable approach at the second stage because, in this case, the outcome variable is continuous while the instrumental variable is dichotomous.²⁰ We deal with a potential endogeneity in education through Instrumental Variable approach and, as in the previous step of the analysis, we consider as IV the fact that the migrant could be treated by an educational reform both in the country of origin and at destination. The first stage is defined as the second equation in the RD system presented previously (equation 2).

¹⁸In the Appendix we include main results considering ecuadorian migrants between 28 and 56 years old.

¹⁹In the case of the Ecuadorian Educational Reform c is the 1964 year and a should be more than 15 years old while in the case of the Spanish Educational Reform c is the 1958 year and a should be less than 15 years old.

²⁰*Treatreg* command in STATA.

4.4 Data and Descriptive Statistics

4.4.1 The Spanish National Immigrant Survey

We use a retrospective micro database that has been derived from the Spanish National Immigrant Survey (Encuesta Nacional de Inmigrantes 2007 – henceforth ENI).²¹ The survey was administered to approximately 15,500 non-native current residents in Spain between the months of November 2006 and February 2007. We select only Ecuadorian migrants that represent the third source of immigrants in Spain after Moroccan and Romanian. In Table A.1 we present the percentage of migrants by country of origin. Considering all the sample, Moroccan and Ecuadorians are the first two major country of origins with 12.17 percent and 8.76 percent of migrants respectively while Romanian are 8.28 percent.

Table A.1: Percentage by country of origin

	% of migrants
Morocco	12.17
Ecuador	8.76
Romania	8.28
Colombia	6.82
France	6.33
Argentina	5.15
United Kingdom	4.96
Germany	4.28
Portugal	3.17
Bolivia	2.58
Venezuela	2.56
Perù	2.54
Cuba	2.19
Bulgaria	2.05
Brazil	2.05

Note: author's elaboration on ENI 2007.

After accounting for missing observations and restricting the sample to individuals who arrived in Spain before 2006 and hence have been in Spain for at least one year, we end up with a sample of 1234 migrants. Taking into account only individuals with a secondary level of education attained, Ecuadorians are at the second place with 7.55

²¹The survey was proposed by a university-based research team within the context of the Population and Society Research Network for the Spanish Statistical Office (INE) in July 2004.

percent of migrants while at the first place Maroccans with 10.71 percent.

Overall, the survey provides comprehensive information on migrants: it pertains general data on the conditions at the origin country and demographic characteristics such as language skills, education, marital status and household structure. Moreover, it collects information on the current place of residence as well as conditions upon departure from the country of origin (i.e., the type of housing, the place of parents' residence, the labor market status and the sector of occupation) and upon arrival in Spain.

4.4.2 Description of Variables

We introduce variables at the individual and household level and variables related to migration to deeply control for characteristics that may influence both the probability to remit and the amount remitted (see Table A.1 in the Appendix).

First, we include standard individual variables such as *age* and *age square* (to capture the potential non-linearity between age and our outcome variables), *gender* (male equal to 1) and *marital status* (married equal to 1, 0 if single). Additionally, we must take into account that any argument related to remittances is linked with earnings; so, we control for the logarithm of annual income at individual level testing the hypothesis that higher income induces higher amount of remittances (Bollard et al., 2011; de la Briere et al., 2002; Funkhouser, 1995; Holst and Schrooten, 2006; Naufal, 2008; Niimi and Schiff, 2010).

Second, we include a set of control variables about migrant's household characteristics such as *children in Spain* and *parents within the Household*. The first is a dummy variable equal to 1 if there is a child within the household at destination; the second allow us to take into account if there are household members as spouse or other parents at destination. Hypothesis behind household characteristics are related to the fact that having children or parents within the household at destination decreases both outcome variables since the income part available as remittances is smaller. Moreover, we control for *social participation* which is a dummy variable equal to 1 if the migrant participates in social clubs or activities and it can be considered as a measure for integration at destination; as in Stark and Dorn (2013), the more integrated is the migrant, the more he will remit to the household at origin.

Third, we control for characteristics more related to the migration experience. As

in Funkhouser (1995), we include *years since migration* and *intention to return* dummy variables (equal to 1 if the migrant has the idea to return at origin within the next 5 years) to capture the fact that usually educated migrants stay abroad for a long period of time and thus they do not have the intention to return, hence they remit less. Moreover, we include a dummy variable which captures if the migrant has a Spanish citizenship to measure migrants' illegal status. In fact, more educated migrants are less likely to be illegal at destination, they usually have bank accounts so they potentially remit more easily due to lower transaction costs; however, having a Spanish citizenship can be considered also a measure of the less intention to return in the country of origin hence also a negative relationship can be found at the extensive and intensive margin. Another important aspect that is strictly related to remittances is the contact with *family ties* at origin; we include a dummy variable equal to 1 if the migrant has a mother, father, spouse brother or children in the origin country and we expect a positive sign for both the outcome variables. In order to test the hypothesis that the propensity to remit and the amount remitted are related to the wealth at origin, we control for the fact that the migrant is a land owner in Ecuador (Holst and Schrooten, 2006) even if we know that having household income at origin would be the best solution to address this specific topic.²²

4.4.3 Descriptive Statistics

In Table A.2 a summary of the descriptive statistics, considering all the variables included in the econometric analysis.

On average, Equadorian remitting migrants represent almost 70 percent of the entire sample and they remit, on average, almost 2500 euros per year (on average, more than 20 percent of their annual income). 14.6 percent have a lower secondary level of education attained. 46 percent are men, 44 percent are married and they are, on average, 33 years old. They usually stay abroad for 6.5 years and 10 percent of them have a Spanish citizenship. With a family composed by, on average, 4 individuals, almost 80 percent of them have children between 0 and 16 years old within the household in Spain and 32 percent of them have relatives (i.e, mother, father, brother, spouse or children) in Ecuador. Looking at the

²²It is commonly known that in developing countries most of the household members have the same income or, at least, they share the same income class.

exogenous variation in education, 83.5 percent of the Ecuadorians in Spain were treated by either the Ecuadorian or the Spanish educational reform.²³

Table A.2: Summary statistics

Variables	Mean	Std. Dev.	Min.	Max.	N
<i>Dependent Variables</i>					
Likelihood to Remit	0.703	0.457	0	1	1182
Remittances (amount)	2466.56	2824.449	0	28000	679
<i>Educational levels</i>					
Primary	0.292	0.455	0	1	1182
Low secondary	0.146	0.354	0	1	1182
High secondary	0.401	0.49	0	1	1182
Tertiary	0.158	0.365	0	1	1182
<i>Individual Characteristics</i>					
Age	33.287	9.802	16	84	1180
Male	0.461	0.499	0	1	1182
Married	0.444	0.497	0	1	1182
Income	11434.396	4275.665	384	48000	793
<i>Household Characteristics</i>					
Parents within the HH	0.369	0.483	0	1	1182
Children in Spain	0.559	0.497	0	1	1182
<i>Migration Characteristics</i>					
Family Ties	0.877	0.328	0	1	1182
Years since migration	6.537	2.991	2	46	1182
Intention to Return	0.163	0.37	0	1	1006
Spanish Citizenship	0.106	0.308	0	1	1182
Social Participation	0.078	0.268	0	1	1182
Land owner at origin	0.305	0.46	0	1	1182
<i>Instrumental Variable</i>					
Reform	0.836	0.371	0	1	1182

Note: author's elaboration on ENI 2007.

Table A.3 describes the percentage of remitting migrants (column 1) and the average of the amount remitted (column 2) by educational levels and by gender. More than 40 percent of migrants with no education or with primary education remit while the percentage decrease for those with a low secondary level and it is even lower for highly

²³If we consider different hypothesis we are going to test in the empirical part of this work, migrants with at least secondary level of education are abroad more years than low skilled migrants, they are owner at origin and they mainly have Spanish citizenship according to the fact that they do not tend to return at origin (Table A.3 in Appendix).

educated migrants (tertiary education attained). By gender, males have a slightly higher propensity to remit than female. Descriptive statistics are similar taking into account the average of the amount remitted. On average, the less educated migrants tend to remit more than more educated migrants. Differences by gender hold also at the intensive margin.

Table A.3: Descriptive Statistics on extensive and intensive margins

	% of remitting migrants	Avg. amount remitted
<i>Panel A: by Educational Levels</i>		
No Education	43.2	1165.89
Primary	40.4	1911.87
Low Secondary	32.8	1845.52
High Secondary	43.6	1861.85
Tertiary	29.9	1849.78
<i>Panel B: by Gender</i>		
Male	38.5	2029.99
Female	35.9	1710.49

Note: author's elaboration on ENI 2007.

In Table A.4 we present the percentage of individuals considering their educational level: in columns (1) the mean, in columns (2) and (3) individuals treated and not treated by the educational reforms. Overall, among all ecuadorians, 42 percent of them have a high secondary level of education completed (41 percent men and 42 percent women) while almost 31 percent have a primary level attained and, in this case, the percentage is higher for men (33 percent) than for women (28 percent). The percentage of migrants with a low secondary level of education does not differ by gender (15 percent). Dissimilarities are evident considering tertiary level: 14 percent of women have a bachelor degree instead of only 9 percent of men. Looking at columns (2) and (3), the effect of the reform is evident. Overall, 16 percent of ecuadorians have a low secondary level of schooling if they have been treated by the reform, while only 10 percent if not treated. Higher differences are found in the male and female subsample (17 percent and 8 percent in the first case and 16 percent and 11 percent in the second case).

Table A.4: Educational level by subsample

		Mean	Reform	No Reform
All sample	Primary	31	30	34
	Low Sec.	15	16	10
	High Sec.	42	43	35
	Tertiary	11	10	19
Male sample	Primary	33	32	41
	Low Sec.	15	17	8
	High Sec.	41	43	34
	Tertiary	9	8	14
Female sample	Primary	28	28	29
	Low Sec.	15	16	11
	High Sec.	42	43	37
	Tertiary	14	12	24

Note: author's elaboration on ENI 2007. Values are expressed as percentage points.

4.5 Results

4.5.1 Extensive Margin: the Likelihood to Remit

In Table A.5 we report Probit results considering five different specifications, with progressively larger sets of controls variables.²⁴ The way we include controls follows a variety of hypothesis we have presented in Section 4.3. In column (1) we present estimation with baseline controls while from column (2) to (5) we add variables depending primarily, on individual migrant's characteristics; secondly, on household members' characteristics; thirdly, features related to migration and, in the last column, we deal with the final specification in which we include land ownership at origin as measure of family wealth in Ecuador.

The relation between the educational explanatory variable and the likelihood to remit is negative but not significant. On the contrary, there are other factors significantly related to the dependent variable. For instance, the probability to remit is increasing and concave in age, it decreases if the migrant has children with him in Spain while it is higher if there are family members in Ecuador (Agarwal and Horowitz, 2002; Banerjee, 1984; Johnson

²⁴Even if this procedure reduces the sample size, it allows us to obtain a more complete characterization of the determinants to remit

and Whitelaw, 1974; Stark, 1991, 1995; Stark and Lucas, 1988). Moreover, as in de la Briere et al. (2002), the intention to return is positive associated with the likelihood to send remittances whereas increasing the years abroad decrease the the probability to remit (Oberai and Singh, 1980; Stark, 1995; Rodriguez, 1998; Rapoport and Docquier, 2006).

Table A.5: Extensive Margin adding controls: Probit Estimates

Dependent variable: Likelihood to Remit					
	(1)	(2)	(3)	(4)	(5)
Low Secondary Education (d)	-0.073 (-0.82)	-0.137 (-1.21)	-0.161 (-1.39)	-0.138 (-1.08)	-0.138 (-1.08)
Age	0.516*** (8.41)	0.620*** (3.65)	0.466*** (2.58)	0.538*** (2.64)	0.541*** (2.66)
Age Square	-0.011*** (-6.98)	-0.015*** (-3.32)	-0.012** (-2.47)	-0.013** (-2.43)	-0.013** (-2.44)
Male (d)	0.077 (0.96)	0.060 (0.52)	0.028 (0.23)	0.134 (0.99)	0.129 (0.96)
Log Income		0.012 (0.09)	0.043 (0.29)	-0.000 (-0.00)	0.016 (0.10)
Married (d)			0.060 (0.53)	-0.015 (-0.12)	-0.005 (-0.04)
Parents within the HH (d)			-0.089 (-0.72)	-0.154 (-1.13)	-0.157 (-1.15)
Children in Spain (d)			-0.372*** (-3.41)	-0.288** (-2.33)	-0.271** (-2.14)
Family ties at origin (d)			1.055*** (6.17)	1.001*** (5.48)	1.000*** (5.48)
Years since migration				-0.107*** (-3.26)	-0.104*** (-3.13)
Intention to return (d)				0.334** (2.01)	0.336** (2.02)
Social Participation (d)				0.322 (1.48)	0.321 (1.48)
Spanish Citizenship (d)				-0.123 (-0.64)	-0.113 (-0.58)
Land ownership at origin (d)					-0.086 (-0.66)
Constant	-6.823*** (-9.00)	-7.261*** (-3.18)	-6.058** (-2.49)	-6.100** (-2.33)	-6.299** (-2.39)
Obs.	1181	791	791	671	671

Note: t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. (d) indicates discrete change of dummy variable from 0 to 1.

In Table A.6 we implement a seemingly unrelated Bivariate Probit estimation dealing with the exogenous variation in education through the educational reforms that were implemented in Ecuador and in Spain.²⁵ The coefficient of our explanatory variable is significant for all specifications. If in the baseline regression is positive (column 1), it be-

²⁵See section 4.3 for a detailed description of these reforms. First-stage of the analysis confirms the positive effect of the reform on having a greater educational level at 10 percent significant level.

comes negative in all other regressions after the inclusion of the logarithm of the migrant's income variable. Thus, whenever we do not control for income, more educated migrants have a higher propensity to remit; on the contrary, once migrants' incomes are taken into account, it comes out the opposite behaviour so that having at least a low secondary level of education decrease the probability to send remittances back home. In particular, adding controls in a way that we test the hypothesis described in the methodological section, we can notice that the coefficient becomes smaller; hence, there is an evidence that other factors should taken into account whenever we deal with the intention to send remittances back home. The other coefficients maintain the same sign as in the Probit estimations: negative if the migrant has children in Spain and for the increase in years abroad; positive for having family members in Ecuador and have the intention to return in the origin country.

Table A.6: Extensive Margin adding controls: Bivariate Probit Estimation

	Dependent variable: Likelihood to Remit				
	(1)	(2)	(3)	(4)	(5)
Low Secondary Education (d)	0.993** (1.99)	-1.494*** (-19.85)	-1.252*** (-4.35)	-1.064** (-2.16)	-1.044** (-1.99)
Age	0.407*** (3.85)	0.371*** (2.87)	0.374** (2.12)	0.472** (2.26)	0.477** (2.27)
Age Square	-0.008*** (-3.51)	-0.009*** (-2.61)	-0.009** (-1.98)	-0.011** (-2.03)	-0.011** (-2.04)
Male (d)	0.118 (1.50)	-0.099 (-1.09)	-0.073 (-0.64)	0.034 (0.24)	0.032 (0.22)
Log Income		-0.005 (-0.06)	0.042 (0.35)	0.002 (0.01)	0.016 (0.12)
Married (d)			0.048 (0.50)	-0.015 (-0.13)	-0.007 (-0.06)
Parents within the HH (d)			-0.076 (-0.74)	-0.137 (-1.11)	-0.140 (-1.12)
Children in Spain (d)			-0.311*** (-2.88)	-0.258** (-2.12)	-0.246** (-1.97)
Family ties at origin (d)			0.871*** (4.24)	0.892*** (4.06)	0.897*** (4.04)
Years since migration				-0.095*** (-2.80)	-0.093*** (-2.72)
Intention to return (d)				0.294* (1.91)	0.298* (1.91)
Social Participation (d)				0.285 (1.43)	0.287 (1.42)
Spanish Citizenship (d)				-0.108 (-0.62)	-0.101 (-0.57)
Land ownership at origin (d)					-0.073 (-0.62)
Constant	-6.150*** (-5.68)	-3.242* (-1.88)	-4.163* (-1.76)	-4.755* (-1.73)	-4.976* (-1.78)
Obs.	1181	791	791	671	671

Note: t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. (d) indicates discrete change of dummy variable from 0 to 1. Marginal fixed effects for the explanatory variable: column (1) is +.2975; column (2) is -.1673; column (3) is -.1525; column (4) is -.1407; column (5) is -.1392.

4.5.2 Intensive Margin: the Amount Remitted

The second part of the empirical analysis is devoted to analyze the intensive margin that is how the migrant's educational level affects the amount remitted in the year preceding the survey (2006).

In Table A.7 we present results for the Ordinary Least Squares estimations. We start from the baseline regression (column 1) and then we add controls following the same logical path as for the extensive margin econometric analysis (from column 2 to 5).

In this case the coefficient of the explanatory variable is positive but not significant suggesting that it could exist a positive relation between education and the amount remitted. We will study if this relation still holds when we will account for the exogenous variation in education.

Another important aspect is the positive and significant sign of the income variable highlighting the strong correlation with the outcome variable considered here. On the contrary, we obtain a negative and significant coefficient if the migrant has children with him in Spain (as at the extensive margin) (Agarwal and Horowitz, 2002; Banerjee, 1984; Johnson and Whitelaw, 1974; Stark, 1995; Stark and Lucas, 1988) while having family ties at origin is positive but not significant. As in the extensive margin results, increasing the number of years abroad is negatively related to the amount remitted while at the intensive margin the coefficient is not significant anymore, so that the time spent abroad is not correlated with the decision on how much remit. Furthermore, if the migrant declares to have the intention to return the amount remitted increases (Stark and Lucas, 1985; Steiner and Velling, 1992; Stark, 1995; Rapoport and Docquier, 2006). Taking into account the fact that remittances may vary with respect to the needs of those left behind, we use land ownership as a measure of earnings in Ecuador (Holst and Schrooten, 2006). As expected, if the migrant owns a land in Ecuador, the amount of remittances he will send to the family at origin decreases and this coefficient is significant at 0.01 percent level implying that the amount remitted depends also on the economic situation of family members left behind (Stark and Lucas, 1988; Gubert 2002).

In Table A.8 we implement the Instrumental Variable approach controlling for the endogeneity of education. At the first stage, a Probit model is applied while an OLS at

Table A.7: Intensive Margin adding controls: OLS Estimates

	Dependent variable: Log Remittances				
	(1)	(2)	(3)	(4)	(5)
Low Secondary Education (d)	0.018 (0.18)	0.100 (0.90)	0.084 (0.77)	0.089 (0.75)	0.083 (0.71)
Age	0.223* (1.67)	0.264* (1.73)	0.282* (1.87)	0.297* (1.70)	0.335** (1.98)
Age Square	-0.004 (-1.34)	-0.006* (-1.73)	-0.007* (-1.95)	-0.008* (-1.76)	-0.008** (-2.01)
Male (d)	0.221** (2.43)	-0.068 (-0.56)	-0.109 (-0.94)	-0.087 (-0.66)	-0.107 (-0.82)
Married (d)		-0.018 (-0.18)	0.097 (0.93)	0.091 (0.79)	0.156 (1.35)
Log Income		0.528*** (3.07)	0.466*** (2.78)	0.425** (2.26)	0.520*** (2.74)
Parents within the HH (d)			0.188* (1.66)	0.124 (0.98)	0.070 (0.55)
Children in Spain (d)			-0.612*** (-6.12)	-0.554*** (-4.79)	-0.463*** (-3.91)
Family ties at origin (d)			0.434 (1.44)	0.424 (1.39)	0.408 (1.39)
Years since migration (d)				-0.058* (-1.71)	-0.039 (-1.14)
Intention to return (d)				0.350** (2.36)	0.355** (2.40)
Social Participation (d)				0.256 (1.33)	0.279 (1.45)
Spanish Citizenship (d)				0.422* (1.84)	0.488** (2.14)
Land ownership at origin (d)					-0.453*** (-3.49)
Constant	3.711** (2.18)	-1.174 (-0.48)	-0.841 (-0.35)	-0.466 (-0.17)	-1.936 (-0.72)
R ²	0.029	0.043	0.109	0.131	0.157
Obs.	676	517	517	438	438

Note: t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. (d) indicates discrete change of dummy variable from 0 to 1.

the second stage.²⁶ The effect of an exogenous increase in migrants educational level is negatively related to the amount remitted and this result holds for all specifications. In particular, adding controls, the coefficient becomes smaller, confirming the importance of the other variables included in the model. Results are similar to OLS estimations, with the exception of the significance of the explanatory variable. Still, the positive income effect is evident so that having more income increase the amount that can be remitted. As in the OLS regressions, having children in Spain is negative related to the amount remitted as well as being owner of a land in Ecuador implies that educated migrants usually have richer families at origin which do not need remittances to smooth earning shocks (Stark and Lucas, 1988; Gubert 2002).

²⁶*treatreg* command in STATA.

Table A.8: Intensive Margin adding controls: IV Estimation

Dependent variable: Log Remittances					
	(1)	(2)	(3)	(4)	(5)
Low Secondary Education (d)	-0.749 (-1.64)	-0.604 (-1.44)	-0.697 (-1.54)	-0.866** (-2.09)	-0.728* (-1.82)
Age	0.253* (1.82)	0.267 (1.61)	0.297* (1.78)	0.331* (1.68)	0.365** (1.96)
Age Square	-0.005 (-1.50)	-0.006 (-1.56)	-0.007* (-1.80)	-0.008* (-1.66)	-0.009* (-1.93)
Male (d)	0.159 (1.60)	-0.134 (-1.06)	-0.170 (-1.38)	-0.182 (-1.28)	-0.188 (-1.38)
Log Income		0.557*** (3.45)	0.496*** (3.13)	0.496*** (2.81)	0.583*** (3.28)
Married (d)			0.110 (1.01)	0.097 (0.80)	0.163 (1.37)
Parents within the HH (d)			0.116 (0.95)	0.038 (0.28)	-0.004 (-0.03)
Children in Spain (d)			-0.643*** (-6.15)	-0.563*** (-4.60)	-0.468*** (-3.80)
Family ties at origin (d)			0.428 (1.37)	0.381 (1.20)	0.371 (1.23)
Years since migration				-0.050 (-1.46)	-0.032 (-0.94)
Intention to return (d)				0.365** (2.36)	0.368** (2.44)
Social Participation (d)				0.421* (1.93)	0.420** (1.97)
Spanish Citizenship (d)				0.404* (1.65)	0.475** (2.00)
Land ownership at origin (d)					-0.467*** (-3.52)
Constant	3.852** (2.17)	-1.046 (-0.41)	-0.813 (-0.32)	-0.985 (-0.34)	-2.422 (-0.87)
Obs.	676	517	517	438	438

Note: t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. (d) indicates discrete change of dummy variable from 0 to 1.

4.6 Conclusions

In this paper we have analyzed empirically the determinants of remittances both at the extensive and at the intensive margin, considering the potential endogeneity of the educational level attained by the migrants.

Although such relationship has been explored in the literature, results are still controversial, not defining the sign of the relationship between remittances and the individual level of human capital, measured as the educational level attained by each migrant (Acemoglu and Angrist, 1991; Becker, 1962; Ben-Porath, 1967; Schultz, 1961). Additionally, at the best of our knowledge, there are very few economic studies looking at an exogenous variation in education to estimate the causal relationship.

To improve the research on this topic, we use the Spanish National Immigrant Survey (2007), a retrospective micro database on non-native current resident in Spain selecting Ecuadorians migrants. To give a causal interpretation on the relationship between migrants' education and remitting behaviour, we exploit an educational reform as exogenous variation in education. Specifically, in the microeconomic analysis we consider the Ecuadorian educational reform implemented in the 1977 that increased the length of compulsory schooling from 6 (primary education) to 9 years (6 of primary education and 3 years of lower secondary education) so that individuals were assigned to additional years of schooling exogenously, depending on their date of birth.

Our findings indicate that, after controlling for a wide set of individual covariates, there exists a negative association between remittances and migrants' educational level: the more the migrant is educated, the less he will remit, both at the extensive and intensive margin. Moreover, including variables related to the intention to return in the origin country and a measure of wealth status of the family left behind, the effect of education decrease both at the extensive and intensive margin, implying that these factors may be related to migrants' remitting behaviour as better educated migrants tend to return less in the origin country (i.e., brain drain effect) (Stark and Lucas, 1985; Steiner and Velling, 1992; Stark, 1995; Rapoport and Docquier, 2006) and, because they have wealthier families left behind, remittances are not needed to smooth earning shocks in their country of birth (Stark and Lucas, 1988; Gubert 2002).

Concluding, the link between migrants' educational level and their remitting behaviour is relevant for policy implications. If the flow of skilled migrants will rise in the next years, remittances may not be considered a way to alleviate poverty at origin, in particular in the long run. This is because there is an evidence of the negative relationship between migrants' educational level and remitting behaviour.

Appendix

Table A.1: Variables description

Variable	Description
<i>Dependent Variables</i>	
Likelihood to Remit	= equal to 1 if the migrant has send remittances in the year preceding the survey (2006)
Remittances (amount)	= logarithm of the amount remitted in the year preceding the survey (2006)
<i>Educational level</i>	
Low secondary	= equal to 1 if the migrant has at least a low secondary level of education
<i>Individual Characteristics</i>	
Age	
Male	= equal to 1 if the migrant is male, 0 if female
Married	= equal to 1 if the migrant is married, 0 if single
Income	logarithm of the individual total income
<i>Household Characteristics</i>	
Parents within the HH	= equal to 1 if the migrant has parents living with him in Spain
Children in Spain	= equal to 1 if the migrant has children living with him in Spain
<i>Migration Characteristics</i>	
Family Ties	= equal to 1 if the migrant has parents or other relatives living with in Ecuador
Years since migration	
Intention to Return	= equal to 1 if the migrant has the intention to return in Ecuador in the next few years
Spanish Citizenship	= equal to 1 if the migrant has a spanish citizenship
Social Participation	= equal to 1 if the migrant participates in social clubs in Spain
Land owner at origin	= equal to 1 if the migrant owns a land in Ecuador
<i>Instrumental Variable</i>	
Reform	= equal to 1 if the migrant has been treated by the Ecuadorian or Spanish educational reform

Note: author's elaboration on ENI 2007.

Table A.2: Individuals' Age at arrival in Spain

	Total	Male	Female
From 0 to 15	6.16	5.58	6.66
From 16 to 29	56.08	55.85	56.28
From 30 to 44	30.55	30.54	30.56
From 45 to 59	4.54	5.06	4.08
60 and more	0.57	0.87	0.3

Table A.3: Descriptive Statistics: testing hypothesis

	% values
<i>Spanish Citizenship</i>	
No Edu	0
Primary	0.063
Low Sec.	0.092
High Sec.	0.107
Tertiary	0.192
<i>Return</i>	
No Edu	0
Primary	0.154
Low Sec.	0.174
High Sec.	0.155
Tertiary	0.189
<i>Wealth (proxy)</i>	
No Edu	0.333
Primary	0.278
Low Sec.	0.277
High Sec.	0.328
Tertiary	0.320
<i>Family Ties</i>	
No Edu	1
Primary	0.886
Low Sec.	0.809
High Sec.	0.882
Tertiary	0.909

Table A.4: Extensive Margin adding controls: Probit Estimates (28-56 sample age)

	Dependent variable: Likelihood to Remit					
	(1)	(2)	(3)	(4)	(5)	
Low Secondary Education	-0.813 (-0.86)	-0.736 (-0.84)	-1.110*** (-2.99)	-0.915* (-1.65)	-0.892 (-1.56)	-0.880 (-1.46)
Age	-0.186 (-0.47)	0.031 (0.06)	-0.085 (-0.16)	-0.083 (-0.14)	-0.121 (-0.20)	-0.115 (-0.19)
Age Square	0.005 (0.46)	-0.001 (-0.08)	0.002 (0.14)	0.002 (0.14)	0.003 (0.21)	0.003 (0.20)
Male (d)	0.076 (0.50)	0.082 (0.48)	0.005 (0.03)	0.180 (1.07)	0.175 (1.03)	0.175 (1.02)
Log Income		-0.063 (-0.41)	-0.039 (-0.28)	-0.114 (-0.74)	-0.112 (-0.72)	-0.105 (-0.66)
Married (d)			0.056 (0.52)	-0.049 (-0.39)	-0.042 (-0.33)	-0.038 (-0.30)
Parents within the HH (d)			-0.007 (-0.07)	-0.036 (-0.28)	-0.039 (-0.30)	-0.041 (-0.32)
Children in Spain (d)			-0.454*** (-3.36)	-0.414*** (-2.84)	-0.422*** (-2.91)	-0.416*** (-2.77)
Family ties at origin (d)			0.804*** (3.65)	0.746*** (3.15)	0.741*** (3.10)	0.742*** (3.08)
Years since migration				-0.093** (-2.55)	-0.083** (-2.33)	-0.082** (-2.26)
Intention to return (d)				0.276* (1.66)	0.272 (1.62)	0.274 (1.63)
Social Participation (d)				0.244 (1.10)	0.273 (1.21)	0.273 (1.20)
Spanish Citizenship (d)					-0.167 (-0.89)	-0.164 (-0.87)
Land ownership at origin (d)						-0.035 (-0.27)
Constant	3.778 (0.76)	1.671 (0.24)	2.684 (0.40)	3.654 (0.48)	4.053 (0.52)	3.891 (0.50)
Obs.	916	662	662	558	558	558

Notes: t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. (d) indicates discrete change of dummy variable from 0 to 1.

Table A.5: Intensive Margin adding controls: IV Estimates (28-56 sample age)

Dependent variable: Log Remittances					
	(1)	(2)	(3)	(4)	(5)
Low Secondary Education	-0.673 (-1.27)	-0.532 (-0.90)	-0.593 (-0.98)	-0.881 (-1.63)	-0.808 (-1.50)
Age	0.512 (1.14)	0.374 (0.72)	0.320 (0.63)	0.270 (0.45)	0.292 (0.50)
Age Square	-0.014 (-1.18)	-0.011 (-0.79)	-0.009 (-0.71)	-0.008 (-0.52)	-0.008 (-0.55)
Male (d)	0.047 (0.43)	-0.191 (-1.33)	-0.200 (-1.45)	-0.208 (-1.32)	-0.216 (-1.40)
Log Income		0.518*** (2.91)	0.463*** (2.60)	0.424** (2.15)	0.522*** (2.59)
Married (d)			0.103 (0.89)	0.072 (0.55)	0.135 (1.04)
Parents within the HH (d)			0.131 (1.01)	0.050 (0.35)	0.001 (0.00)
Children in Spain (d)			-0.668*** (-6.01)	-0.599*** (-4.47)	-0.499*** (-3.60)
Family ties at origin (d)			-0.322 (-0.91)	-0.332 (-1.00)	-0.273 (-0.84)
Years since migration				-0.058 (-1.59)	-0.039 (-1.08)
Intention to return (d)				0.425** (2.54)	0.424*** (2.58)
Social Participation (d)				0.414 (1.64)	0.417* (1.66)
Spanish Citizenship (d)				0.473* (1.92)	0.524** (2.14)
Land ownership (d)					-0.411*** (-2.82)
Constant	1.473 (0.26)	-1.355 (-0.20)	0.559 (0.09)	2.001 (0.26)	0.484 (0.06)
Obs.	572	445	445	373	373

Notes: t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. (d) indicates discrete change of dummy variable from 0 to 1.

Table A.6: Summary of all main results: Secondary Education as explanatory variable

	Dependent variables			
	Likelihood to remit		Log Remittances	
	Probit	Biprobit	OLS	Treatreg
Secondary Education	0.105 (0.90)	-1.388*** (-6.76)	0.092 (0.86)	-1.039*** (-2.73)
Age	0.527*** (2.66)	0.368** (2.08)	0.338** (2.00)	0.345* (1.71)
Age Square	-0.013** (-2.45)	-0.010** (-2.13)	-0.008** (-2.02)	-0.009* (-1.78)
Male	0.144 (1.07)	-0.003 (-0.02)	-0.106 (-0.81)	-0.218 (-1.50)
Married	-0.013 (-0.10)	0.015 (0.18)	0.154 (1.33)	0.183 (1.45)
Log Income	0.005 (0.04)	0.008 (0.08)	0.522*** (2.74)	0.574*** (3.29)
Parents within the HH	-0.134 (-0.99)	-0.061 (-0.59)	0.060 (0.48)	0.091 (0.65)
Children in Spain	-0.258** (-2.01)	-0.174** (-2.01)	-0.461*** (-3.89)	-0.491*** (-3.80)
Family ties at origin	1.005*** (5.46)	0.623*** (3.38)	0.409 (1.39)	0.350 (1.15)
Years since migration	-0.106*** (-3.17)	-0.064** (-1.99)	-0.039 (-1.16)	-0.026 (-0.70)
Intention to return	0.336** (2.02)	0.230** (2.06)	0.355** (2.41)	0.363** (2.25)
Social Participation	0.286 (1.33)	0.187 (1.43)	0.277 (1.44)	0.485** (2.15)
Spanish Citizenship	-0.110 (-0.56)	-0.092 (-0.78)	0.498** (2.19)	0.351 (1.41)
Land ownership at origin	-0.088 (-0.68)	-0.053 (-0.61)	-0.459*** (-3.54)	-0.402*** (-2.85)
Constant	-6.209** (-2.40)	-3.148 (-1.35)	-2.012 (-0.75)	-1.687 (-0.59)
Obs.	671	671	438	438

Notes: t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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