Network Effects on Migrants' Remittances

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Abstract

This paper explores the existence of network effects in migrants' remittance behavior. In this study, networks are defined as groups of immigrants from the same country that live in the same locality. Using the National Immigrant Survey, a unique database for Spain, immigrants are found to be more likely to remit and to remit more money if they belong to high remitting country groups. This finding sheds new light on the determinants of the decision to remit, as well as on the scope of immigrant networks.

JEL codes: J61, F22, O15, A14, E21

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1 Introduction

The World Bank estimates that remittances, i.e., money sent abroad by immigrants, totaled $420 billion in 2009, of which $317 billion went to developing countries. The absolute amount of remittances increased sharply in the last decade with the exception of the most recent years of the economic crisis (2008 to 2010). The evolution of the total quantity remitted over time can be seen in Figure 1. The money received is an important source of income for many developing economies, representing in some cases a very relevant percentage of the gross domestic product (GDP) of the receiving country[1]. From the microeconomic perspective, remittance sending constitutes an indicator of return migration intentions. Remittances are also an input into household decision-making in the money-receiving country, affecting labor supply, self-employment, and even fertility. See, for instance, Maimbo and Ratha (2005). Additionally, remittances allow families to overcome financial constraints and invest in productive assets as shown in Chiodi, Jaimovich, and Montes-Rojas (2009).

This paper addresses whether there are network effects in remittance sending. In particular, I test whether remittance sending increases as a consequence of living in the same locality as compatriots from high remitting cultures.

Remittances may be sent due to altruism or self-interest. Self-interest includes investment as well as saving motives. Rapoport and Docquier (2006) provides an in-depth analysis of remittance motives. Social networks may increase remittances sent for altruistic reasons because high remitting networks may exert social pressure towards remitting more, as well as reinforce the links of immigrants with the home country. Moreover, social networks may reduce remittances sent for self-interest reasons because networks may refer good savings or investment opportunities in the country of origin. Additionally, social networks may simply facilitate remittance sending by informing network members about the means of transferring money.

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[1]Of the top 10 remittance recipients in 2006, the proportion of remittances over total GDP ranges from over one third (36.2% for Tajikistan) to one fifth (20.3% for Jordan).

A prolific branch of the literature on social networks focuses on their effects on immigrants. Immigrants' behavior has been shown to significantly depend on the quantity and quality of their social links. The seminal contributions in Borjas (1992) and Borjas (1995) find positive network effects on the human capital accumulation of immigrants. Bertrand, Luttmer, and Mullainathan (2000) shows that immigrants with more contacts use welfare more often than if they belong to high welfare using groups. Aslund and Fredriksson (2005) supports these results by using quasi-experimental evidence.

The extant literature focuses on how networks alter the labor market of immigrants. After accounting for the self-selection of immigrants into ethnic enclaves, Damm (2009) finds that networks have an overall positive effect on employment probabilities. According to Beaman (2006), the effect depends on the length of residence of the social network in the host location, in the sense that relatively old networks have a positive employment influence, while relatively young networks have a negative effect. Andersson, Burgess, and Lane (2009) finds that immigrants belonging to social networks are more likely to be employed in the same firms as those of other members of the same network. Additionally, social networks have been shown to affect wages and the occupational choice of immigrants. According to Patel and Vella (2007), immigrants are more likely to choose the most popular occupations among their compatriots. As a consequence, they experience increases in wages. In the same line, Munshi (2003) finds that immigrants have a higher probability of holding a preferred non-agricultural job when their network is exogenously larger.

The impact of social networks on immigrants remitting behavior has only been marginally addressed. Amuedo-Dorantes and Pozo (2006) argue that immigrants with social networks, as defined by the presence of friends and family members in the location, are expected to remit less because they have lower incentives to remit for insurance motives. According to this argument, they only allow social networks to have an impact on remitting behavior through the probability of being employed. In this paper, I show that social networks directly affect the remitting behavior of immigrants, even after controlling for

employment status and income. Funkhouser (1995) provides some evidence in favor of cultural differences determining remittance behavior. Motivated by the great differences in remittance sending between El Salvador and Nicaragua, Funkhouser compares the determinants of remitting in those countries. He finds that the differences in remitting behavior between them cannot be explained by differences in observed characteristics. Instead, it is explained by differences in the behavioral coefficients and the impact of self-selection. These findings are in line with the primary result of this paper, in that cultural factors are important. The contribution of this paper is to show that cultural differences are exacerbated by the presence of network effects.

According to the World Bank, in recent years, Spain ranks sixth in the list of top remittance-sending countries. The amount of money remitted from Spain has risen sharply since 2000, reaching a maximum in 2008, when the amount was over 15 million US dollars. Spain is also the 10th country with the highest absolute number of immigrants, as reported by the World Bank. Given its geographical situation and its cultural links with former colonies, Spain has received immigrant inflows from many different countries. This will prove to be particularly useful in this analysis, because it will provide the necessary variation in remitting cultures.

The importance of cultural factors, when explaining remitting behavior in Spain, is evidenced by the great dispersion existing in the proportion of remitters and the average quantity remitted across country groups. Figure 3.1 shows that the average proportion of remitters by country takes many different values covering all the spectrum between zero and one. According to the data displayed in Figure 3.2, the ranking of continents by proportion of remitters is led by Asia, with over one half of immigrants sending remittances. Americans rank second, with less than 5 percentage points under the proportion of remitters from Asia. Africans follow with almost 40% of their immigrants sending remittances. Finally, Europeans are found to include relatively few remitters (less than one fourth of them remit).

Figure 4.1 exhibits the distribution of average quantity remitted in a year by birth

country. The variable takes on many different values, reflecting the great variation existing across cultures. By classifying immigrants by birth continent, the ranking of average quantity remitted is displayed in Figure 4.2. This ranking is very similar to the one found for the proportion of remitters within continent groups. However, we observe that Africans depart much more from the remitting behavior of Asians and Americans. In fact, Africans remit less than half the average Asian. This can be due to differences in income.

To provide a first insight into how the correlation between remitting behavior and number of individuals in the network differs for high and low remitting country groups, Figures 5.1 and 5.2 display some correlations. Individuals from countries with a low proportion of remitters display a positive, but much lower, correlation between remittance sending and the number of individuals in the network relative to individuals from countries with a high proportion of remitters. Similarly, individuals from countries with a low average quantity remitted exhibit a positive, but much lower, correlation between quantity remitted and number of individuals in the network, relative to individuals from countries with a high average quantity remitted. This is in agreement with the results of the primary estimations, reflecting that individuals in social networks are more likely to remit, and remit more, if they belong to high remitting cultures.

The remainder of the paper proceeds as follows. Section 2 provides the conceptual framework that relates remittances and immigrant networks. Section 3 presents the empirical strategy. Section 4 describes the databases, the construction of the variables and the sample included in the analysis. In Section 5 the empirical results are discussed and some robustness checks and extensions are included. Section 6 concludes.

2   Conceptual framework

Researchers have emphasized the role of networks in explaining immigrants' individual behavior. They found that social networks influence education attainment (Borjas 1992

and 1995), welfare use (Bertrand et al., 2000), employment (Munshi, 2003), and wages (Beaman, 2007), among others.

Immigrants are likely to change their remitting behavior when they are in social networks. According to Amuedo-Dorantes and Pozo (2006), social networks may reduce remittances sent for insurance purposes. They argue that immigrants with social networks are expected to remit less, since they are subject to less income risk given the capacity of networks to help their members find employment. Therefore, they attribute social networks an indirect effect on remittances through affecting individual employment probability but they consider the presence of social networks to have no direct effect on remittances. However, social networks may directly affect remitting behavior by providing information on money sending means, by referring good investment and savings opportunities and/or by imposing cultural norms. Those social norms may operate via social pressure and/or via reinforcement of ties with the home country.

The information mechanism operates such that immigrants learn about an inexpensive company used to send money to their relatives. They also learn about savings or investment opportunities in the home country through neighbors from the same country and decide to remit and/or to remit more. Additionally, an immigrant may feel obligated to send money to the home country if cultural norms dictate so and she/he is surrounded by co-nationals. Finally, having more co-nationals around may reinforce the cultural tights with the home country and induce immigrants to remit or remit more.

If social networks operate through transmitting information and enforcing cultural norms, remittance sending increases for those immigrants surrounded by co-nationals from high remittance sending groups. In contrasts, if networks have an effect on remittances exclusively through the provision insurance, the effect should be insignificant once one controls for employment and income. The purpose of this paper is precisely precisely to test whether social networks play a direct role in explaining remitting behavior.

3 Methodology

The purpose of the empirical exercise is to test whether immigrants exposed to other immigrants from the same country remit more for immigrants from high remitting country groups. In this context, network size, as defined by the relative number of immigrants from the same country that live in the same location, is used as a proxy for the availability of contacts in a location. Similarly, the average remitting behavior in the group composed of individuals from the same country reflects remitting culture. I use average remittance sending in the country group, instead of in the network, because the last one can introduce an omitting variable bias due to its correlation with unobserved characteristics that the individual may have in common with individuals from the same country living in the same municipality. Therefore, the key variable of interest is measured as the interaction of network size and remitting culture. This allows me to control for the direct effect of network size, as well as culture. Including network size as a control deals with the presence of potential omitted personal characteristics correlated with the number of immigrants in the network. The direct impact of remitting culture will be included in the birth country fixed effects.

In practice, two different dimensions of remitting behavior are explored. First, the probability of remitting is estimated as a function of network size, its interaction with remitting culture as measured by the proportion of remitters from the same country, and a set of controls. Second, the quantity remitted is estimated using as explanatory variables the network size, its interaction with remitting culture, as measured by the average quantity remitted by immigrants from the same country, and several controls.

The individual probability of remitting is modeled using a linear specification as follows:

$$y_{ilc} = \beta_0 + \beta_1 size_{ilc} * culture_{ic} + \beta_2 size_{ilc} + \beta_3 X_{ilc} + \beta_4 V_l + W_c + \varepsilon_{ilc}$$

where: y_{ilc} equals one if individual i living in location l and born in country c remits and zero otherwise. The variable $size$ reflects the relative number of individuals in the network,

culture stands for the proportion of remitting individuals from i's country, X contains individual characteristics, family characteristics and labor market status indicators, V represents a set of location dummies and W denotes a vector of country binary variables. Finally, ε is the error term.

The set of individual characteristics includes a male dummy, age, age squared, indicators for length of residence, a Spanish nationality binary variable, a documented dummy, indicators for the level of education (primary, secondary and tertiary), a dichotomous variable for being educated in Spain, and a binary variable for owning a house in the sending country.

The vector of family characteristics is composed of a married dummy, the number of household members, a dichotomous variable for intending to bring some family members to Spain, an indicator for spouse abroad, a binary variable for at least a brother abroad, a dummy for at least a child abroad, an indicator for father abroad and a dummy for mother abroad.

The variables reflecting labor market status include an employed dummy, income, an indicator for permanent labor contract, and dummies for the sector of employment (industry, construction and services)[2].

The missing covariates are dummied out so as not to reduce the sample. The standard errors are clustered at the location by country level because the interaction of size and culture varies among those dimensions.

The previous estimations are complemented by the analysis of quantity remitted. This is done by means of a linear model of the form[3]:

$$y_{ilc} = \beta_0 + \beta_1 size_{ilc} * culture_{ic} + \beta_2 size_{ilc} + \beta_3 X_{ilc} + \beta_4 V_l + W_c + \varepsilon_{ilc}$$

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[2]The list of included controls is extremely similar to the ones used in recent studies like Sinning (2007) in relation to the determinants of remittances for immigrants in Germany.

[3]Estimation is performed assuming a linear functional form instead of a Tobit model. This is conducted because the estimation resulting from the Tobit model is unreliable due to the large number of controls. Our estimates would be biased towards zero with respect to the Tobit estimates which is consistent with the argument that they provide a lower bound for the actual network effect.

where: y_{ilc} is the quantity remitted by individual i during the previous year which takes upon the value of zero when the individual does not remit. *Culture* reflects the average quantity remitted by immigrants born in the same country.

Similarly to the estimation for the probability of remitting, the missing covariates are dummied out and standard errors are allowed to be correlated within the cells defined by location and birth country.

Network studies are potentially subject to what Manski (1993) calls the 'reflection problem'. This refers to omitted variables causing artificial correlation in the outcomes between individuals from the same country or between individuals in the same location. Therefore, in the analysis of network effects, it is important to account for the existence of unobservable characteristics common to co-nationals and people living in the same location. The inclusion of location, as well as birth country dummies accounts for many of the omitted variable biases that arise in this setup. Location fixed effects control for local labor market features and any location characteristic that affects the likelihood of remitting for all individuals living there. For instance, the existence of a money transfer agency in one location may increase the incentives to remit. Additionally, birth country dummies take into account the existence of cultural factors that affect the remitting behavior of immigrants independently of whether they are surrounded by other immigrants from the same country or not.

Another source of concern that arises when studying network effects is self-selection. In this setup, the coefficient associated to the interaction of network size and remitting culture could be biased if individuals self-select differently depending on their culture. For instance, living within a birth country group could indicate strong ties with the country of origin if the individual belongs to a high-remitting country group but it could sign a strong attachment to the host country if the individual comes from a low-remitting culture. I check whether this could explain the network effect found in the ordinary least squares (OLS) estimation by performing an alternative estimation where network size in the municipality is instrumented by network size at the province level. If self-selection

is present in this context, the OLS estimates would be biased due to selection within as well as between provinces. The instrumental variables (IV) estimates would be biased exclusively due to selection between provinces. Given that moving between municipalities in the same province is much easier than moving between provinces, getting to know the bias induced by self-selection within provinces gives us an upper bound for the total bias. Therefore, the IV estimation enables me to test the hypothesis that no network effects exist and that the positive coefficient arising in the OLS estimation can be explained entirely by differential selection. This strategy was first used by Evans, Oates, and Schwab (1992). The comparison of the OLS and IV estimations reported in Section 5 indicate that the results are not driven by differential selection.

My estimates may underestimate the true extent of network effects. For instance, I control for birth country, as well as municipality fixed effects, which may comprise network effects. However, excluding those controls could bias the coefficient, because birth country and municipality of residence are likely to be correlated with individual unobserved characteristics. Therefore, it is preferable to obtain conservative estimates. Additionally, there may be networks different from the ones defined by the birth country. For instance, immigrants may establish relationships in their workplace with individuals from different nationalities. The focus of this paper is to prove the existence of positive network effects in remitting behavior. The quantification of those effects would probably require richer databases or experimental designs and is left for future research.

4 Data and descriptive statistics

4.1 Databases

The primary database used in the empirical analysis is the National Immigrant Survey of Spain. This is complemented by the Spanish Town Hall Census. The National Immigrant Survey of Spain (Encuesta Nacional de Inmigrantes) is a unique database containing detailed information on international migration to Spain. It provides information on a

wide variety of aspects regarding the migratory experience. Information is structured in 7 modules that refer to: the co-resident domestic group, socio-demographic characteristics, conditions upon departure, conditions upon arrival, labor market activity, housing, and contacts with Spanish civil society and with the society of origin. Regarding remittances, surveyed individuals are asked whether they remit, how much they remitted in the last year and to whom they sent their transfer. Some family questions regard the presence of family members abroad, as well as the intention to bring a family member to Spain. These serve as proxies of an individuals' willingness to remit. Additionally, the labor market module includes working status, income and type of labor contract, determinants of the capacity to remit. The targeted population is foreign born citizens, 16 years old or older, living in a dwelling in Spain at the time of the interview, and who have been in Spain for at least one year. If the duration of their stay was less than one year, they needed to state their intention to stay for at least one year to be included in the sample. The reference period is January 2007. At that time, the stock of migrants in Spain was very high. Hence, it is possible to determine representatives for many ethnic groups in the sample. This provides enough variation to study the effect of culture on immigrants' decisions. The total number of households included in the sample is 15465. The reference population was immigrants included in the Town Hall Census data. For further information on the survey design and other methodological issues, see Reher and Requena (2009) or the the Spanish National Statistics Institute (INE)[4]. The National Immigrant Survey has key advantages for the study of the effect of social networks on remittances. It allows us to define social networks at a very disaggregated level because it provides information on municipality of residence as well as birth country. Additionally, it allows us to control for many factors influencing remitting behavior.

The main drawback of the National Migration Survey is that it is not representative at the location level. This issue has been addressed by matching the locations with the

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[4]A document containing all methodological details can be found at:
http://www.ine.es/en/daco/daco42/inmigrantes/ inmigra_meto_en.pdf

Spanish Town Hall Census. The information from the Town Hall Census is then used to compute the number of individuals from a certain country in each location. The Town Hall Census is an administrative register that contains information on all individuals residing in the municipality. All individuals living in Spain are obliged to register, regardless of whether they are documented or undocumented.

The primary advantage of the Town Hall Census for the study of immigrants is its accuracy regarding the number of immigrants that live in a location. The reason is that immigrants have powerful incentives to register on those location listings. First, they can be certain that there will be no negative legal consequences of registering, even if they are undocumented. Second, registering gives them automatic rights to basic medical care for themselves and their families, access to the education system for their children and many other social services. Additionally, it is compulsory for non-EU immigrants to re-register in the Town Hall Census every two years. Hence, one should not expect our figures to be artificially inflated due to return migration.

4.2   Construction of network variables

Network size

The variable network size measures the availability of contacts for each immigrant according to her/his birth country and location of residence. In this context, networks are defined as groups of immigrants born in the same country and living in the same location. However, actual interactions among individuals from the same country may be influenced by total population in the location. Hence, network members in small locations are expected to interact over those in big locations. To account for this, network size is computed as the actual number of network members divided by the total population in the location. To avoid underweighting groups that are small in the overall country, we measure concentration in the locality relative to other localities. In particular, I divide the previously defined variable by the ratio of number of immigrants from the corresponding country in Spain and the total population in Spain. To summarize, the variable size can

be expressed as follows:

$$size_{cl} = \log \frac{N_{cl}/N_l}{N_c/N}$$

where: N represents the number of individuals at the level of aggregation determined by the subindexes, with c denoting birth country and l standing for location. This definition was been first adopted by Bertrand, Luttmer, and Mullainathan (2000). Results are robust to other choices of the network size measure [5]. All variables involved in the computation of size are obtained from the Town Hall Census.

Remitting culture

The variable remitting culture refers to the average value of the variable in the left hand side of each regression. The average is computed for each birth country to proxy remitting cultures. Therefore, in the regressions for the probability of remitting, culture corresponds to the proportion of remitters among immigrants from the corresponding country. In the equation for quantity remitted, culture refers to the average quantity remitted by individuals from the corresponding country. When computing the average quantity remitted, a value of zero is assigned to no remitters.

In all regressions, the variable culture is included in differences with respect to the average culture for all immigrants. This is done to ease interpretation of the coefficient associated to the variable network size. In summary, the expression for the variable culture can be written as:

$$culture_c = \overline{y}_c - \overline{y}$$

where: y represents the left hand side variable in the regressions, $\overline{y}$ stands for its mean and the subindex c denotes that the variable is averaged by the birth country.

The information involved in the calculations for the variable remitting culture is ob-

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[5]I alternatively used the measure in natural terms instead of logs, as well as the log of the ratio between individuals from the same country over the total number of individuals in the municipality. The estimated coefficients were comparable.

tained by averaging the remit dummy and the variable quantity remitted from the National Migration Survey.

4.3   Sample definition and descriptive statistics

The sample used to estimate the probability of remitting is drawn from the National Migration Survey. It is therefore composed of individuals aged 16 or more, born abroad and that have been in Spain for at least one year or intend to stay for at least that long. From that set of individuals, I removed those born in countries with less than 5000 immigrants in Spain [6]. This removal enables the computation of a consistent culture variable and leaves 58 different countries of birth in the sample.

The final sample includes 14329 individuals distributed across 796 locations and is described in Tables 1.1 to 1.4. One observes that over one third of total individuals remit. The average proportion of network members in a locality is 2.06%.

Regarding individual characteristics, sampled immigrants are predominantly female. They are relatively old compared to the native population, with an average age of 40. The majority of immigrants have recently arrived. Over one half of them have been in Spain for 10 years or less. The level of regularization of immigrants is low. Slightly over one fourth have a Spanish nationality and less than one half are documented migrants. In contrast, sampled individuals are relatively educated. Over one half of them have a secondary education and over one fifth hold a tertiary education degree. These education levels have only been achieved in Spain for around 20% of sampled individuals. Finally, over one half of the sampled individuals declare owning a house in the sending country.

With respect to family characteristics, over one half of sampled immigrants declare being married. The average number of cohabiting individuals is 3. The important role of family in the migrating decision is highlighted by the fact that one fourth of interviewed individuals declare having the intention to bring a family member to Spain. Relatively

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[6]Results are insensitive to the removal of small birth country groups. This happens because it only implies a small change in the number of sample points.

few individuals have their immediate family (spouse and children) abroad. In contrast, over one half have at least a brother or sister abroad and around one third have one parent abroad.

Regarding the labor market status of immigrants in the sample, we observe that almost two thirds are employed, although their average income per month is relatively low. Immigrants' jobs are of low quality on average. Only slightly over one fourth have a permanent contract and the majority of workers concentrate in services.

In the regression for quantity remitted, the sample selection criteria is the same. Only individuals from countries with over 5000 individuals in Spain are included. This leaves 13237 individuals. These are slightly less than the sample size in the regression for probability of remitting, because the number of missing observations in the variable quantity remitted is greater than that for the variable remit.

The average remitted quantity in the last year is around 600 Euros. The descriptive statistics for the network variables and the controls are extremely similar to the ones in the regression for the probability of remitting. This provides some evidence on that the additional missing observations, relative to the ones included in the probability of remitting estimation, do not induce sample selection issues.

5 Empirical results

When drawing conclusions on the existence of network effects on remitting behavior, one needs to focus on the coefficient associated with the interaction of size and culture. A positive coefficient is interpreted as individuals from high remitting groups remitting more as a consequence of being surrounded by more individuals from their country. This is coherent with the existence of social pressure towards remittance sending when this is a cultural norm in the country group. Additionally, a positive coefficient could indicate the influence of information on money sending channels, as well as on savings and investment opportunities provided by the network. In contrast, a non-significant coefficient would

indicate that networks have no effect on remittances other than the indirect effect through some of the controls like employment and income.

5.1 Probability of remitting

The OLS estimation displayed in Table 3.1 produces a coefficient associated with the interaction of size and culture that is positive and statistically different from zero. The estimated effect is positive, even in the absence of controls. Moreover, the magnitude of the effect remains similar as we add more controls. The biggest drop occurs when adding locality dummies to the basic specification. The coefficient is reduced slightly when controlling for labor market status. This indicates that part of the network effect operates through improving the labor market status of network members. The IV estimation results in slightly higher coefficients, as illustrated in Table 3.2[7]. The estimated effects move in the same direction as the OLS coefficients when more controls are added. The coefficients arising from the OLS and IV estimations are not statistically different from each other and indicate that, if anything, selection within provinces biases the coefficient towards zero. This leads to the conclusion that self-selection does not play a role in our context, even without controlling for birth country, location or residence, individual characteristics, family characteristics and labor market status.

The estimated OLS coefficient is a lower bound for the true effect for two reasons: First, immigrant networks indirectly affect remittances through some of the controls (some of the potential channels are intentions to bring a family member to the host country, employment and income). The estimated network effect is conditional upon all those variables. Hence, the total impact of social networks on remittances is likely to be stronger. Second, if self-selection played a role, the effect would be higher. Following this reasoning, one concludes that the coefficient for the variable size interacted with culture in the absence of self-selection biases is higher than 0.026. This can be interpreted as any factor

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[7]The first stage indicates that the instrument is not weak under the Stock and Yogo (2002) criteria.

that increases remittance sending by one percentage point in the absence of networks actually increases average remittance sending due to the presence of networks by at least 0.016 points[8].

The estimated network effect is coherent with the findings obtained when computing the size variable in levels, instead of logs, as well as when computed as the log of the ratio of network members over total population in the location. The result is also robust to assuming other functional forms for the probability of remitting, for instance the Probit model.

Regarding the controls, the direction of the estimated effects is consistent with the findings by Bollard, McKenzie, and Morten (2010) in their study of the remitting behavior of African migrants. I find that being older, having Spanish nationality, being documented, being single, having family members abroad, and being employed have positive impacts on the likelihood of remitting and on the quantity remitted. Surprisingly, education does not play a significant role when the variable 'having terminated the studies in the host country' is included. This last feature of the estimation is coherent with the findings by Sinning (2007).

5.2   Quantity remitted

The OLS estimation for quantity remitted displayed in Table 4.1 results in a positive and significant coefficient for the variable size interacted with the average remitted quantity in the country group. In agreement with the findings for the probability of remitting, the magnitude of the estimated impact is arguably consistent as more controls are added. The IV results can be found in Table 4.2. This estimation produces coefficients that are

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[8]The formula to obtain these figures is derived in Bertrand, Luttmer, and Mullainathan (2000). The figures correspond to the weighted average of a variable defined as:

$$\left(\frac{1}{1 - \beta_1 * \overline{size_c}} \right) - 1$$

where: $\overline{size_c}$ is the average size by birth country and the weights are proportional to the number of individuals from each country in the sample.

around than 50% higher than the OLS coefficients.[9].

The comparison of the OLS and IV estimates shows that the bias induced by the self-selection of immigrants is, if anything, negative. Therefore, one can conclude that network effects, as quantified by the coefficient associated with the variable size by culture, are at least 0.067.

The magnitude of the estimated network effect is such that an exogenous increase in the quantity remitted by one percentage point induces an increase in quantity remitted due to the influence of networks bigger than 0.044. This effect is higher in magnitude relative to the effect for the probability of remitting. This can be explained because networks influence, in addition to the likelihood of remitting (the change from zero to a positive value for quantity remitted), the quantity remitted when the individual decides to remit. Both effects follow the same direction.

The impact of the controls on quantity remitted is similar to their effect on the probability of remitting. Some exceptions are the variables 'being documented' that displays a negligible effect and 'having a secondary education degree', whose coefficient turns significantly positive. Additionally, 'being married' appears not to be correlated with quantity remitted while the coefficient for 'number of individuals in the household' becomes significantly positive.

5.3 Additional specifications

Different subsamples

In this section, I explore which individuals are more influenced by networks when deciding on remittance sending and quantity remitted. Individuals are divided into subsamples according to their gender, length of their stay in Spain and whether they are Latinos or not. Separated regressions are then run for each of those groups.

Women's behavior is thought to be more influenced by networks than men's. Addi-

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[9]The first stage shows that the instrument is valid under the Stock and Yogo (2002) criteria.

tionally, individuals that have lived for a shorter time period in Spain are expected to be more affected by networks because they are less integrated into the host society, on average. Finally, Latinos remit much more than immigrants from other origins (they represent 40% of the sample and send 60% of total remittances). Therefore, they are more likely to have a distinctive remitting behavior. This high remitting behavior could be the result of a strong multiplier effect or could indicate that Latinos are highly committed to remitting and therefore no external influence could change their behavior.

The results of the regressions for the probability of remitting are displayed in Table 5.1. The corresponding regressions for quantity remitted are shown in Table 5.2. The findings for the probability of remitting are perfectly coherent with the expectations that women are more affected by networks than men. Surprisingly, individuals living longer in the host country appear to be more influenced by networks. This can be explained by whether individuals are very committed to remittances at the beginning and this effect vanishes over time for individuals that are surrounded by low-remitting co-nationals, but not for individuals in high-remitting networks. Finally, Latinos are more affected by networks when deciding on whether to remit or not to remit. They are also less affected by networks when they decide on the remitting quantity.

Mechanisms

In the primary specifications, a positive and significant network effect is found when the estimation is conducted conditioning on a number of controls that help explain remitting behavior. However, networks are likely to influence remittances indirectly through their impact on some of the controls. As mentioned previously, Amuedo-Dorantes and Pozo (2006) argue that network effects on remittances operate through employment, but there could be other indirect effects. In this section, I analyze the potential impact of immigrant networks on employment, income and the intentions to bring family members to Spain. If social networks are correlated with immigrants' intentions to bring family members to Spain, employment or income positively (negatively), the unconditional network effect would be stronger (weaker).

The results displayed in Table 6.1 correspond to the estimations when culture is defined by the proportion of remitters from the corresponding country. Table 6.2 contains the results when culture is measured by average quantity remitted. Networks are found to have an effect on the probability of employment. This finding implies that the unconditional effect for the probability of remitting, as well as for quantity remitted, is stronger than the conditional effect.

6   Conclusion

This paper explores the existence of network effects on remitting behavior. Networks are defined as groups of immigrants from the same birth country living in the same location. They influence individuals remitting behavior in the sense that individuals are more likely to remit or to remit more as a consequence of being part of social networks formed by individuals from high remitting country groups.

Using a unique database for Spain, networks are shown to have a positive impact on the probability of remitting as well as on the quantity remitted. This is consistent with the predominance of the encouraging effects of networks on remitting, like social pressure and information on saving or investment opportunities, as well as on money sending channels.

Remittances constitute an important source of income for families in developing economies. Therefore, understanding the determinants of these money flows is useful to design policies fighting poverty. Additionally, the significance of social networks when explaining remittance behavior suggests that the scope of networks is broader than what we currently know.

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Figures

Figure 1: Evolution of remittances inflows over time
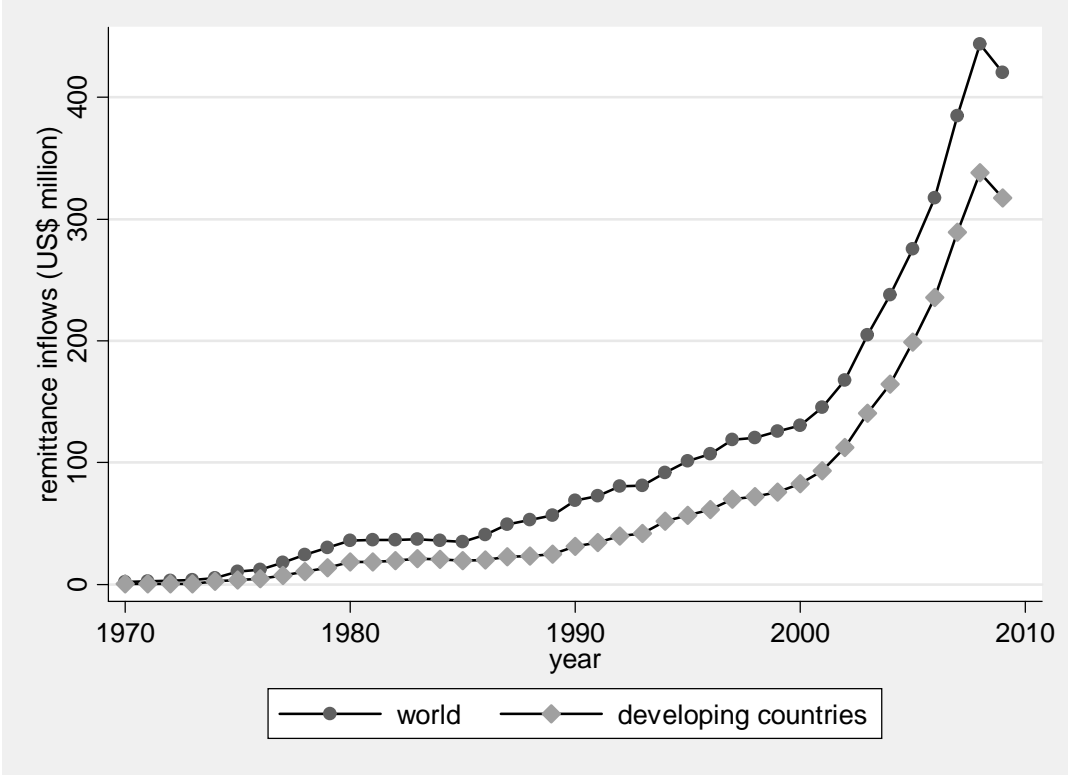
This data can be found in the website of the World Bank, http://econ.worldbank.org/. The graph displays annual data on remittances transferred throughout the entire world and remittances received by developing countries.

Figure 2: Evolution of remittances outflows from Spain over time
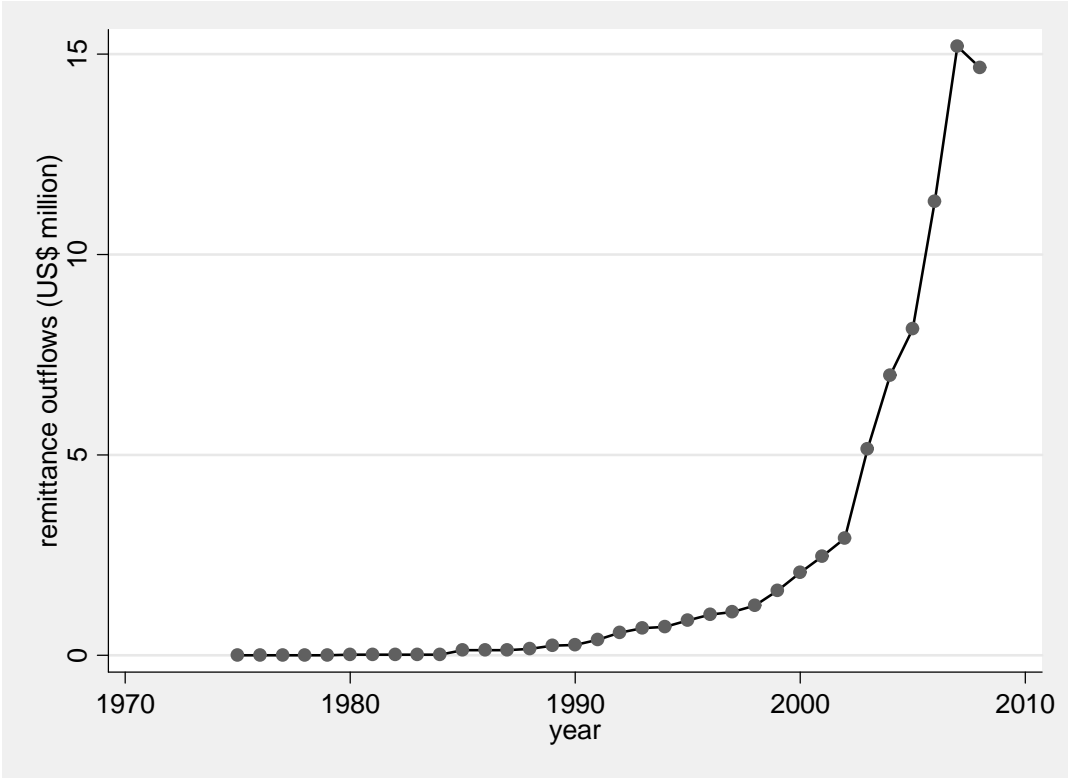
This data is located on the website of the World Bank, http://econ.worldbank.org/. The graph displays annual data on remittances sent from Spain.

Figure 3.1: Remittance sending from Spain by birth country
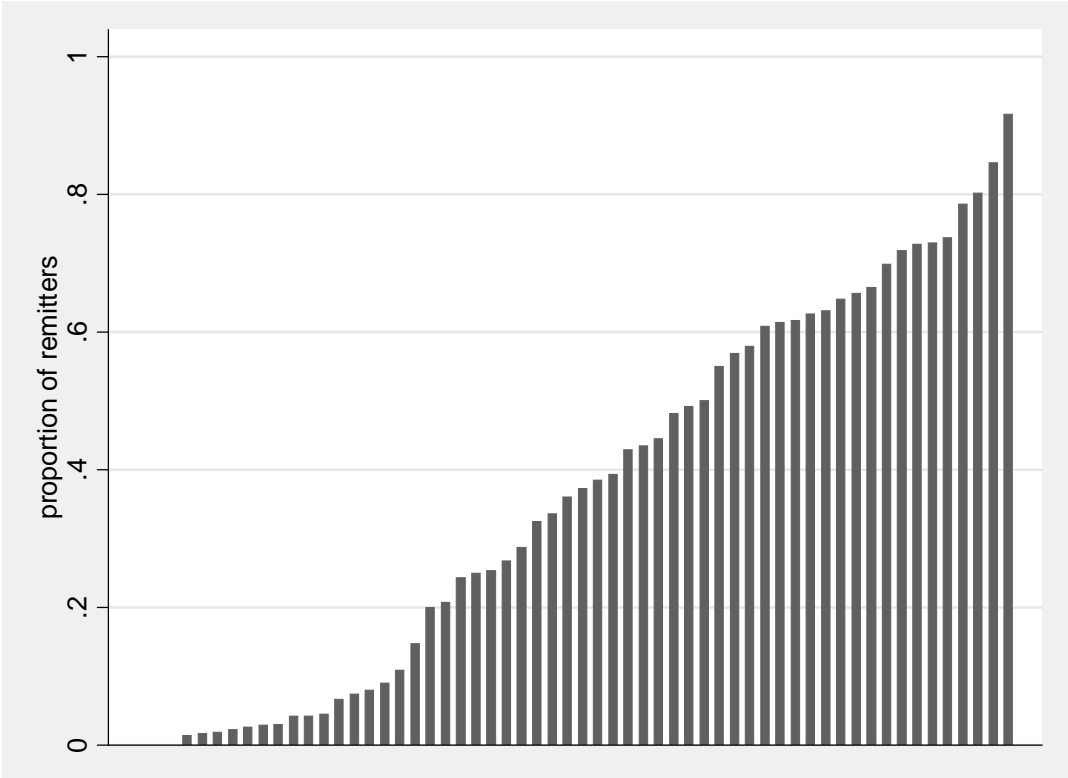
This data is obtained from the Spanish National Migration Survey. Each bar represents the proportion of remitters from one country. Only countries with over 5000 individuals living in Spain are represented.

Figure 3.2: Remittance sending by birth continent
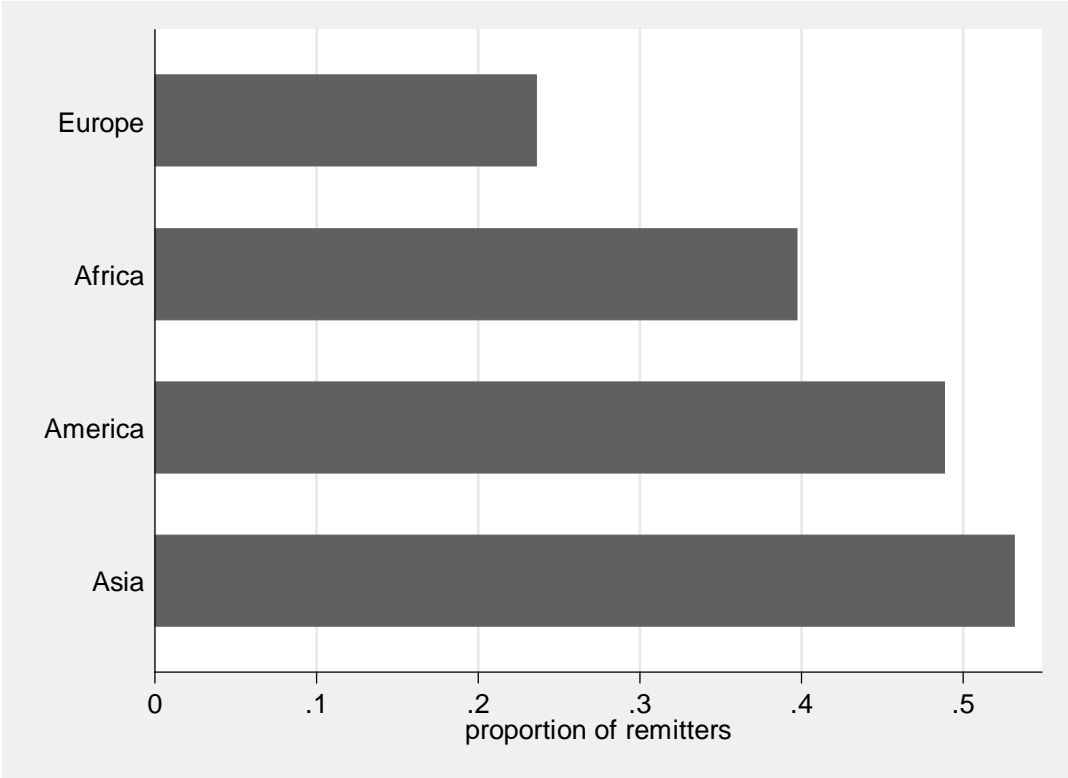
This data is obtained from the Spanish National Migration Survey. Each bar represents the proportion of remitters from one continent. Oceania is not displayed because immigrants from that continent are not representative in the sample.

Figure 4.1: Quantity remitted from Spain by birth country
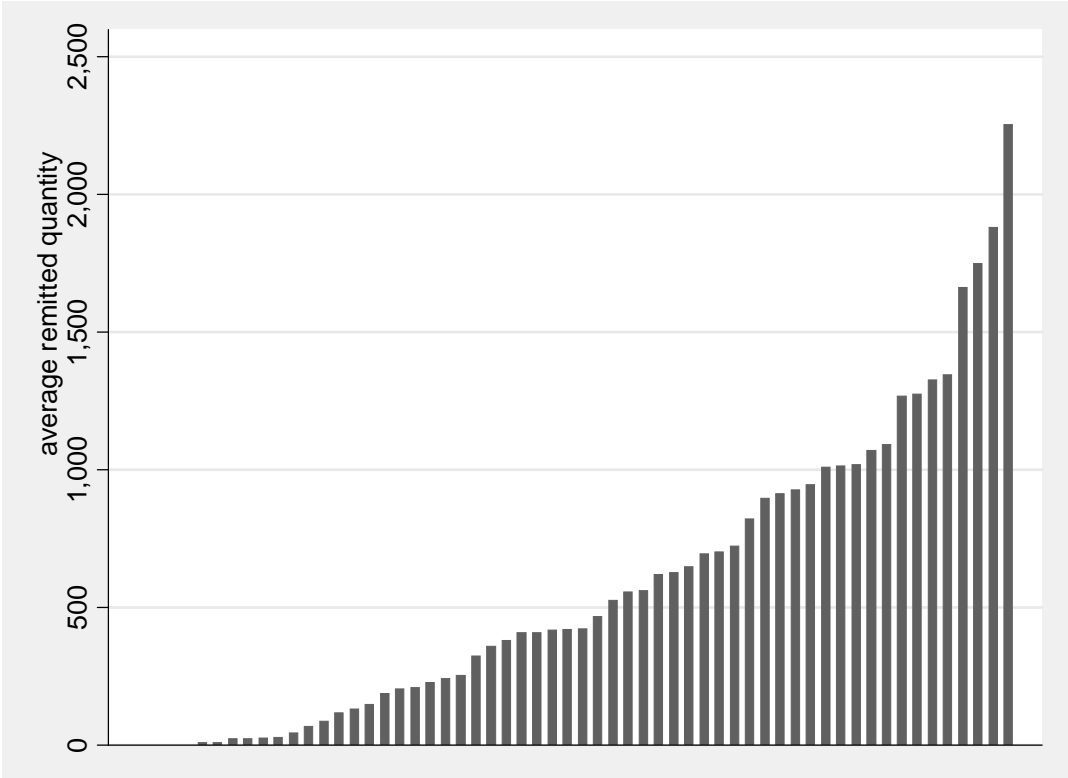
This data is obtained from the Spanish National Migration Survey. Each bar represents the average quantity remitted by immigrants from one country. Only countries with over 5000 individuals living in Spain are represented.

Figure 4.2: Quantity remitted from Spain by birth continent
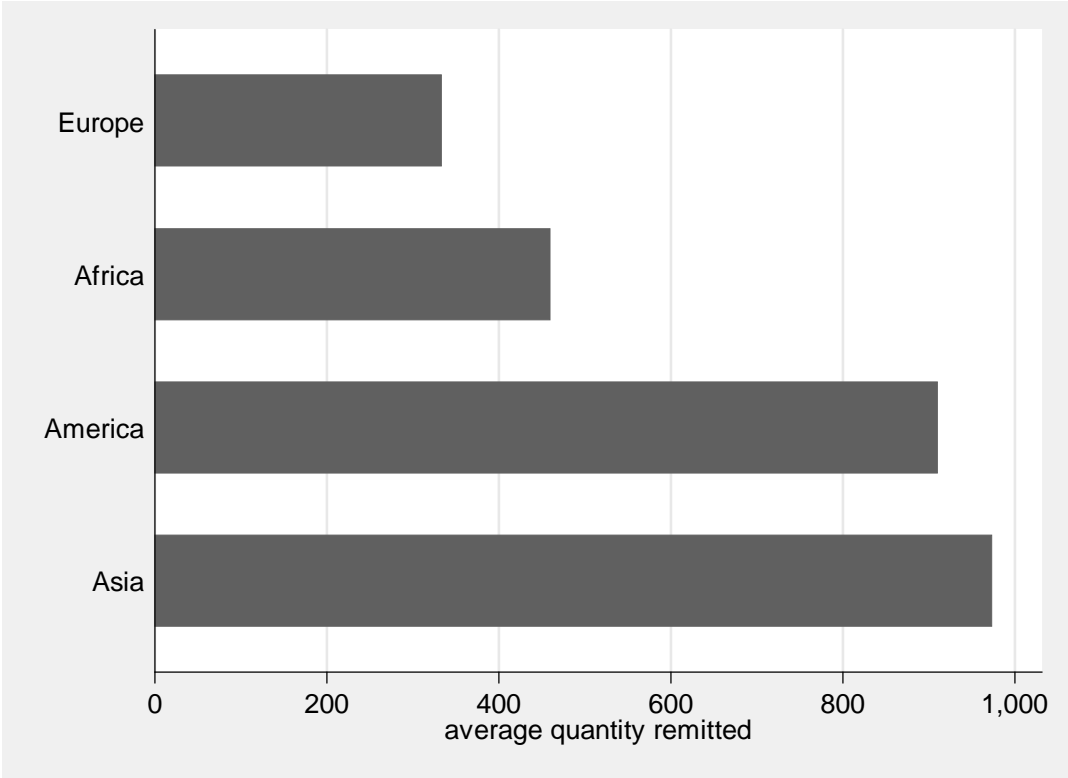
This data is obtained from the Spanish National Migration Survey. Each bar represents the average quantity sent by immigrants from one continent. Oceania is not displayed because immigrants from that continent are not representative in the sample.

Figure 5.1: Correlation between remittance sending and network size by country of origin
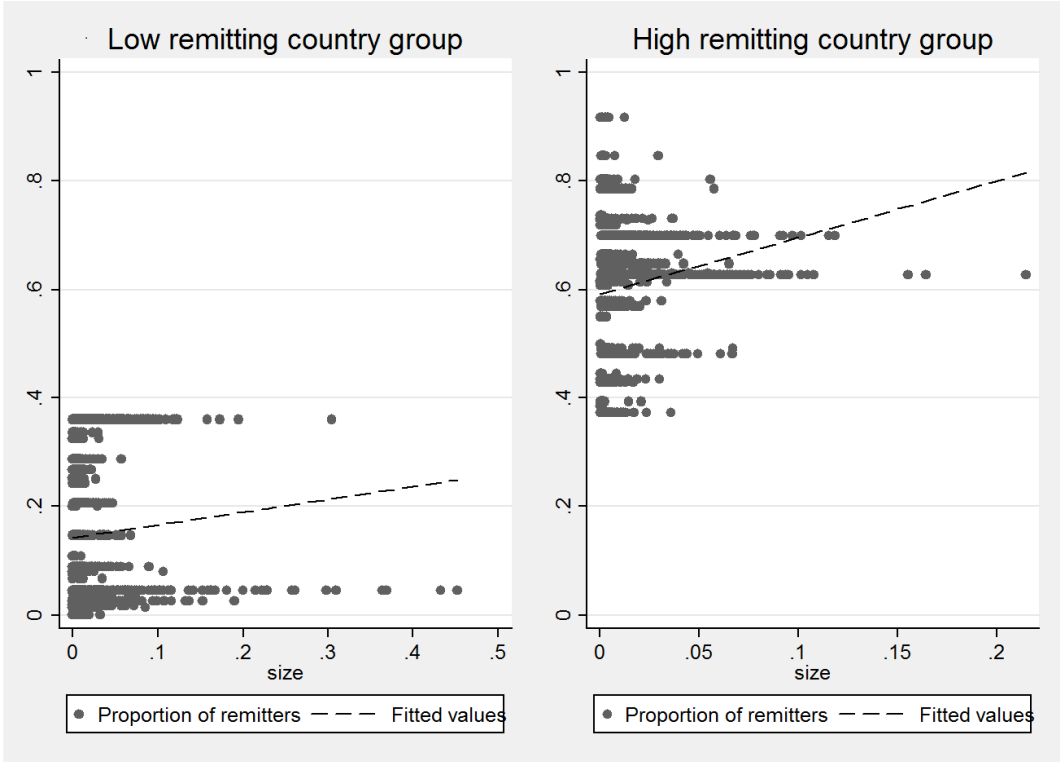
These correlations are computed using data from the Spanish National Migration Survey. The variable network size is computed as the number of immigrants from the same country living in the locality divided by the total population in the locality. The coefficient associated with the slope is 0.235 for the low remitting country groups and 1.043 for the high remitting country groups. They are statistically significant and different from each other at the 1% level.

Figure 5.2: Correlation between quantity remitted and network size by country of origin
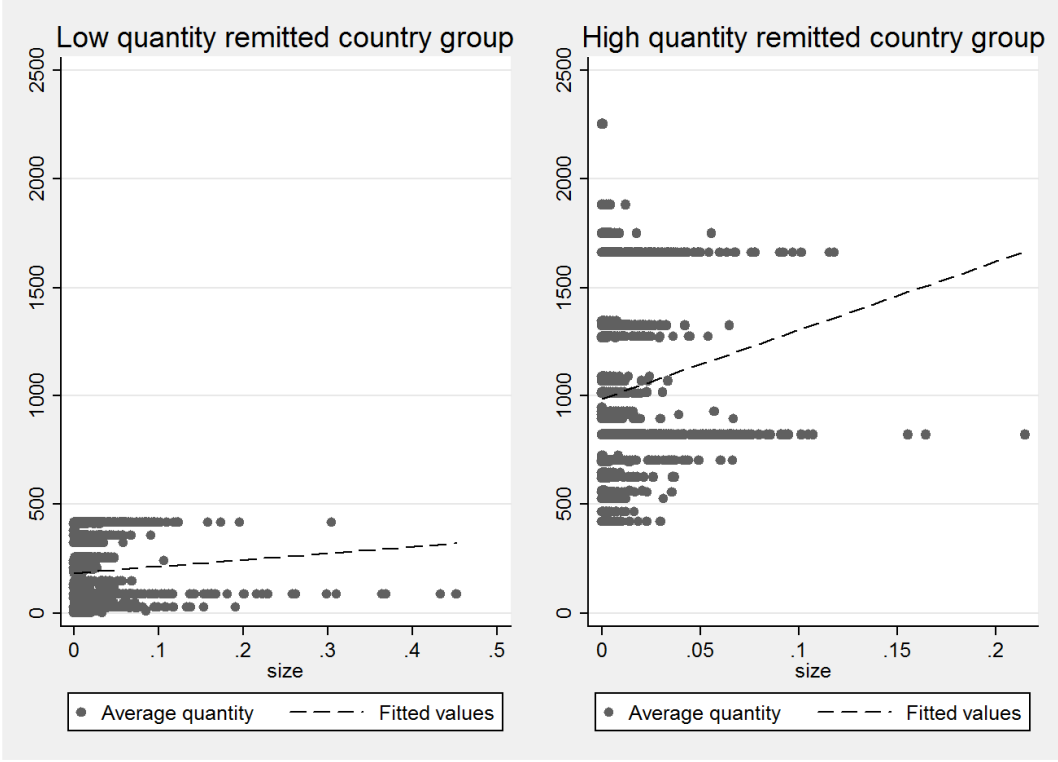
These correlations are computed using data from the National Migration Survey. The variable network size is computed as the number of immigrants from the same country living in the locality divided by the total population in the locality. Average quantity is the average quantity sent by immigrants in the network, including zero for non-remitters. The coefficient associated with the slope is 305.177 for the low quantity country groups and 3158.802 for the high quantity country groups. They are statistically significant and different from each other at the 1% level.

Tables

Table 1.1: Descriptive statistics for the probability of remitting estimation. Remittances and networks

	Mean	Standard Deviation	Minimum	Maximum
Remit	0.37	0.483	0	1
Size	0.624	1.218	-4.317	5.824
Size by culture	0.007	0.363	-1.692	2.021
Province size by culture	0.004	0.251	-1.075	1.185
Locality			1	796
Country of birth			1	58

The table displays the descriptive statistics of the variables reflecting the remitting behavior and network characteristics of the immigrants. The individual data is obtained from the Spanish National Immigrant Survey. The information used to compute the network size variable comes from the Spanish Town Hall Census. The sample is composed of immigrants from countries with over 5000 individuals living in Spain. Network size is computed as the logarithm of the ratio of two variables. The variable in the numerator is the ratio between the number of immigrants from the corresponding birth country in the municipality and the number of individuals in the municipality. The variable in the denominator is the ratio between the number of immigrants from the corresponding birth country in Spain and the total population in Spain. Remitting culture is the proportion of remitters from the birth country in Spain minus the average proportion of remitters in Spain. The number of included observations is 14329.

Table 1.2: Descriptive statistics for the probability of remitting estimation. Individual characteristics

	Mean	Standard Deviation	Minimum	Maximum
Male	0.446	0.497	0	1
Age	39.197	14.306	16	98
Age squared	1741.03	1351.993	256	9604
3 to 5 years in Spain	0.246	0.431	0	1
6 to 10 years in Spain	0.286	0.452	0	1
11 to 20 years in Spain	0.126	0.332	0	1
21 to 30 years in Spain	0.074	0.262	0	1
More than 30 years in Spain	0.139	0.346	0	1
Spanish nationality	0.283	0.45	0	1
Documented	0.449	0.497	0	1
Primary education	0.157	0.364	0	1
Secondary education	0.521	0.5	0	1
Terciary education	0.207	0.405	0	1
Educated in Spain	0.204	0.403	0	1
House at origin	0.288	0.453	0	1

The table displays the descriptive statistics of the variables reflecting the individual characteristics of the immigrant. The individual data is obtained from the Spanish National Immigrant Survey. The sample is composed of immigrants from countries with over 5000 individuals living in Spain. The number of included observations is 14329.

Table 1.3: Descriptive statistics for the probability of remitting estimation. Family characteristics

	Mean	Standard Deviation	Minimum	Maximum
Married	0.536	0.499	0	1
Household members	3.356	1.576	1	18
Intentions to bring family	0.246	0.431	0	1
Spouse abroad	0.046	0.21	0	1
Children abroad	0.129	0.336	0	1
Mother abroad	0.356	0.479	0	1
Father abroad	0.283	0.451	0	1
Brother abroad	0.485	0.5	0	1

The table displays the descriptive statistics of the variables reflecting the family characteristics of the immigrant. The individual data is obtained from the Spanish National Immigrant Survey. The sample is composed of immigrants from countries with over 5000 individuals living in Spain. The number of included observations is 14329.

Table 1.4: Descriptive statistics. Labor market status

	Mean	Standard Deviation	Minimum	Maximum
Employed	0.638	0.48	0	1
Income	530.367	679.312	0	9000
Permanent contract	0.279	0.449	0	1
Industry	0.075	0.264	0	1
Construction	0.112	0.315	0	1
Services	0.415	0.493	0	1

The table displays the descriptive statistics of the variables describing the labor market status of the immigrant. The individual data is obtained from the Spanish National Immigrant Survey. The sample is composed of individuals from countries with over 5000 individuals living in Spain. The number of included observations is 14329.

Table 2.1: Descriptive statistics for the quantity remitted estimation. Remittances and networks

	Mean	Standard Deviation	Minimum	Maximum
Remit	601.894	1696.466	0	60000
Size	0.626	1.23	-4.317	5.824
Size by culture	14.548	693.122	-3921.243	5039.739
Province size by culture	9.403	489.402	-3225.222	3119.999
Locality			1	796
Country of birth			1	58

The table displays the descriptive statistics of the variables reflecting the remitting behavior and network characteristics of the immigrant. The individual data is obtained from the Spanish National Immigrant Survey. The information used to compute the network size variable comes from the Spanish Town Hall Census. The sample is composed of immigrants from countries with over 5000 individuals living in Spain. Network size is computed as the logarithm of the ratio of two variables. The variable in the numerator is the ratio between the number of immigrants from the corresponding birth country in the municipality and the number of individuals in the municipality. The variable in the denominator is the ratio between the number of immigrants from the corresponding birth country in Spain and the total population in Spain. Remitting culture is the average quantity remitted in the last year by individuals from the birth country in Spain minus the average quantity remitted in Spain. The number of included observations is 13237.

Table 2.2: Descriptive statistics for the quantity remitted estimation. Individual characteristics

	Mean	Standard Deviation	Minimum	Maximum
Male	0.444	0.497	0	1
Age	39.5	14.579	16	98
Age squared	1772.799	1383.51	256	9604
3 to 5 years in Spain	0.238	0.426	0	1
6 to 10 years in Spain	0.277	0.448	0	1
11 to 20 years in Spain	0.128	0.334	0	1
21 to 30 years in Spain	0.079	0.27	0	1
More than 30 years in Spain	0.15	0.357	0	1
Spanish nationality	0.297	0.457	0	1
Documented	0.429	0.495	0	1
Primary education	0.156	0.362	0	1
Secondary education	0.52	0.5	0	1
Terciary education	0.212	0.409	0	1
Educated in Spain	0.216	0.412	0	1
House at origin	0.285	0.451	0	1

The table displays the descriptive statistics of the variables reflecting the individual characteristics of the immigrant. The individual data is obtained from the Spanish National Immigrant Survey. The sample is composed of individuals from countries with over 5000 individuals living in Spain. The number of included observations is 13237.

Table 2.3: Descriptive statistics for the quantity remitted estimation. Family characteristics

	Mean	Standard Deviation	Minimum	Maximum
Married	0.538	0.499	0	1
Household members	3.336	1.563	1	18
Intentions to bring family	0.227	0.419	0	1
Spouse abroad	0.041	0.199	0	1
Children abroad	0.121	0.326	0	1
Mother abroad	0.34	0.474	0	1
Father abroad	0.272	0.445	0	1
Brother abroad	0.476	0.499	0	1

The table displays the descriptive statistics of the variables reflecting the family characteristics of the immigrant. The individual data is obtained from the Spanish National Immigrant Survey. The sample is composed of immigrants from countries with over 5000 individuals living in Spain. The number of included observations is 13237.

Table 2.4: Descriptive statistics for the quantity remitted estimation. Labor market status

	Mean	Standard Deviation	Minimum	Maximum
Employed	0.629	0.483	0	1
Income	531.911	688.464	0	9000
Permanent contract	0.282	0.45	0	1
Industry	0.075	0.263	0	1
Construction	0.109	0.311	0	1
Services	0.411	0.492	0	1

The table displays the descriptive statistics for the variables measuring the labor market status of the immigrant. The individual data is obtained from the Spanish Town Hall Census. The sample is composed of immigrants from countries with over 5000 individuals living in Spain. The number of included observations is 13237.

Table 3.1: Probability of remitting. Ordinary least squares

	basic	locality	individual	family	labor
Dep var: Remit	(1)	(2)	(3)	(4)	(5)
size by culture	0.021	0.014	0.024	0.032	0.026
	(0.013)*	(0.013)	(0.012)*	(0.012)***	(0.012)**
size	0.006	0.008	0.002	0.007	0.006
	(0.006)	(0.004)**	(0.004)	(0.003)**	(0.003)*
Observations	14902	14902	14784	14354	14329
R^2	0.279	0.34	0.398	0.47	0.478

The dependent variable is equal to one if the individual remits and zero otherwise. Network size is computed as the logarithm of the ratio of two variables. The variable in the numerator is the ratio between the number of immigrants from the corresponding birth country in the municipality and the number of individuals in the municipality. The variable in the denominator is the ratio between the number of immigrants from the corresponding birth country in Spain and the total population in Spain. Remitting culture is the proportion of remitters from the birth country in Spain minus the average proportion of remitters in Spain. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5%, and *** if the level of significance is less than 1%. The basic regression includes size interacted by culture, size, and birth country dummies. The second column adds individual characteristics to the basic specification, including a male dummy, age, age squared, indicators for length of residence, a Spanish nationality binary variable, a documented dummy, indicators for the level of education (primary, secondary and tertiary), a dichotomous variable for being educated in Spain, and a binary variable for owning a house in the sending country. The third column includes, in addition to the controls in column 2, a married dummy, the number of household members, a dichotomous variable for intending to bring some family members to Spain, an indicator for spouse abroad, a binary variable for at least a brother abroad, a dummy for at least one child abroad, an indicator for father abroad and a dummy for mother abroad. The fourth column contains all the already mentioned controls plus a set of variables for labor market status, including an employed dummy, income, an indicator for permanent labor contract, and dummies for the sector of employment (industry, construction and services). Finally, the fifth column adds municipality dummies. When included, dummy variables account for missing observations in the following variables: documented, educated in Spain, brother abroad, children abroad, father abroad, mother abroad, income and permanent contract. The individual data is obtained from the Spanish National Immigrant Survey. The information used to compute the network size variable comes from the Spanish Town Hall Census. The sample is composed of immigrants from countries with over 5000 individuals living in Spain. The standard errors are clustered by municipality and birth country groups.

Table 3.2: Probability of remitting. Instrumental variables

	basic	locality	individual	family	labor
Dep var: Remit	(1)	(2)	(3)	(4)	(5)
size by culture	0.033	0.019	0.033	0.046	0.038
	$(0.017)^{**}$	(0.017)	$(0.017)^{**}$	$(0.016)^{***}$	$(0.016)^{**}$
size	-.002	0.01	0.007	0.012	0.006
	(0.01)	$(0.005)^*$	(0.005)	$(0.005)^{**}$	$(0.003)^*$
Observations	14902	14902	14784	14354	14329
R^2	0.278	0.34	0.398	0.47	0.478

The dependent variable is equal to one if the individual remits and zero otherwise. Network size is computed as the logarithm of the ratio of two variables. The variable in the numerator is the ratio between the number of immigrants from the corresponding birth country in the municipality and the number of individuals in the municipality. The variable in the denominator is the ratio between the number of immigrants from the corresponding birth country in Spain and the total population in Spain. Remitting culture is the proportion of remitters from the birth country in Spain minus the average proportion of remitters in Spain. The variables size (at the municipality level) and its interaction with culture are instrumented using size at the province level and its interaction with culture. In the first stage, the instruments are jointly significant for all specifications. In particular, the F-statistic for the joint-significance of both instruments is 2277.11 in the first stage for network size and 1352.57 in the first stage for the interaction of network size and remitting culture in column 5. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5%, and *** if the level of significance is less than 1%. The basic regression includes size interacted by culture, size, and birth country dummies. The second column adds individual characteristics to the basic specification, including a male dummy, age, age squared, indicators for length of residence, a Spanish nationality binary variable, a documented dummy, indicators for the level of education (primary, secondary and tertiary), a dichotomous variable for being educated in Spain, and a binary variable for owning a house in the sending country. The third column includes the controls in column 2, as well as a married dummy, the number of household members, a dichotomous variable for intending to bring some family members to Spain, an indicator for spouse abroad, a binary variable for at least one brother abroad, a dummy for at least a child abroad, an indicator for father abroad and a dummy for mother abroad. The fourth column contains all the already mentioned controls plus a set of variables for labor market status including an employed dummy, income, an indicator for permanent labor contract, and dummies for the sector of employment (industry, construction and services). Finally, the fifth column adds municipality dummies. When included, dummy variables account for missing observations in the following variables: documented, educated in Spain, brother abroad, children abroad, father abroad, mother abroad, income and permanent contract. The individual data is obtained from the Spanish National Immigrant Survey. The information used to compute the network size variable comes from the Spanish Town Hall Census. The sample is composed of immigrants from countries with over 5000 individuals living in Spain. The standard errors are clustered by municipality and birth country groups.

Table 4.1: Quantity remitted. Ordinary least squares

	basic	municipality	individual	family	labor
Dep var: Quantity	(1)	(2)	(3)	(4)	(5)
size by culture	0.082	0.054	0.066	0.073	0.067
	(0.035)**	(0.03)*	(0.03)**	(0.029)**	(0.029)**
size	26.031	-.322	-9.771	-1.426	-2.595
	(15.861)	(19.042)	(19.090)	(18.970)	(18.843)
Observations	13740	13740	13638	13261	13237
R^2	0.098	0.15	0.172	0.224	0.229

The dependent variable is remittances quantity sent in the last year. Network size is computed as the logarithm of the ratio of two variables. The variable in the numerator is the ratio between the number of immigrants from the corresponding birth country in the municipality and the number of individuals in the municipality. The variable in the denominator is the ratio between the number of immigrants from the corresponding birth country in Spain and total population in Spain. Remitting culture is the average quantity remitted in the last year by individuals from the country of birth in Spain minus the average quantity remitted in Spain. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5%, and *** if the level of significance is less than 1%. The basic regression includes size interacted by culture, size and birth country dummies. The second column adds individual characteristics to the basic specification, including a male dummy, age, age squared, indicators for length of residence, a Spanish nationality binary variable, a documented dummy, indicators for the level of education (primary, secondary and tertiary), a dichotomous variable for being educated in Spain, and a binary variable for owning a house in the sending country. The third column includes, in addition to the controls in column 2, a married dummy, the number of household members, a dichotomous variable for intending to bring some family members to Spain, an indicator for spouse abroad, a binary variable for at least one brother abroad, a dummy for at least one child abroad, an indicator for father abroad and a dummy for mother abroad. The fourth column contains all the already mentioned controls plus a set of variables for labor market status, including an employed dummy, income, an indicator for permanent labor contract, and dummies for the sector of employment (industry, construction and services). Finally, the fifth column adds municipality dummies. When included, dummy variables account for missing observations in the following variables: documented, educated in Spain, brother abroad, children abroad, father abroad, mother abroad, income and permanent contract. The individual data is obtained from the Spanish National Immigrant Survey. The information used to compute the network size variable comes from the Spanish Town Hall Census. The sample is composed of immigrants from countries with over 5000 individuals living in Spain. The standard errors are clustered by municipality and birth country groups.

Table 4.2: Quantity remitted. Instrumental variables

	basic	municipality	individual	family	labor
Dep var: Quantity	(1)	(2)	(3)	(4)	(5)
size by culture	0.128	0.083	0.096	0.104	0.099
	(0.039)***	(0.038)**	(0.038)**	(0.038)***	(0.038)***
size	26.986	10.637	6.075	14.388	12.946
	(20.867)	(24.333)	(24.667)	(24.706)	(24.776)
Observations	13740	13740	13638	13301	13237
R^2	0.098	0.15	0.171	0.224	0.229

The dependent variable is remittance quantity sent in the last year. Network size is computed as the logarithm of the ratio of two variables. The variable in the numerator is the ratio between the number of immigrants from the corresponding birth country in the municipality and the number of individuals in the municipality. The variable in the denominator is the ratio between the number of immigrants from the corresponding birth country in Spain and the total population in Spain. Remitting culture is the average quantity remitted in the last year by individuals from the country of birth in Spain minus the average quantity remitted in Spain. The variable size (at the municipality level) and its interaction with culture are instrumented using size at the province level and its interaction with culture. In the first stage, the instruments are jointly significant for all specifications. In particular, the F-statistic for the joint-significance of both instruments is 2241.15 in the first stage for network size and 990.49 in the first stage for the interaction of network size and remitting culture in column 5. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5%, and *** if the level of significance is less than 1%. The basic regression includes size interacted by culture, size, and birth country dummies. The second column adds individual characteristics to the basic specification, including a male dummy, age, age squared, indicators for length of residence, a Spanish nationality binary variable, a documented dummy, indicators for the level of education (primary, secondary and tertiary), a dichotomous variable for being educated in Spain, and a binary variable for owning a house in the sending country. The third column includes, in addition to the controls in column 2, a married dummy, the number of household members, a dichotomous variable for intending to bring some family members to Spain, an indicator for spouse abroad, a binary variable for at least one brother abroad, a dummy for at least one child abroad, an indicator for father abroad and a dummy for mother abroad. The fourth column contains all the already mentioned controls plus a set of variables for labor market status, including an employed dummy, income, an indicator for permanent labor contract, and dummies for the sector of employment (industry, construction and services). Finally, the fifth column adds municipality dummies. When included, dummy variables account for missing observations in the following variables: documented, educated in Spain, brother abroad, children abroad, father abroad, mother abroad, income and permanent contract. The individual data is obtained from the Spanish National Immigrant Survey. The information used to compute the network size variable comes from the Spanish Town Hall Census. The sample is composed of immigrants from countries with over 5000 individuals living in Spain. The standard errors are clustered by municipality and birth country groups.

Table 5.1: Probability of remitting. Different subsamples

	women	men	short	long	latin	rest
Dep var: Remit	(1)	(2)	(3)	(4)	(5)	(6)
size by culture	0.04	0.025	0.016	0.038	0.059	0.002
	(0.016)**	(0.018)	(0.018)	(0.019)**	(0.031)*	(0.016)
size	0.009	0.002	0.004	0.011	0.004	0.005
	(0.005)**	(0.005)	(0.005)	(0.006)*	(0.008)	(0.005)
Observations	7942	6387	7840	6489	5840	8489
R^2	0.498	0.529	0.435	0.52	0.468	0.501

The dependent variable is remittances quantity sent in the last year. Size is computed as the logarithm of the ratio of two variables. The variable in the numerator is the ratio between the number of immigrants from the corresponding birth country in the municipality and the number of individuals in the municipality. The variable in the denominator is the ratio between the number of immigrants from the corresponding birth country in Spain and total population in Spain. Culture is the proportion of remitters from the birth country in Spain minus the average proportion of remitters in Spain. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5%, and *** if the level of significance is less than 1%. All regressions include size interacted by culture as well as size, individual characteristics, involving a male dummy, age, age squared, indicators for length of residence, a Spanish nationality binary variable, a documented dummy, indicators for the level of education (primary, secondary and tertiary), and a dichotomous variable for being educated in Spain, family characteristics, entailing a married dummy, the number of household members, a dichotomous variable for intending to bring some family members to Spain, an indicator for spouse abroad, a binary variable for at least on brother abroad, a dummy for at leats one child abroad, an indicator for father abroad and a dummy for mother abroad, labor market status, including an employed dummy, income, an indicator for permanent labor contract, dummies for the sector of employment (industry, construction and services), and a binary variable for owning a house in the sending country, municipality dummies and birth country indicators. Additionally, dummy variables account for missing observations in the following variables: documented, educated in Spain, brother abroad, children abroad, father abroad, mother abroad, income and permanent contract. The individual data is obtained from the Spanish National Immigrant Survey. The information used to compute the size variable comes from the Spanish Town Hall Census. The sample in the first column is composed of women, in the second of men, in the third of early immigrants (stay shorter or equal than seven years), in the fourth of long stayers (stay longer than 7 years), in the fifth of Latinos and in the sixth of non-Latinos. The standard errors are clustered by municipality and birth country groups.

Table 5.2: Remitted quantity. Different subsamples

	women	men	short	long	latin	rest
Dep var: Quantity	(1)	(2)	(3)	(4)	(5)	(6)
size by culture	0.006	0.148	0.047	0.1	0.072	0.138
	(0.04)	(0.046)***	(0.043)	(0.049)**	(0.053)	(0.038)***
size	-14.506	14.459	-1.657	1.960	-31.226	23.333
	(29.155)	(24.104)	(20.981)	(38.625)	(34.348)	(19.235)
Observations	7362	5875	7051	6186	5251	7986
R^2	0.242	0.296	0.282	0.189	0.291	0.203

The dependent variable is remittances quantity sent in the last year. Size is computed as the logarithm of the ratio of two variables. The variable in the numerator is the ratio between the number of immigrants from the corresponding birth country in the municipality and the number of individuals in the municipality. The variable in the denominator is the ratio between the number of immigrants from the corresponding birth country in Spain and the total population in Spain. Culture is the average quantity remitted in the last year by individuals from the birth country in Spain minus the average quantity remitted in Spain. The variable size (at the municipality level) by culture is instrumented using size at the province level by culture. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5%, and *** if the level of significance is less than 1%. All regressions include size interacted by culture and size, individual characteristics, involving a male dummy, age, age squared, indicators for length of residence, a Spanish nationality binary variable, a documented dummy, indicators for the level of education (primary, secondary and tertiary), and a dichotomous variable for being educated in Spain, family characteristics, entailing a married dummy, the number of household members, a dichotomous variable for intending to bring some family members to Spain, an indicator for spouse abroad, a binary variable for at least one brother abroad, a dummy for at least one child abroad, an indicator for father abroad and a dummy for mother abroad, labor market status, including an employed dummy, income, an indicator for permanent labor contract, dummies for the sector of employment (industry, construction and services), and a binary variable for owning a house in the sending country, municipality dummies and birth country indicators. Additionally, dummy variables account for missing observations in the following variables: documented, educated in Spain, brother abroad, children abroad, father abroad, mother abroad, income and permanent contract. The individual data is obtained from the Spanish National Immigrant Survey. The information used to compute the size variable comes from the Spanish Town Hall Census. The sample in the first column is composed of women, in the second of men, in the third of early immigrants (stay shorter or equal than 7 years), in the fourth of long stayers (stay longer than 7 years), in the fifth of Latinos and in the sixth by non-Latinos. The standard errors are clustered by municipality and country of birth groups.

Table 6.1: Probability of remitting. Mechanisms

	intend	employed	income
	(1)	(2)	(3)
size by culture	-.0008	0.018	14.775
	(0.012)	(0.006)***	(17.368)
size	-.004	0.005	-9.297
	(0.003)	(0.002)***	(4.663)**
Observations	14329	14329	14329
R^2	0.326	0.909	0.48

The dependent variable is a dichotomous variable for intending to bring some family members to Spain in the first column, an employed dummy in the second column and income in the third column. Size is computed as the logarithm of the ratio of two variables. The variable in the numerator is the ratio between number of immigrants from the corresponding country of birth in the municipality and the number of individuals in the municipality. The variable in the denominator is the ratio between number of immigrants from the corresponding country of birth in Spain and total population in Spain. Culture is the average quantity remitted in the last year by individuals from the country of birth in Spain minus the average quantity remitted in Spain. The variable size (at the municipality level) by culture is instrumented using size at the province level by culture. The coefficients are market with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5%, and *** if the level of significance is less than 1%. All regressions include size interacted by culture as well as size, individual characteristics, involving a male dummy, age, age squared, indicators for time of residence, a Spanish nationality binary variable, a documented dummy, indicators for the level of education (primary, secondary and tertiary), and a dichotomous variable for being educated in Spain, family characteristics, entailing a married dummy, the number of household members, a dichotomous variable for intending to bring some family members to Spain, an indicator for spouse abroad, a binary variable for brother abroad, a dummy for children abroad, an indicator for father abroad and a dummy for mother abroad, labor market status, including an employed dummy, income, an indicator for permanent labor contract, dummies for the sector of employment (industry, construction and services), and a binary variable for owning a house in the sending country, municipality dummies and country of birth indicators. Additionally, dummy variables account for missing observations in the following variables: Documented, educated in Spain, brother abroad, children abroad, father abroad, mother abroad, income and permanent contract. The individual data is obtained from the Spanish National Immigrant Survey. The information used to compute the size variable comes from the Spanish Town Hall Census. The sample is composed by immigrants from countries with over 5000 individuals living in Spain. The standard errors are clustered by municipality and country of birth groups.

Table 6.2: Remitted quantity. Mechanisms

	intend	employed	income
	(1)	(2)	(3)
size by culture	-1.89e-06	4.16e-06	0.01
	(6.40e-06)	(3.65e-06)	(0.008)
size	-.004	0.004	-9.398
	(0.003)	(0.002)***	(4.719)**
Observations	14329	14329	14329
R^2	0.326	0.909	0.48

The dependent variable is a dichotomous variable for intending to bring some family members to Spain in the first column, an employed dummy in the second column and income in the third column. Size is computed as the logarithm of the ratio of two variables. The variable in the numerator is the ratio between the number of immigrants from the corresponding birth country in the municipality and the number of individuals in the municipality. The variable in the denominator is the ratio between the number of immigrants from the corresponding birth country in Spain and the total population in Spain. Culture is the average quantity remitted in the last year by individuals from the birth country in Spain minus the average quantity remitted in Spain. The variable size (at the municipality level) by culture is instrumented using size at the province level by culture. The coefficients are marked with * if the level of significance is between 5% and 10%, ** if the level of significance is between 1% and 5%, and *** if the level of significance is less than 1%. All regressions include size interacted by culture as well as size, individual characteristics, involving a male dummy, age, age squared, indicators for length of residence, a Spanish nationality binary variable, a documented dummy, indicators for the level of education (primary, secondary and tertiary), and a dichotomous variable for being educated in Spain, family characteristics, entailing a married dummy, the number of household members, a dichotomous variable for intending to bring some family members to Spain, an indicator for spouse abroad, a binary variable for at least one brother abroad, a dummy for at least one child abroad, an indicator for father abroad and a dummy for mother abroad, labor market status, including an employed dummy, income, an indicator for permanent labor contract, dummies for the sector of employment (industry, construction and services), and a binary variable for owning a house in the sending country, municipality dummies and birth country indicators. Additionally, dummy variables account for missing observations in the following variables: documented, educated in Spain, brother abroad, children abroad, father abroad, mother abroad, income and permanent contract. The individual data is obtained from the Spanish National Immigrant Survey. The information used to compute the size variable comes from the Spanish Town Hall Census. The sample is composed of immigrants from countries with over 5000 individuals living in Spain. The standard errors are clustered by municipality and birth country groups.