

Migration and remittances in Romania: out of sight, out of mind?¹

Abstract

Emigration is costly and direct costs of migration are increasing in geographic distance and skill requirements. Migrants' remittances may thus be seen partly as repayments of loans provided by the family to cover the costs of migration. Using a new data set of bilateral remittance flows from OECD countries to Romania, we find that the loan repayment hypothesis cannot be rejected. In particular, remittances are increasing with geographic distance. Long-distant migrants tend to remit more. Moreover, we find that a rise in the number of Romanian migrants residing in OECD countries increases remittances to Romania. This result holds taking into account potential endogeneity between the number of migrants and remittances.

Keywords: International migration; remittances; loan repayment; bilateral data; Romania.

JEL classification codes: F24, J61, O15.

1. Introduction

In 2007, recorded flows of immigrant money sent to developing countries reached U.S. \$281 billion (Ratha and Xu, 2008).² This amounts to 4 per cent of developing countries' GDP. Understanding the determinants of these remittances is an important policy issue. Remittances allow reducing

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² The World Bank considers that unrecorded flows, transiting through informal channels, could amount to at least 50 per cent of the official recorded flows.

poverty and smoothing consumption (World Bank, 2006). They remain more resilient than private flows during financial crises (Ratha and Xu, 2008). Moreover, they represent an important source of foreign exchange. They outpace private capital flows and official development assistance, and, for some countries, the volume of foreign direct investments (Ratha, 2005).

Recent literature addresses a relevant policy question: What causes different developing countries to receive different levels of remittances? (Adams, 2009; Freund and Spatafora, 2008). The number of emigrants, the level of transfer costs, the political instability of the receiving countries and financial factors, such as interest rates and exchange rates, are identified as primary determinants of aggregate official remittances to developing countries. In this paper, we use a new data set composed of bilateral remittance flows to explore further this question. This data set allows investigating a complementary explanation of aggregate remittances, based on some theoretical foundations: the costs of emigration.

Emigration involves important direct costs (for example transportation of persons and household goods or obtaining visa).³ Such costs may impact on remittances, through two conceptually distinct channels: the extent and the type of migration. First, the costs of emigration may affect the extent of migration, that is the number of migrants, and thus the overall amount of remittances sent back home. Second, the costs of emigration may affect the type of migration (for example distant or close, skilled or unskilled, temporary or permanent) and thus the pattern of remittances. Theory highlights actually that the type of migration influences the motives of remittances (Rapoport and Docquier, 2006). Consider a model where migration decisions are made in a family context and liquidity constraints are binding. In this context, informal arrangements between migrant and non-migrant members may occur as follows: the family provides implicit loans to finance the costs of

³ Borjas (1999: 1711) also points out two indirect costs: 'forgone earnings (for example, the opportunity cost of a post-migration unemployment spell), and psychic costs (for example, the disutility associated with leaving behind family ties and social networks)'.¹

emigration. Then, the migrant sends back money home partly to reimburse these costs. Remittances may thus be seen partly as loan repayments.⁴ This hypothesis is a relatively old idea and has been tested successfully using household survey (Johnson and Whitelaw, 1974; Lucas and Stark, 1985; Poirine, 1997; Stark and Lucas, 1988).⁵ However, as far as we know, the loan repayment hypothesis has never been explored as a complementary determinant of aggregate remittances to developing countries.

Do aggregate remittances include a loan repayment component? To answer this question, we use a new data set of the National Bank of Romania. This data set breaks down inflows of Romanian remittances by source country. This new bilateral dimension of the data allows focussing on two specific dyadic factors: (1) the bilateral geographic distance between Romania and a source country and (2) the average education level of Romanian migrants in a source country. We argue that if aggregate remittances have a loan repayment component, they should be positively related to these two dyadic factors. Actually, both pre-migration investments in education and long-distance emigration are costly. For instance, Mayda (2009) shows cogently that, among the variables affecting the costs of emigration, geographic distance appears to be the most important one. Inflows of Romanian remittances are therefore expected to increase both with the level of the Romanian migrants' education and the geographic distance to Romania.

Romania is, for various reasons, a relevant recipient country. First, Romania is a recent country of massive emigration. In 2007, the stock of legal emigrants reached 1.2 million and 5.7 per cent of population (Ratha and Xu, 2008). Second, Romania is currently in the top-10 recipients of remittances among developing countries. Its recorded inward remittance flows reached U.S. \$4.7

⁴ For a theoretical exposition of the loan repayment hypothesis, see Rapport and Docquier (2006).

⁵ Using a household survey conducted in Botswana in 1978-1979, Lucas and Stark (1985) find that remittances rise significantly with years of schooling of the migrant. 'Thus support is certainly lent to the notion that remittances are partially a result of an understanding to repay initial educational investments' (Lucas and Stark, 1985: 910).

billion in 2006 and 6.8 billion in 2007 (Ratha and Xu, 2008). For comparison, they represent 5.5 per cent of GDP and about 60 per cent of foreign direct investment inflows. Finally, Romania joined the European Union on January 1, 2007, but it is still considered as a middle-income country. Poverty persists (see World Bank 2003). Poverty acts as a push factor of migration, but also leads to binding liquidity constraints which render likely family loan arrangements.

Our paper is related to a vast literature on the determinants of international remittances. Other hypotheses suggest different effects of distance and education on remittances. For instance, remittances are expected to decrease with distance in the three following cases: (1) if remittances contain an altruistic component and ‘if one admits that altruism is solvable in distance’ (Rapoport and Docquier, 2006: 1153); (2) if remote migration increases strategic behaviours. An increase of distance from family may actually reduce the enforcement of the implicit loan contract; Finally (3), if distance is a proxy for transfer costs (Lueth and Ruiz-Arranz, 2008). Theory is also ambiguous in its prediction of the effect of education on remittances. Education may have no effect per se once we control for the higher earning it allows (Stark, 1995). On contrary, if educated migrants are likely to spend more time abroad and to reunite with their families in the labour-receiving country, we may expect a smaller propensity to remit (Faini, 2007). The sign of the impact of education and distance on remittances is thus an empirical question.

This paper makes three contributions to the literature. First, we use a new bilateral data set, identifying 15 source countries of the OECD, to explore if aggregate remittances include a loan repayment component. Second, given our empirical findings, the loan repayment hypothesis cannot be rejected. Thus, we present evidence that distance positively influences remittances. All other things being equal, long-distant migrants tend to remit more. However, we find only weak evidence of a positive effect of education on remittances. More precisely, the education effect disappears when controlling for distance. The high pairwise correlation between education and distance explains this result and suggests that the costs of long-distance migration are supported by migrants

with high levels of education. Finally, we confirm that remittances depend positively on the stock of migrants (Freund and Spatafora, 2008): an increase in the stock of Romanian migrants residing in OECD countries leads to an increase in recorded remittances to Romania. However, there is a concern of endogeneity because remittances may in turn increase the stock of migrants. This endogeneity may bias the estimates of education and distance. In fact the number of migrants in a given country appears to decrease the costs of migration in that country (Carrington *et al.*, 1996, McKenzie and Rapoport, 2007). Settled migrants actually diffuse information for new migrants and lower the costs of their adaptation. They provide job-search assistance or help in finding housing. This suggests that a biased estimate of the stock of migrants may bias the impact of both education and distance since they partly capture costs of emigration. We treat this problem using an instrumental variable estimator. We make use of the bilateral dimension of the data to find appropriate and new instruments. We exploit differences in religious and linguistic heterogeneity at the destination country as instrumental variables for the stock of migrants. Our results appear fairly robust to this approach.

The rest of the paper is organised as follows. In the next section, we briefly review the stylised facts about the Romanian international migration. These stylised facts support the possibility of informal family arrangements. In section 3, we describe our bilateral data set and discuss very recent contributions in relation to the type of data we use. In section 4, we design our empirical model. In section 5, we expose the results. Finally, we conclude in section 6.

2. Facts and issues

Before embarking on estimation it is helpful to review some stylised facts about the Romanian international migration. The output lost in the beginning of the 1990s triggered a massive emigration but also exacerbated poverty.

A massive emigration. The United Nations Population Division (UNPD) offers valuable orders of magnitude to evaluate the Romanian emigration, by computing the net number of international

migrants during a period divided by the average population. The net rate per thousand population reached (-4,6) between 1990 and 1995 and (-3,1) between 1995 and 2000. These rates are much larger than in other developing countries on average (around -0,5 from 1990 to 2000). In 2007, the stock of legal emigrants reached 1.2 million and 5.7 per cent of population (Ratha and Xu, 2008). Capturing illegal migration is an issue but stock data are still more reliable than flows. As acknowledged by Docquier and Rapoport (2009: 4) 'There is a high turnover among illegal migrants, and many of them tend to be regularised after some time'.

Poverty is still relatively high. In 2002, 28.9 per cent of the population is living below the national poverty line and 10.2 per cent live in severe poverty (defined as those with insufficient means to purchase a minimum caloric intake each day) (World Bank, 2003: 18). The poor face difficulties to obtain credit and two-thirds live in the least developed and rural areas of Romania.

Romanian migrants leave temporarily and return fairly soon. Short-term migrants might be expected to remit more than long-term migrants (Elbadawi and Rocha, 1992; Rodriguez and Horton, 1996). They tend to keep closer ties due to expectations of return. Additionally, the such expectations improve the enforcement of the implicit loan contract. The migrant reimburses her loan, in the perspective of her return. Some studies highlight the temporary character of the Romanian migration. A World Bank survey documents that the majority of Romanian migrants prefers to spend shorter times abroad and then return home (Mansoor and Quilian, 2006). Thus, less than 10 per cent of the migrants answer that they prefer to leave permanently or leave temporarily without plan to return. This pattern is supported by sociologist studies of Romanian migration (Potot, 2008). Romanian migrants tend to cross national borders for temporary periods and keep close ties with relatives at home despite remoteness.

These stylised facts render likely family loan arrangements to finance migration. If this type of arrangements is relatively spread across households, its consequences should be partly observable at

the aggregate level. However, this does not preclude the existence of other familial motives (for instance insurance) or individualistic motives (for instance altruism).

2. Bilateral data

Data on bilateral remittances come from the National Bank of Romania. They are collected via (1) banks reports for amounts received in banks accounts, (2) reports of the money transfer companies such as Western Union and Money Gram and (3) reports of the National Post Office for amounts sent via postal orders.⁶ We identify recorded flows to Romania from 15 source countries of the OECD: Austria, Belgium, Canada, Denmark, France, Germany, Greece, Ireland, Italy, Portugal, Spain, Switzerland, Turkey, the United Kingdom and the United States. Data are quite recent and on a quarterly frequency. We cover 2005, 2006, 2007 and the first three quarters of 2008. Before 2005, only global information on remittances is available.

Data constraints are relatively strong in the literature. Almost all papers do not identify the source country of remittances.⁷ The first studies using bilateral data work with a tiny number of observations (Lianos, 1997; Straubhaar, 1986). More recently, two papers done independently and concurrently to ours work with larger samples. The first one uses a sample of 11 destination countries (Lueth and Ruiz-Arranz, 2008). Each one has recorded flows from about 16 source countries and different period of time. The authors find evidence that remittances follow a gravity type pattern: bilateral remittances increase with the source and destination countries' GDP and decrease with geographic distance. However, originally, the gravity equation is theoretically derived to model trade flows. When applying this equation to remittances, it is difficult to understand how bilateral transaction costs matter. They are not an increasing function of geographic distance, which is the proxy used for bilateral transaction costs. For instance, it costs U.S. \$17 to transfer U.S. \$200

⁶ The NBR estimates that around 40 per cent of remittances are coming through informal channels.

from the USA to Colombia for a capital-to-capital distance of 3845 kms. But, it costs only U.S. \$3 to transfer the same amount from the USA to Mexico, for a roughly similar distance (3038 kms). As an alternative illustration, it costs only U.S. \$4 to transfer the same amount from the USA to Philippines for a much larger distance (13,794 kms). Thus, the transaction costs of remittances seem unrelated to distance but determined by the lack of financial development in the labour-sending country (Freund and Spatafora, 2008).⁸

The second paper works with a sample of 21 Western European source countries and 7 European neighbouring destinations, over the period 2000-2005 (Schiopu and Siegfried, 2006). The authors find evidence for altruism on the belief that bilateral remittances increase with the difference between source and destination countries' GDPs. We may wonder however whether such a difference is a good indicator to capture altruism motives (see Rapoport and Docquier, 2006).

Related to international organisms, such as the IMF (Lueth and Ruiz-Arranz, 2008) and the European Commission (Schiopu and Siegfried, 2006), both papers have built large data sets compared to the literature, which is a valuable contribution. Using a large sample of observations introduces more variability on remittance patterns and allows for more general results, but has two potential drawbacks. First, remittances are recorded in very different ways among destination countries, due to a lack of international harmonization in the data collection. This heterogeneity undermines the scope of the results. Second, data on remittance determinants for destination developing countries are sometimes difficult to observe, get and incorporate in the estimation, due to their qualitative type (for instance political stability) or confidential nature (for instance the black

⁷ Lianos (1997) works on Greek inflows of remittances: 31 observations from Germany (1961-1991), 11 from Belgium (1981-1991) and 12 from Sweden (1980-1991). Straubhaar (1986) uses a time series of 19 remittance flows from Germany to Turkey (1963-1982).

⁸ Ratha and Shaw (2007) find evidence for higher remittance costs between developing countries. They also find that the cost of remitting U.S. \$200 from a developed country to a developing country is significantly much lower than the cost of remitting the same amount in the opposite way.

market premium). Working on one receiving country (here Romania) and various remitters reduces the size of the sample but avoids the previous shortcomings. First, flows are recorded in a more homogeneous way. Second, controlling for the specific destination country's factors such as inflation, political stability or the black market premium (or differential of interest rate) is not any more required. These variables only present a time-series variation which is more easily captured.

3. A specification of bilateral remittances

Having introduced the new data set of bilateral aggregate remittances and developed some understanding of a potential loan repayment component we now investigate a broader issue: the determinants of bilateral remittance flows. According to the theoretical and empirical literature, the main determinants of aggregate remittances are related to the following factors: (a) economic size, (b) financial environment and (c) labour market. Our basic regression accounts for dyadic and source country-variables related to these factors. Recall that in our sample the destination country is always Romania. Thus, we discard destination country-variable controls. These variables only have time-series variation, captured by allowing for year and quarter specific effects in remittances:

$$\begin{aligned} \ln(\text{Remittances})_{ir,qt} = & \beta_0 + \beta_1 \ln(\text{Education})_{ir} + \beta_2 \ln(\text{Distance})_{ir} + \beta_3 \ln(\text{GDP})_{i,qt} \\ & + \beta_4 \ln(\text{StockMig})_{ir} + \beta_5 \ln(\text{ExChange})_{ir,qt} + \beta_6 \ln(\text{Unemploy})_{i,qt} \\ & + \alpha_1 (\text{EurOldmig})_i + \alpha_2 (\text{EurNewmig})_i + \gamma_q + \lambda_t + \varepsilon_{ir,qt}, \end{aligned} \quad (1)$$

where i , r , t and q indicate the source country, Romania, year and quarter, respectively. The dependant variable $(\text{Remittances})_{ir,qt}$ is the value of bilateral remittance flows from the source country i to Romania at year t and quarter q . We use logs on both sides of the equation, to reduce the potential skewness of the distribution and to interpret the estimated coefficients in elasticity terms. The coefficients of interest to us are β_1 and β_2 . ε_{irt} represents the usual error term capturing unobserved factors and mismeasurements of the remittances level. The explanatory variables are defined as follows (year and quarter subscripts are omitted for simplicity):

Variables of interest:

- $(Education)_{ir}$ denotes the average education level of Romanian migrants in country i ;
- $(Distance)_{ir}$ is the distance between i and Romania.

Main controls:

We define the main controls, briefly review the literature and discuss the main concerns.

a. Economic size:

- $(GDP)_i$ is the Gross Domestic Product of country i ;
- $(StockMig)_{ir}$ denotes the stock of Romanian migrants in country i .

The empirical literature is unanimous on the effect of economic size. The aggregate income of the source country i , proxied by GDP, positively influences the volume of remittances sent (Elbadawi and Rocha, 1992; Lianos, 1997). This is consistent with the patterns displayed using simple descriptive statistics. In 2007, the United States and Western Europe account for almost two-third of remittance flows to developing countries (Ratha and Xu, 2008).

The aggregate income mixes the income of natives and migrants. Ideally, we would like to assess only the aggregate income effect of the Romanian migrants: the higher their aggregate income, the larger their aggregate remittances. However, data for such an ideal are unavoidable. To mitigate this problem we benefit from the bilateral dimension of our data and use the stock of Romanian migrants in the source country to proxy their aggregate income. Thus, we argue that remittances from a given source country i to Romania are positively related to the income of i and the number of its Romanian migrants. A concern of this estimation strategy is the potential simultaneity between migration and remittances. Remittances may indeed stimulate emigration. We will treat this problem using an instrumental variable estimator.

b. Financial environment:

- $(ExChange)_{ir}$ denotes the nominal exchange rate of country i facing the Romanian Lei.

Financial variables, such as exchange rates and interest rates at destination, are considered as important determinants of remittances (Adams, 2009; El Sakka and McNabb, 1999; Elbadawi and Rocha, 1992; Lianos, 1997). Due to the bilateral nature of our sample, with one destination country, we only consider the effect of the bilateral exchange rate. A variation of $(ExChange)_{ir}$ affects the purchasing power of remittances and leads to an ambiguous effect. Consider an appreciation of the source's currency vis-à-vis the Lei. We get to two opposite effects: (1) an income effect: migrants remit more to benefit from an increasing purchasing power; (2) a substitution effect: migrants remit less, while keeping unchanged the purchasing power of the amount transferred.

c. Labour market:

- $(Unemploy)_i$ is the unemployment rate of country i .

The literature documents unambiguously that an increase in the unemployment of the source country i negatively impacts on the volume of remittances. Three complementary explanations are at hand. First, a rise in unemployment causes significant losses of income which reduce remittances. Second, a rise in unemployment increases the migrant's uncertainty about future incomes, and may incite migrants to decrease their remittances in anticipation. Finally, a high rate of unemployment reduces the migrant's probability to be employed and consequently the probability to remit. In fact, in all the OECD countries, except Italy and Greece, unemployment affects immigrants especially (OECD, 2006).

d. Fixed effects:

- γ_q and λ_t are year and quarter fixed effects respectively.

They control for the temporal variation of destination country factors.

- $(EurOldmig)_i$ is a binary variable which is unity if country i is an Old Immigration country of Europe, zero otherwise;
- $(EurNewmig)_i$ is a binary variable which is unity if country i is a New Immigration country of Europe, zero otherwise.

These two dummies aim to control for countries' specific characteristics related to the policy of immigration, which may affect the volume of remittances (see below). Restrictive immigration policies are one of the most salient facts among the new trends in international migration. OECD countries have reinforced their controls to fight against terrorism and prevent irregular migration. Despite more restrictive policies, the immigration policy in OECD countries is not uniform. Using the OECD (2006) outlook on international migration, which is the main source depicting immigration policies in OECD countries, we identify three relatively homogeneous groups of countries. They present similarities in the way they deal with the international transit of persons.⁹

The first and base group against which comparisons are made includes North American countries (Canada and the United States). They are immigration countries long ago and tend to attract and keep in priority skilled migrants (OECD, 2006: 194). Their structure of immigration differs from European countries (Docquier *et al.*, 2009). However, as acknowledged by the OECD (2006: 80), we split the European countries into two distinct groups: the old and the new European immigration countries. The old European immigration countries (*EurOldmig*) regroup the so-called Western European countries: Austria, Belgium, France, Germany, Switzerland and the United Kingdom. They promoted a mass immigration since the post-war period until the seventies. Then, they adopted more restrictive immigration policies. In contrast, the new immigration countries (*EurOldmig*) present a different pattern of migration. This group involves Cyprus, Greece, Ireland, Italy, Portugal, Spain, and Turkey which is not strictly speaking in Europe. Broadly speaking, from the post-war period until the seventies, these countries were labour-*sending* countries. Then, they became more developed and after the adoption of restrictive policies in the older immigration countries, they became labour-*receiving* countries.

⁹ Another way to deal with differences of immigration policy across countries would be to use country dummies. However, due to data limitations, this would introduce high multicollinearity into the regressions.

We argue that immigration policy may affect remittances through two channels: the duration and the legality of migration. First, Romanian migration to the new European immigration countries appears to be more temporary. For illustration, using OECD data on naturalization rates, we find that on average 26 per cent of Romanian official migrants are naturalized in the new immigration countries¹⁰ against 59 per cent in old immigration countries and 65 per cent in North America.¹¹ Since the intent to return home is hypothesized to induce greater savings and remittances (see above), we expect larger remittances from new European immigration countries. Second, restrictive immigration policies aim to prevent irregular immigration. Since illegal Romanian migration to Europe, as a whole, seems easier than to North America, we expect a higher stock of illegal migrants in Europe and thus larger remittances (given that illegal migrants transfer money through legal means).

Details about the source and data construction are provided in Appendix 1. In Appendix 2, we provide some summary statistics for the variables and briefly comment on the statistics related to remittances, stock of migrants, distance and education.

4. Estimates of bilateral determinants of remittances

Table 1 reports the estimation of equation (1) which explains about 80 per cent of the variance of bilateral remittances. We use two different estimators: Ordinary Least Squares (OLS) in columns (1) to (6) and Instrumental Variables (IV) in column (7).¹² The latter estimator allows addressing the potential endogeneity of the stock of migrants (see below).

¹⁰ Turkey inflates this average. Without Turkey, the average rate of new immigration countries falls to 13 per cent.

¹¹ Due to lack of data, the average rate for old European immigration countries does not include the United Kingdom and Germany.

¹² Due to data limitations, we do not use panel data estimation. For instance, the within estimator would not allow to estimate the effect of our variables of interest (education and distance). They are here time-independent.

Table 1. Bilateral remittances determinants

Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable ^a :	ln(R)	ln(R)	ln(R)	ln(R)	ln(R)	ln(R/StMig)	ln(R)
Method:	OLS	OLS	OLS	OLS	OLS	OLS	IV
ln(<i>Education</i>) _{ir}		0.51 (0.25)**		0.13 (0.16)	-0.23 (0.20)	0.64 (0.13)***	-0.04 (0.18)
ln(<i>Distance</i>) _{ir}			0.85 (0.15)***	0.82 (0.14)***	0.64 (0.11)***	1.02 (0.11)***	0.58 (0.13)***
ln(<i>StockMigrants</i>) _{ir}	0.26 (0.04)***	0.42 (0.10)	0.53 (0.06)***	0.56 (0.08)***	0.34 (0.10)***	1	0.30 (0.08)***
ln(<i>GDP</i>) _i	0.93 (0.06)***	0.89*** (0.07)***	0.77 (0.07)***	0.77 (0.07)***		0.55 (0.05)***	0.87 (0.07)***
ln(<i>GDP/Pop</i>) _i					1.72 (0.35)***		
ln(<i>Pop</i>) _i					0.86 (0.07)***		
ln(<i>ExChange</i>) _{ir}	-0.20 (0.35)	-0.05 (0.33)	0.11 (0.27)	0.14 (0.27)	0.22 (0.23)	0.34 (0.32)	-0.01 (0.17)
ln(<i>Unemployment</i>) _i	-1.26 (0.18)***	-1.18 (0.17)***	-1.33 (0.17)***	-1.31 (0.17)***	-0.91 (0.19)***	-1.38 (0.18)***	-1.11 (0.17)***
(<i>EurOldmig</i> dummy) _i	1.63 (0.20)***	2.12 (0.28)***	3.27 (0.34)***	3.32 (0.35)***	2.76 (0.28)***	4.35 (0.30)***	2.57 (0.28)***
(<i>EurNewmig</i> dummy) _i	3.17 (0.26)***	3.97 (0.38)	4.74 (0.32)***	4.88 (0.38)***	4.27 (0.32)***	6.15 (0.31)***	3.94 (0.29)***
<i>1st Quarter</i> dummy	-0.33 (0.13)**	-0.34 (0.13)**	-0.35 (0.13)**	-0.36 (0.12)**	-0.29 (0.12)**	-0.38 (0.13)**	-0.35 (0.12)**
<i>2nd Quarter</i> dummy	-0.21 (0.14)	-0.22 (0.13)	-0.23 (0.12)*	-0.23 (0.12)*	-0.16 (0.12)	-0.24 (0.14)*	-0.22 (0.12)*
<i>3rd Quarter</i> dummy	-0.18 (0.14)	-0.19 (0.13)	-0.19 (0.13)	-0.20 (0.13)	-0.17 (0.13)	-0.21 (0.15)	-0.19 (0.13)
<i>2006</i> dummy	0.40 (0.11)***	0.38 (0.10)***	0.34 (0.10)***	0.34 (0.09)***	0.28 (0.10)***	0.30 (0.11)***	0.37 (0.09)***
<i>2007</i> dummy	0.58 (0.12)***	0.58 (0.12)***	0.56 (0.11)***	0.56 (0.12)***	0.40 (0.12)***	0.57 (0.13)***	0.57 (0.11)***
<i>2008</i> dummy	-0.10 (0.16)	-0.06 (0.15)	-0.05 (0.13)	-0.04 (0.12)	-0.18 (0.12)	0.04 (0.13)	-0.07 (0.13)
Obs. Nb.	205	205	205	205	205	205	205
Adj. R ²	0.78	0.77	0.82	0.82	0.82	0.76	0.80
Wald Stat. (Ho: A=B) ^b	191.2***	160.0***	146.1***	134.9***	128.0***	188.8***	106.4***
Coefficients on instrumental variables in first stage							
Dependent variable = ln(<i>StockMigrants</i>) _{ir}							
(Ratio of Religious Fractionalization) _i							3.77 (0.27)***
(Ratio of Language Diversity) _i							1.37 (0.21)***
Shea Partial R ²							54.79
F-Statistic ^b							212.4
Hansen J-Statistic							1.93
[p – value]							0.16

Notes: ^a dependent variable: R means Remittances. ^b p-value<0.01 is not reported. Heteroskedastic consistent standard errors are in parentheses, with *, **, ***, denoting the significance at 1, 5 and 10 per cent level, respectively. Constant is not reported.

We first comment on the OLS estimates. The heteroscedasticity is corrected using White (1980). For simplicity, we present the results as follows. In column (1), we estimate equation (1), without our two variables of interest, education and distance. In columns (2) and (3), we add education and distance, respectively. Then, we include both education and distance in column (4). Finally, we check the robustness of our results in columns (5) and (6).

In column (1), as expected, economic size variables exhibit a positive effect on remittances. First, holding other factors constant, a 1 per cent increase in source country GDP increases remittances by about 0.9 per cent on average. Second, a 1 per cent increase in stock of migrants increases remittances by about 0.3 per cent on average. In addition, we find a significant negative impact of the unemployment rate. This effect was expected since an unemployment rise increases macroeconomic instability, causes significant loss of income and reduces the migrant's probability to be employed. On the other hand, the estimate of the bilateral exchange rate is not statistically significant. This could be the result of the above mentioned ambiguity between substitution and income effects.

The results on the dummy variables are worth mentioning. Equation (1) differentiates among the groups of OECD countries hosting Romanian migrants. As expected above, the results establish a clear and statistically significant ranking: European new immigration countries tend to remit more than European old immigration countries, which remit more than North American countries. The Wald statistic reported in Table (1) indicates that the difference within Europe is highly significant with a p-value lower than 0.01. The time fixed effects estimates reveal some interesting patterns. The quarter dummies measure the difference in remittances relative to the fourth quarter (that is the base group). It appears that during the first quarter migrants are estimated to remit less than during the last quarter. This result can be the consequence of above normal expenses and/or remittances sent to prepare the Christmas and New Year festivities in the last quarter. The year dummies measure the difference in remittances relative to 2005 (that is the base group). Results exhibit a

significant increase in remittances in 2006 and 2007, but no difference in 2008. This slow down could be the result of the actual global financial crisis; a phenomenon acknowledged by Ratha and Xu (2008) in developing countries.

In column (2), we investigate the impact of the migrant's education on remittances and estimate equation (1) without the distance variable. We find a statistically and economically significant positive effect of the migrant's education. A 1 per cent increase in education increases remittances by about 0.5 per cent, holding other factors fixed. However, this effect appears to be not sufficiently robust across specifications.

Other results of column (2) are little affected compared with column (1). The differences between the groups of countries are nevertheless worth mentioning. The difference between European and North American countries increases by controlling for the effect of education. This is expected since Romanian migrants in Canada and the United States are on average more educated (see Table 4 in Appendix 2).

In column (3), we investigate the impact of distance on remittances and estimate equation (1) without the education variable. We find a statistically and economically significant positive effect of distance on remittances. *Ceteris paribus*, a 1 per cent increase in distance to Romania leads to a 0.85 per cent increase in bilateral remittances on average. If, as argued above, migratory costs increase with distance, the loan repayment hypothesis cannot be rejected. A larger distance implies a higher loan to cover migratory expenses and then larger remittances to repay back the loan. In addition, note that controlling for distance again increases the difference between European and North American countries. This is explained by the relative remoteness of North American countries compared to Europe.

In column (4), we estimate equation (1) and include both education and distance variables. The distance effect remains highly significant ($p < 0.01$). However, controlling for distance, the education effect disappears ($p > 0.1$). This can be the result of the high collinearity between both variables. The

pairwise correlation coefficient equals 0.65 with a p-value of 0.01. High correlation between education and distance suggests that the costs of long-distance migration are supported by the migrants with high levels of education. Other results are basically unchanged with respect to columns (1) to (3).

In columns (5) and (6), we check the robustness of our main results on education and distance. In column (5), we substitute population (pop) and GDP per capita (GDP/POP) for GDP, to control, respectively, for size and development differences across source countries. The results show that an increase in source country per capita income and population increase remittances. Other results remained unchanged compared to column (4). In column (6), we impose a unitary coefficient to the stock of migrants, by moving the variable $\ln(\text{StockMigrants})$ to the left hand side of the equation (1). In this way, we express the dependent variable as remittances per migrant. This unitary constraint complies with the larger estimates of migrant stock found in the literature. For instance, Lianos (1997) finds a 0.9 elasticity and Elbadawi and Rocha (1992) a unitary elasticity, although these results are not strictly comparable to ours. This unitary constraint has no particular theoretical foundation but it helps determining the direction of the simultaneity bias in the relationship between migration and remittances. In fact, in column (6), we observe that the unitary constraint has inflated the estimates of distance and education. The latter becomes even statistically significant. Consequently, a reverse causality, such as remittances increase migration, may produce an upward bias in the estimate of the stock of migrants and thus an upward bias in distance and education estimates.

In column (7), we account for this simultaneity issue. We use two instrumental variables for the stock of migrants. First, we exploit differences in religious heterogeneity in the labour-receiving country.¹³ The exclusion restriction is that the religious fractionalization of a country has no effect

¹³ Faini (2007) controls for the possibility that total migration is endogenous by using the geographic distance as an instrumental variable. However, our regressions show that this variable is inappropriate since it affects remittances.

on Romanian remittances, other than its effect through an increase in the stock of migrants. «Measured religious fractionalization tends to be higher in more tolerant and free societies» (Alesina *et al.*, 2003: 158) and such societies appear to be more attractive for migrants. The measure of religious fractionalization is based on data from the *Encyclopedia Britannica* and taken from Alesina *et al.* (2003). However, our empirical strategy might capture the effect of religious fractionalization on remittances, but working through other channels. Consequently, we use a measure of linguistic diversity as an additional instrumental variable. A diversity of tongues in a country is likely to be highly correlated with immigration but not with Romanian remittances. The measure of language diversity comes from Melitz (2008).

The first stage result, partly reported at the bottom of Table (1), shows that the estimates of both the ratio of religious fractionalization (in %) and the ratio of the language diversity (in %) are positive and economically and statistically highly significant. The large F-statistic indicates that our two restriction variables provide a good fit in the first stage regression. The Shea partial r-squared of the first stage regression is also quite large (0.55) and the Sargan overidentification test (with a p-value of 0.16) supports the validity of the instruments. The two stage least squares estimates in column (7) produce results which are almost identical to the OLS estimates of column (4). This appears to be a good sign of the validity of our instrumental variable approach. Among other results, estimates of column (7) exhibit a slightly lower elasticity of the stock of migrants, confirm a positive and significant effect of distance on remittances and a non significant effect of education.

5. Conclusion

Recent literature addresses a relevant policy question: What causes different developing countries to receive different levels of remittances? Using a new data set composed of bilateral remittance flows we explore further this question. We wonder whether aggregate remittances include a loan repayment component. Emigration is costly and migrants' remittances may be seen partly as

repayments of loans provided by the family to cover the costs of migration. Given our empirical findings, this hypothesis cannot be rejected. In particular, remittances are increasing with geographic distance, used as a proxy for the costs of migration. However, we find only weak evidence of a positive effect of education on remittances. More precisely, the education effect disappears when controlling for distance. Moreover, we confirm that remittances depend positively on the stock of migrants: an increase in the stock of Romanian migrants residing in OECD countries leads to an increase in recorded remittances to Romania. However, the potential endogeneity between the stock of migrants and remittances may bias the estimates of education and distance. In fact the number of migrants in a given country appears also to affect the costs of migration in that country. We treat this problem using an instrumental variable estimator and find that our results appear fairly robust to this approach.

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Appendix 1. Data construction

Table 2. Data and variable definitions

Variables	Description
Bilateral remittances	Come from the National Bank of Romania. Quarterly frequency. Converted into current USD using a quarterly exchange rate from <i>International Financial Statistics</i> (IMF).
Migrant's education	Computed as the share of highly educated Romanian migrants in the total number of Romanian migrants in a given country. Source: OECD <i>Foreign-Born and Expatriates</i> 2005. Three level of education: (1) primary, (2) secondary, and (3) tertiary.
Bilateral distance	Computed as the distance in kilometres between the largest cities of the two countries. Source: CEPII.
GDP	Gross Domestic Product. Quarterly frequency. Source: OECD.
Stock of migrants	Come from OECD <i>Foreign-Born and Expatriates</i> 2005.
Bilateral exchange rate	Measured in Romanian Lei per unit of foreign currency. Quarterly frequency. Source: <i>International Financial Statistics</i> .
Unemployment rate	Extracted from OECD <i>Stat Web Browse</i> , except for Turkey (IMF). Quarterly frequency.
Old immigration country	= 1 if the source country is Austria, Belgium, France, Germany, Switzerland or the United Kingdom, and 0 otherwise
New immigration country	= 1 if the source country is Greece, Ireland, Italy, Portugal, Spain or Turkey, and 0 otherwise
Religious fractionalization	Taken from Alesina <i>et al.</i> (2003)
Language Diversity	Come from Melitz (2008)

Appendix 2. Summary statistics

We briefly comment on the statistics of remittances, stock of migrants, distance and education. Remittances to Romania increase over the period considered (2005-2008), notably from the main source countries: Italy (a factor 2.1 increase), Spain (a factor 2.3) and the United States (a factor 4.5). In 2005, the stock of official Romanian migrants by source country reached 39,751 people with a large variance: from 139,080 people in the United States to 2804 in Portugal. The average distance between Romania and source countries is about 2450 kms. The most remote countries are the United States (7986 kms) and Canada (7422 kms), while Greece (741 kms) and Turkey (746 kms) are the closest. Table 4 reports the percentage of Romanian migrants with tertiary education in the main source countries in 2005. The average rate is 28 per cent, but again with a large variance.

Table 3. Summary statistics of the variables

Variables	Mean	Standard deviation	Min	Max
ln(Bilateral Remittances)	17.28	1.36	14.78	20.45
ln(Migrant's Education)	-1.48	0.59	-2.81	-0.62
ln(Bilateral Distance)	7.58	0.72	6.09	8.96
ln(GDP)	27.50	1.20	25.77	30.31
ln(Stock of Migrants)	10.04	1.23	7.53	11.84
ln(Bilateral Exchange Rate)	0.31	-0.71	2.11	1.61
ln(Unemployment Rate)	1.86	0.31	1.16	2.47
Old Immigration Country	0.45	0.50	0	1
New Immigration Country	0.40	0.49	0	1
Ratio of Religious	0.42	0.24	0.01	0.82
Fractionalization				
Ratio of Language Diversity	0.24	0.22	0.02	0.70

Note: 205 observations.

Table 4. Percentage of Romanian migrants with tertiary education, 2005

Country of emigration	%	Country of emigration	%
Austria	12.7	Italy	9.8
Belgium	34.5	Portugal	17.4
Canada	53.9	Spain	13.2
France	25.2	Switzerland	50.2
Germany	18.0	Turkey	6.1
Greece	14.9	United Kingdom	46.5
Ireland	23.4	United States	38.1

Source: authors' computation on the OECD database, *Foreign-Born and Expatriates 2005*