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**DETERMINANTS OF  
WORKERS' REMITTANCES**

**EVIDENCE FROM  
THE EUROPEAN  
NEIGHBOURING REGION**

by Ioana Schiopu  
and Nikolaus Siegfried



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# DETERMINANTS OF WORKERS' REMITTANCES EVIDENCE FROM THE EUROPEAN NEIGHBOURING REGION<sup>1</sup>

by Ioana Schiopu<sup>2</sup>  
and Nikolaus Siegfried<sup>3</sup>



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## **Abstract**

Workers' remittances have become the second largest source of net financial flows to developing countries. However, the main motives for sending remittances remain controversial. This paper examines the importance of altruistic versus investment motives using a new panel data set of bilateral flows from 21 Western European to 7 EU neighbouring countries. We find that altruism is important for remitting, as the GDP differential between sending and receiving countries is positively correlated with the average remittance per migrant. By contrast, interest rate differentials are insignificant, suggesting a weak investment motive. Finally, migrants' skills raise remittances, while a large informal economy in the sending country depresses official remittance flows.

JEL classification: D13, D64, F22, F24, O15

Keywords: migration, remittances, migrants' skills, altruism, balance of payments

## Non-technical summary

Workers' remittances have increased steadily over the last years. They currently represent the second largest source of net financial flows to developing countries, outpacing the transfers from official sources. While this has earned them a lot of attention at the political level, the main motives for remitting money remain controversial. Theoretical considerations suggest that remittances may be sent for investment purposes or for altruistic reasons, supporting the migrant's family.

This paper overcomes the main problem with understanding the issues at hand, namely the scarcity and inaccuracy of data. We study the determinants of workers' remittances from European countries to a sample of countries in the European Neighboring Region (ENR). This is an area of particularly high remittance flows, as five countries in the region (Morocco, Egypt, Turkey, Lebanon and Jordan) were among the ten main recipients of global remittance flows in 2001. We construct a country-by-country dataset of bilateral remittance flows from 21 European countries to 7 ENR countries. The dataset reflects better the amount remitted by migrating workers; it captures bilateral remittance flows and it incorporates information that has not been used in previous studies, such as income inequality and the share of the informal economy in the sending country. Using this dataset, we investigate altruistic and investment motives for remitting.

We find that the difference in GDP between the host and home countries increases average remittances. By contrast, the effect of the interest rate differential does not appear to be significant. We interpret these results as an indication that altruism is important for remitting, while the investment motive to remit is weak at best.

In addition, the empirical results suggest that average remittances per migrant increase with the migrants' skill level. Moreover, the share of the informal economy tends to lower the average remittances per migrant. Third, and importantly for the efforts to lower remittance costs, we find that lower remittance costs tend to raise remittance flows if countries are sufficiently far apart. Finally, we do not find conclusive evidence as to whether earning inequality in the host country is more likely to lower or raise average remittances.

## 1. Introduction

Workers' remittances have grown steadily over the past 30 years, rising at an average annual rate of more than 7% in nominal terms over the last decade. In contrast to net official flows (aid plus debt), which have stagnated if not declined, remittances have been increasing and have become the second largest source of net financial flows to developing countries recently. In 2001, remittance flows were already ten times net transfers from private sources and double those from official sources (Kapur 2003). Global remittances have amounted to an estimated 91 billion USD in 2003, when they equalled 1.6 percent of developing countries' GDP or half of total inward FDI, exceeding all other private capital inflows. The World Bank's Global Economic Prospects 2006 report focuses particularly on migration and remittances. The report notes that officially recorded money sent home by migrant workers worldwide exceeded \$232 billion in 2005. Of this, developing countries received \$167 billion, more than twice the level of development aid from all sources. The authors suggest that remittances sent through informal channels could add at least 50% to the official estimate, making remittances the largest source of external capital in many developing countries.

As a result, workers' remittances have gained increasing interest from both researchers and policy makers over the last years. They are perceived as an important element for development in emerging economies, which prompted policy makers to encourage progress on understanding and facilitating remittances through formal financial systems, as well as on channelling a bigger remittance share to investment.<sup>4</sup>

The EU Neighbouring Region (ENR)<sup>5</sup> is an area of particularly high remittances flows; five countries in the region (Morocco, Egypt, Turkey, Lebanon and Jordan) were among the ten main recipients of global remittance flows in 2001 and euro area remittances to non-EU countries exceeded EUR 13 billion in 2003. Also for the local economies, remittances are important (see Table 1); they account for a large share of local GDP, ranging up to 20% in Bosnia and Herzegovina and 23% in Jordan. Furthermore, the remittance flows for most of the ENR countries are considerably larger than FDI, amounting up to five times FDI inflows in Albania, or even 12 times in Egypt.

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<sup>4</sup> These issues have been brought up at the 2004 G-8 Sea Island Summit and the Special Summit of the Americas in January 2004. At the level of European Union, the Council invited the Commission in May 2003 to investigate the possibilities for reducing the cost and increasing the reliability of remittances from workers living in the EU.

<sup>5</sup> For the purpose of this paper, the term EU Neighbouring Region (ENR) refers to the main recipients of remittances in the area, i.e. the Eastern European and Mediterranean countries.

**Table 1. Workers' remittances in selected ENR countries<sup>6</sup>**

	<b>Albania</b>	<b>Bosnia &amp; Herzegovina</b>	<b>Bulgaria</b>	<b>Croatia</b>	<b>Romania</b>	<b>FYR of Macedonia</b>	<b>Turkey</b>
USD bln	0.7	1.2	0.6	1.4	1.6	0.4	3.0
% of GDP	17.0	19.7	3.8	6.1	3.6	12.2	0.8
% of FDI	546.9	365.9	53.6	89.8	111.0	599.1	115.7
	<b>Egypt</b>	<b>Israel</b>	<b>Jordan</b>	<b>Morocco</b>	<b>Syria</b>	<b>Tunisia</b>	
USD bln	2.9	4.0	2.2	3.3	0.6	1.1	
% of GDP	3.7	3.3	23.3	9.4	4.2	5.2	
% of FDI	1268.6	99.7	615.3	177.7	82.0	240.6	

Source: IMF (2005)

Flows to the Maghreb, Turkey, as well as Southern and Eastern Europe originate mainly in the euro area. National data indicate that 82% of Morocco's remittances stem from the euro area, accounting for about two-thirds of the country's trade deficit. Central bank data also show that 85% of Romania's and Tunisia's remittance inflows are transfers from the euro area. This is in line with the finding that EU countries have experienced huge remittance outflows over the last decade, fuelled in part by intense migration from ENR countries.

Despite the increased interest in workers' remittances, relatively little work has been done to improve the understanding of the macroeconomic determinants of remittance flows. The main reasons for this are the scarcity and inaccuracy of data. Most previous work has investigated microeconomic determinants of remittances relying on survey data. Alternatively, researchers have used IMF balance of payments data to investigate macroeconomic determinants. However, these data have several shortcomings, in particular the high aggregation level and measurement issues.

This paper contributes to the remittance literature in at least two ways. First, it addresses a key question in the remittance literature, namely whether remittances behave like capital flows or like altruistic transfers. To this effect, we create a new dataset containing information on bilateral remittance flows from 21 European countries to 7 ENR countries and investigate influencing factors on the average remittance per migrant. The use of bilateral migration and remittance – and hence, remittance per migrant – data permits to better quantify the effects of remittance determinants used in the literature, such as GDP and interest rate differentials between sending and receiving countries.

Previous studies (e.g. Chami, Fullenkamp and Jahjah 2005) that looked at the effects of such factors have used aggregate remittance data. To our knowledge, bilateral data have not yet

<sup>6</sup> The table collects countries for illustration purposes only. They do not coincide with the countries in the empirical sample, which are shown in Table 3 in the appendix.



been studied to estimate determinants of workers' remittances. The only attempt in this spirit is the study by Glytsos (2002), who uses IMF data on aggregate remittance flows and assigns country pairs according to the main migration flows (e.g., all remittance flows to Turkey are assumed to stem from Germany). However, this may be misleading; our data indicate that – except for Algeria – remittances from one country never account for more than 50% of all remittance inflows into any receiving country (see Chart 4 in the Appendix).

Second, the new data allow us to extend the set of candidate variables for explaining the size of remittance flows. In particular, we use (i) an indicator for the development of the financial nexus between each pair of countries, (ii) bilateral data on the stock of migrants and on the migrants' skill level, (iii) a measure of income inequality and (iv) the size of the informal economy in the sending country as potential factors.

The rest of the paper is structured in five Sections. The next Section provides an overview of the theoretical and empirical literature on workers' remittances; Section 3 outlines the theoretical framework; Section 4 discusses our dataset and related data issues; Section 5 presents the estimation results and a final Section concludes.

## **2. Literature review**

Remittances are sent due to a combination of altruistic and self-interest motives. Understanding these motives has been on the agenda of researchers for at least three decades; Rapoport and Docquier (2005) provide an excellent overview of theoretical models. On the one hand, it is widely acknowledged that altruism towards family members at home is an important motivation for remitting (Johnson and Whitelaw 1974, Lucas and Stark 1985). This implies a utility function in which the migrant cares about the consumption of the other members of the household.

Self-interest motives for remitting may evolve if the family is perceived as a market in which members aim at entering into mutually beneficial agreements. Theories that have macroeconomic implications have focussed in particular on aspects of inheritance, loan repayment, insurance and exchange. Stark (1981a, 1981b) and Lucas and Stark (1985) view remittances as the result of an intergenerational contract between migrants and their parents in the home country. In contrast with the altruistic motive, remittances should increase in the family's income and wealth if sending remittances is a way of migrants to compete for inheritance.

Other papers (Poirine 1997, Ilahi and Jafarey 1999) have emphasised the idea of remittances as repayments to the family who finances migration in the first place. This suggests a U-

shaped relation between the family's pre-transfer income and remittances. Poor families are unable to make the investment in migration costs while wealthy families have less incentive to send a family member abroad to increase family income. Thus, assuming that wealthy families can invest more in education, remittances should first increase and then decrease in the migrant's skill level.

Third, the phenomenon of migration might be seen as a means of reducing risk by diversifying the sources of a family's income (Stark 1991). In this framework, remittances act like an insurance against income shocks that might hit the recipients in the home country (Agarwal and Horowitz 2002, Gubert 2002). At the macroeconomic level, this implies that remittances will increase if output is more volatile in the recipient country.

Finally, remittances may be seen in an exchange framework, where they represent a payment by the migrant for services provided by family members, such as taking care of her relatives or property (Cox 1987; Cox, Eser and Jimenez 1998). If the family's marginal utility decreases in income, more remittances are required to guarantee the provision of services at home. Hence, a higher pre-transfer income of the family and lower unemployment at home would raise the amount of remittances.

The empirical literature has largely focussed on the microeconomic level using survey data; an overview is given in Buch and Kuckulenz (2004). Another strand of literature, reviewed by Aydas, Neyapti, and Metin-Ozcan (2004), has investigated the macroeconomic determinants of remittances. We will follow this second path in an attempt to better understand how the macroeconomic environment affects remittance flows.

Macroeconomic studies have emphasised determinants such as the level of economic activity in the host and the home countries, the wage rate, inflation, interest rate differentials, or the efficiency of the banking system (El-Sakka and McNabb 1999; Russell 1986). Wahba (1991) suggests that political stability and consistency in government policies and financial intermediation significantly affect the flow of remittances. In a sample of five Mediterranean countries, Faini (1994) finds evidence that the real exchange rate is also a significant determinant of remittances. Real earnings of workers and total number of migrants in the host country were consistently found to have a significant and positive effect on the flow of remittances (Swamy 1981; Straubhaar 1986; Elbadawi and Rocha 1992; El-Sakka and McNabb 1999; Chami, Fullenkamp and Jahjah 2005). In addition, demographic factors like the share of female employment or a high age-dependency ratio in the host country reduce remittances, while illiteracy rates affect them positively (Buch and Kuckulenz 2004). Aydas, Neyapti and Metin-Ozcan (2004) indicate that the black market premium, interest rate

differential, inflation rate, growth, home and host country incomes and periods of military regime have significantly affected Turkish remittance flows. Chami, Fullenkamp and Jahjah (2005) find a significant negative relation between the income gap of the recipient country against the US and worker remittances in percent of GDP.

However, the evidence on most macroeconomic determinants is mixed. In particular, the influence of the interest rate differential,<sup>7</sup> the black market premium, domestic income and inflation is inconclusive.<sup>8</sup> In addition, Buch and Kuckulenz (2004) find that economic growth and the level of economic development do not have a clear impact on the magnitude of remittances a country receives.

The main causes for inconclusive empirical results are lack of adequate data and poor data quality. Gathering accurate data on remittances is an extremely difficult task and the data usually underestimate the true remittance flows. One reason is that official statistics do not capture remittances sent outside the banking system. A second reason is contained in the high thresholds for recording; in the euro area, remittances are registered only beyond a level of EUR 12,500 per transfer, which goes a long way in explaining why the euro area is a net receiver of remittances. Third, a portion of remittance flows might include items such as goods imported by returning migrants or in-kind transfers, which are usually not captured in official statistics. To circumvent such difficulties, various studies have attempted to test the theoretical predictions using data for one country (or region), or one migrant group.

We have collected a new dataset of bilateral remittance flows, which includes non-bank transfers and is not limited by reporting thresholds for several countries. While economic activity or the interest rate level in the sending and the recipient country may not be statistically significant, the difference in the respective variable between the two countries may matter. Our dataset permits investigating such difference effects.

### 3. Theoretical framework

We present a simple two-period model that describes the behaviour of a representative migrant born in the home country  $i$ , and working in the host (or remittance sending) country  $j$ . In the first period, she maximizes her utility by allocating the income between costly transfers to her family in the home country, own consumption in the host country and savings. The

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<sup>7</sup> Swamy (1981), Straubhaar (1986), Glytsos (1988) and Elbadawi and Rocha (1992) find no significant relationship between remittance flows and interest rate differentials between the sending and receiving countries, or the variation in exchange rates. In contrast, Glytsos and Katselli (1986) find per capita remittances to be related to the interest rate in the sending country. El-Sakka and McNabb (1999) find that interest rate differentials negatively affect the remittances.

<sup>8</sup> Both Glytsos and Katselli (1986) and Elbadawi and Rocha (1992) find a negative effect of inflation, while El-Sakka and McNabb (1999) find a positive effect.

migrant can acquire financial/non-financial assets in both host and home country, each of them yielding a certain rate of return. In the second period, the agent consumes what she saved in the period before.

The migrant's problem can be decomposed in two steps. First, given her earnings in the host country she decides how much to allocate to consumption, savings and transfers to her family. Second, given total savings, she solves a portfolio allocation problem, by choosing the shares invested in the home and the host country.

The first step of the representative migrant's problem is formalized as follows:

$$\underset{C_1^i, C_2^i, X^{ij}, S \geq 0}{\text{Max}} \dots U_{ij} = \{u(C_1^i) + \beta u(C_2^i) + \gamma u(C_1^j)\}, \quad (1)$$

where  $\beta \in (0,1]$  is the migrant's time discount rate,  $\gamma \in (0,1]$  the degree of altruism towards her family;  $C_t^i$  migrant's consumption in country  $i$  at time  $t$  ( $t=1, 2$ );  $C_1^j$  denotes the migrant's family's consumption in country  $j$  and is defined as:

$$C_1^j = I^j + X^{ij},$$

where  $I^j$  is the family income in country  $j$  and  $X^{ij}$  the amount that the migrant working in country  $i$  sends to his family.

The migrant solves problem (1) subject to the following resource constraints:

$$C_1^i + \tau X^{ij} + S = I^i, \quad (2)$$

$$C_2^i = S \times R \quad (3)$$

where  $S$  is the amount saved out of the current income  $I^i$  that the migrant earns in country  $i$  and  $R$  is the overall portfolio return. The constant  $\tau > 1$  can be thought of as a transfer cost. The sender pays  $\tau$  dollars for each dollar received by the beneficiary.

Assuming logarithmic utility and denoting  $I_d^i = I^i - S$  as the income available for own consumption and family transfers, the optimisation problem above can be formulated via the following Lagrangean:

$$L = \ln(C_1^i) + \beta \ln(C_2^i) + \gamma \ln(I^j + X^{ij}) + \lambda(I_d^i - C_1^i - \tau X^{ij}) + \mu(S \times R - C_2^i).$$

We get the following first order conditions for  $C_1^i$  and  $X^{ij}$ :



$$(C_1^i) \quad \frac{1}{I_d^i - \tau X^{ij}} - \lambda \leq 0, \dots C_1^i \geq 0, \text{ with complementary slackness,}$$

$$(X^{ij}) \quad \frac{\gamma}{I^j + X^{ij}} - \tau\lambda \leq 0, \quad X^{ij} \geq 0, \text{ with complementary slackness.}$$

Logarithmic utility assures an interior solution for  $C_1^i$ , so  $\lambda = \frac{1}{I_d^i - \tau X^{ij}}$ .

The solution for  $X^{ij}$  is interior if the degree of altruism is sufficiently strong:  $\gamma > \frac{\tau I^j}{I_d^i}$ .

Assuming family transfers different from zero, we can express  $C_1^i$  and  $X^{ij}$  as functions of  $I_d^i$ :

$$X^{ij} = \frac{\gamma I_d^i - \tau I^j}{\tau(1 + \gamma)} = \frac{\gamma(I^i - S) - \tau I^j}{\tau(1 + \gamma)}, \quad (4)$$

$$C_1^i = I_d^i \left(1 - \frac{\gamma}{\tau(1 + \gamma)}\right) + \frac{\tau I^j}{\tau(1 + \gamma)} = (I^i - S) \left(1 - \frac{\gamma}{\tau(1 + \gamma)}\right) + \frac{\tau I^j}{\tau(1 + \gamma)}. \quad (5)$$

Using (4) and (5) in (1) we get the indirect utility as a function of  $S$ :

$$\underset{S \geq 0}{\text{Max}} \quad U_{ij} = \ln \left\{ (I^i - S) [\tau(1 + \gamma) - \gamma] + \tau I^j \right\} + \beta \ln(S) + \gamma \ln [I^j \tau \gamma + \gamma(I^i - S)].$$

The optimal savings  $S^*$  is the solution of the following first-order condition:

$$\frac{\tau(1 + \gamma) - \gamma}{(I^i - S)(\tau(1 + \gamma) - \gamma) + \tau I^j} + \frac{\gamma}{I^j \tau \gamma + \gamma(I^i - S)} = \frac{\beta}{S}. \quad (6)$$

The left hand side of (6) is an increasing function of  $S$  and the right-hand side is decreasing in  $S$ . Therefore, equation (6) has a unique solution  $S^* \in (0, I^i)$ .

$S^*$  is an increasing function of  $\tau$ , while the amount of remittances sent to family back home,  $X^{ij}$  is decreasing in  $\tau$ .

The second step of the optimization problem involves the decision regarding the portfolio allocation. That is, given the optimal savings amount  $S^*$  and the exogenous rates of return on assets in both countries  $R^i$  and  $R^j$ , the agent chooses the asset mix  $A^i$  and  $A^j$  that maximizes the return of her portfolio. Formally,

$$\underset{A^i, A^j \geq 0}{\text{Max}} [A^i R^i + A^j R^j], \quad (7)$$

$$\text{subject to } A^i + A^j [1 + f(A^j)] = S^*, \quad (8)$$

where  $f(x) = x^\alpha$ ,  $\alpha \in (0,1)$  represents the cost of investing in home country assets. This cost is intended to capture not only the monetary costs (fees and charges of the financial institutions in the case of investment in financial assets) but also risks associated with imperfect monitoring or generally idiosyncratic risks not included in the return. For simplicity, the budget constraints above are expressed in terms of consumption goods in the sending country  $i$ .

The first-order conditions with respect to  $A^i$  and  $A^j$  are:

$$(A^i) \quad R^i - \lambda \leq 0, A^i \geq 0 \text{ with complementary slackness;}$$

$$(A^j) \quad R^j - \lambda(1 + (1 + \alpha)(A^j)^\alpha) \leq 0, A^j \geq 0 \text{ with complementary slackness.}$$

It can be seen that  $A^j = 0$  when  $R^i = \lambda > R^j$  and  $A^i = 0$  when  $R^i < \frac{R^j}{1 + (1 + \alpha)(S^*)^\alpha}$ .

The interior solutions for  $A^i$  and  $A^j$  are:

$$A^j = \left( \frac{R^j}{R^i(1 + \alpha)} \right)^{1/\alpha} \text{ and } A^i = S^* - \left( \frac{R^j}{R^i(1 + \alpha)} \right)^{\frac{1+\alpha}{\alpha}}. \quad (9)$$

Consequently, the total amount of remittances the representative migrant sends from country  $i$  to country  $j$  is:

$$REM_{ij} = X^{ij} + A^j = X^{ij} (I^i, I^j, \tau) + A^j (R^j, R^i). \quad (10)$$

Based on the above equilibrium relationship, we estimate the following remittance function:

$$REM_{ijt} = f(I_t^i - I_t^j, R_t^i - R_t^j, \tau), \quad (11)$$

where  $REM$  are remittances per migrant, subscripts  $i$  and  $j$  indicate the receiving and sending country respectively and  $t$  is a time subscript. The first argument denotes the difference between real incomes of the migrant and her family back home, according to equation (4). The second terms denote the rate of return differential for financial and possibly non-financial assets (real-estate) as given by the linearised version of equation (9). The effect of the income differential on the remittance flow will capture the altruistic motive to remit, while the effect of the two rates of return reflects the importance of self-interest behind the decision to remit.

The final term is the cost of sending remittances between two countries.

Since empirical evidence indicates a lot of variation of migrants' skill composition across countries,<sup>9</sup> we augment this framework by accounting for the skill level of migrants and a measure of income inequality in the sending country. Low-skilled migrants tend to make up the bottom of the income distribution in the host country, so a higher income inequality will depress their earnings and thereby, the amount remitted.

#### **4. Data issues and methodology**

As discussed in Appendix 1, balance of payment data are likely to underestimate the true remittance flows due to high recording thresholds and transfers through informal channels, such as *hawala*<sup>10</sup>, cash carried by friends and relatives, and in-kind remittances. In addition, bilateral remittance flows are not recorded and as a consequence, only aggregate figures have been used in empirical research.

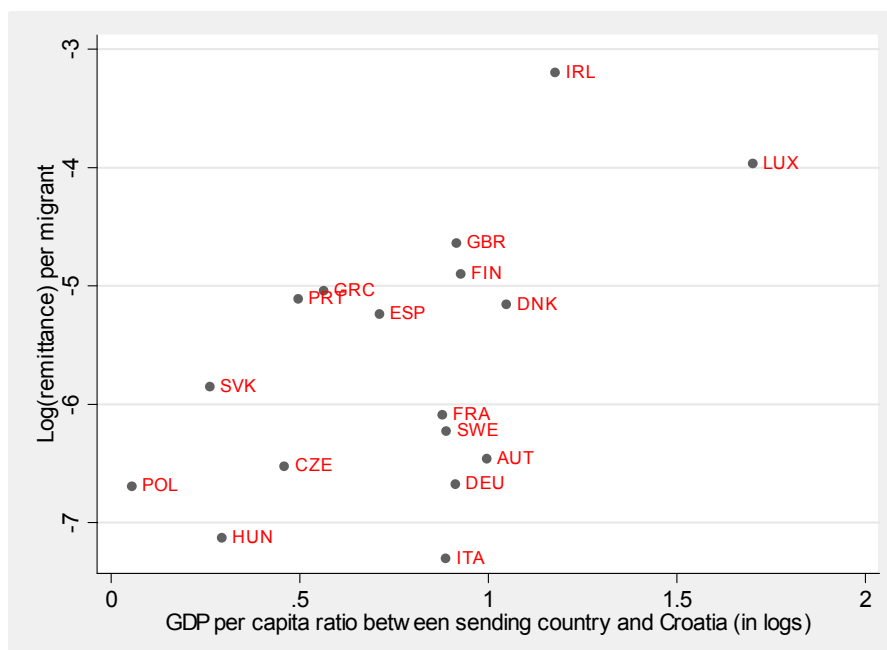
Harrison et al. (2004) is the only attempt to estimate bilateral remittance flows between 57 countries and 18 geographic regions. They use IMF balance of payments data to compute the average remittance inflow into a country per national abroad. Multiplying by the number of migrants from the home country to the host country gives the remittance inflow from the host country to the home country. While this procedure may give an idea of the bilateral flows, it assumes that the migrants coming from the home country but working in different countries have the same saving decision rule and remit the same amount. This is not very likely, as remittances are likely to be positively correlated with disposable income. Indeed, our country-by-country data confirm this presumption. Chart 1 shows for the example of Croatia a positive relationship between average remittance per migrant and the GDP per capita ratio between sending country and Croatia.

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<sup>9</sup> OECD (2002) International Migration data indicate that the fraction of migrants with less than upper secondary education varies between 8% and 81% for the remittance sending countries in our sample.

<sup>10</sup> *Hawala* is a wide-spread informal remittance system. The worker transfers a sum in foreign currency to an agent overseas under the agreement that the local currency equivalent determined at an agreed exchange rate (which is usually set above the official exchange rate) is transferred by the agent's local counterpart to the migrant's family or nominee.

**Chart 1: Average remittances to Croatia and GDP ratio (2004)**



Sources: See Table 4 in the Appendix.

We collected bilateral remittance data from 19 EU countries, Norway and Switzerland to nine receiving ENR countries. The data are observed annually over the period 2000–2005, but not all countries have data for all periods. Table 4 in the Appendix gives the sources and definitions for remittance flow data, as well as data sources for the other variables used in the regressions.

The remittance data were then matched with migration data from OECD (2002), resulting in a dataset of 97 pairs, a total of 264 observations. Table 3 in the Appendix shows the European sending countries, the ENR receiving countries and the observed periods. For the estimation, we excluded Romania and Russia, for which only one year of data was available.

Chart 4 in the Appendix gives a breakdown of bilateral remittance flows by receiving country in the sample for the last year available for each country. It turns out that in the Maghreb countries, remittance flows predominantly originate in France. Germany is the largest source of remittance flows to Eastern Europe and Russia, while Ireland is also quite important as a source of remittances for the former Yugoslav republics.

Table 2 in the Appendix provides summary statistics for the variables used in the empirical part. The dependent variable is the log of remittances per migrant from country  $i$  to country  $j$ , obtained by dividing the log of remittances from  $i$  to  $j$  by the migrant stock from country  $j$  living in  $i$ . We consider the following variables as potential influencing factors for remittance flows ).



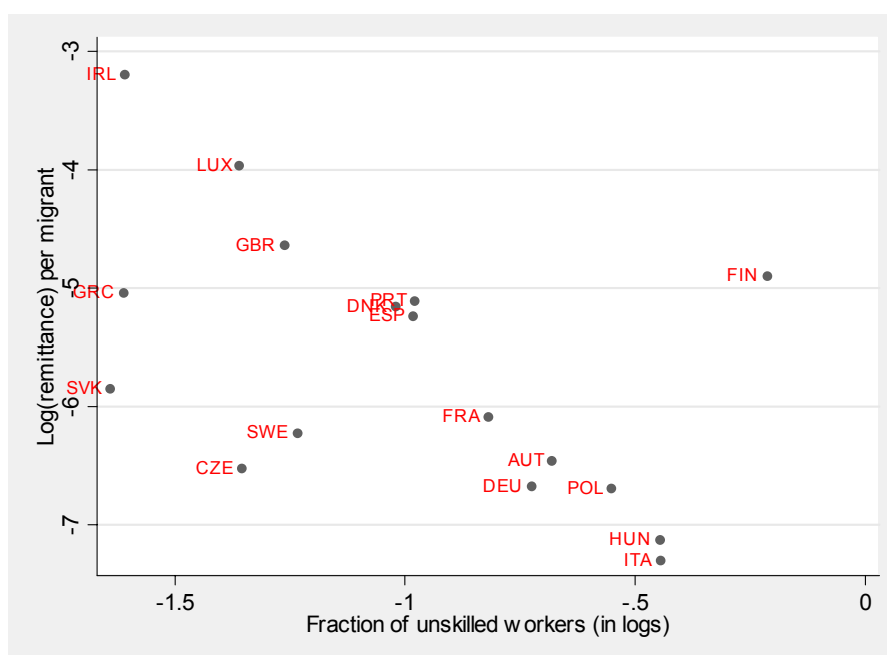
*Rate of return for financial assets.* The rate of return differential for financial assets is proxied by the real short-term deposit rate differential between sending and receiving countries. This permits us to take into account inflation in both countries. A larger real interest rate differential should attract more remittance inflows if migrants consider their home market less risky than the general market. However, given that the deposit rate refers to local currency deposits, interest rate differentials reflect both risk perceptions and expected exchange rate movements. Since in particular Eastern European countries have experienced a “convergence play” during the observation period, a low interest rate differential may reflect market expectations of an exchange rate appreciation. If this effect dominates the effect of the risk profile, the effect of the interest rate differential on remittance flows may well be negative.

*Income differential.* The ratio of GDP per capita in USD at purchasing power parities is used as a proxy for the income differential between sending and receiving countries. This contrasts with previous studies, which have used GDP in USD at nominal exchange rates. First, our measure accounts for non-tradables, thereby avoiding inflating the income gap. Second, the variable captures the fact that the migrant makes his decision based on the goods and services that the transferred amount of money can buy for his family at home. It is worth noting that the income differential may also partly account for investment motives, assuming that poorer countries should grow faster and therefore have higher returns. However, unless there are considerable market distortions, such an effect would be fully captured by the interest rate differential.

*Migration.* Data on bilateral migrant stocks for each country pair have been collected from the OECD database for the last year available (2001 or 2002). Yearly country-by-country data on migrants’ stock are available only for few country pairs in the sample. However, variations over time should not be a reason for concern, as the pattern of these data suggests that the migrant stock does not change dramatically over time.

*Skill level.* The OECD database also contains information about the skill levels of migrants. Since income is strongly correlated with human capital, this suggests a negative relationship between remittances and the fraction of unskilled people (defined to include those with less than upper secondary education) in the total stock of migrants. Chart 2 seems to support this hypothesis for Croatia, the country with the largest number of data on remittance sending counterparts.

**Chart 2: Average remittance and Croatian migrants' skill level (2004)**



Sources: See Table 4 in the Appendix.

As an alternative measure of unskilled workers, we include the fraction of medium skilled migrants (those with upper secondary and post-secondary non-tertiary education). Broadening the scope of the unskilled group appears to be warranted on at least two accounts. First, the quality of education may be expected to be higher in the host OECD countries than the home countries at every education level. Second, migration is generally associated with a loss in the skill level since human capital is country specific. Moreover, migrants frequently accept jobs for which they are overqualified, earning wages corresponding to a lower skill level.

*Income inequality.* Higher income inequality in the sending country might reduce the migrant's wage income and thereby, the amount remitted. As this is particularly true for low skilled people, they are more likely to migrate to countries with low earnings inequality.<sup>11</sup> This will attenuate the negative effect of skill on migrant's wage and thereby, on the amount she remits. The effect of income inequality on average remittances depends on the shares of skilled and unskilled migrants and the strength of the selection bias. We use the Gini coefficient for the last available year as a measure of income inequality.

*Remittance cost.* Orozco (2002) finds that costs vary widely between countries and among institutions involved in the transfer, reflecting the level of involvement of the banking industry and other businesses and the extent of government involvement to reduce transfer

<sup>11</sup> This is called Borjas's negative-selection hypothesis, and has been validated with data from the 1990 and 2000 Mexican and U.S. population censuses (Chiquiar and Hanson 2005).

costs. Neither costs of sending money through different institutions nor the precise channels of transfers are known.<sup>12</sup> Wahba (2005) uses bank deposits per GDP in the receiving countries as a proxy for financial development.

As many transfers are not made through banks, and as we need a bilateral measure for remittance costs, we construct a measure of financial linkage between two countries. Multiplying the number of Western Union agents per million people in the sending and receiving countries gives the number of possible links between each country pair. This proxy captures the availability of remittance services in both sending and receiving countries, i.e. the shoe-leather costs of remitting. In addition, this variable captures the degree of competition on the market for money-sending services, even for countries where banks have the largest market share. The presence of a tight network of money-transfer agents in the market is likely to induce banks to offer similar services in terms of costs and procedures.<sup>13</sup> Financial services are more likely to be used for remitting if high travel costs prevent unofficial money transfers. Therefore, we create an interaction term between the financial linkage and a dummy that assumes the value zero if two countries share a common border and one otherwise.

*Unofficial economic activity.* As discussed above, a considerable share of remittances is transferred by informal means, especially from countries that experienced massive illegal migration. Such transfers will not be measured in our data. To account for this, we control for the level of unofficial activity in the sending countries. A larger share of unofficial activity raises the chance that official migrants participate in it and remit the related income through non-official channels. Hence we expect a negative sign for this variable.

*Rate of return on real estate.* A natural proxy for the return differential on non-financial assets would be the difference in house prices, as real estate investment is an important reason for remitting. Anecdotal evidence suggests that house prices in Romania soar in summer due to the temporary return of migrant workers, pushing up real estate demand. Survey data from Egypt indicate that 54% of remittances are spent on housing and land (Orozco 2002). Unfortunately, reliable data on house prices are not available for ENR countries. Moreover, the existing data on residential property prices for European countries do not allow price level comparison between countries. Finally, prices are not adjusted for quality indicators, such as age, location, or number of bathrooms.<sup>14</sup> A potential solution would be rent data but such data

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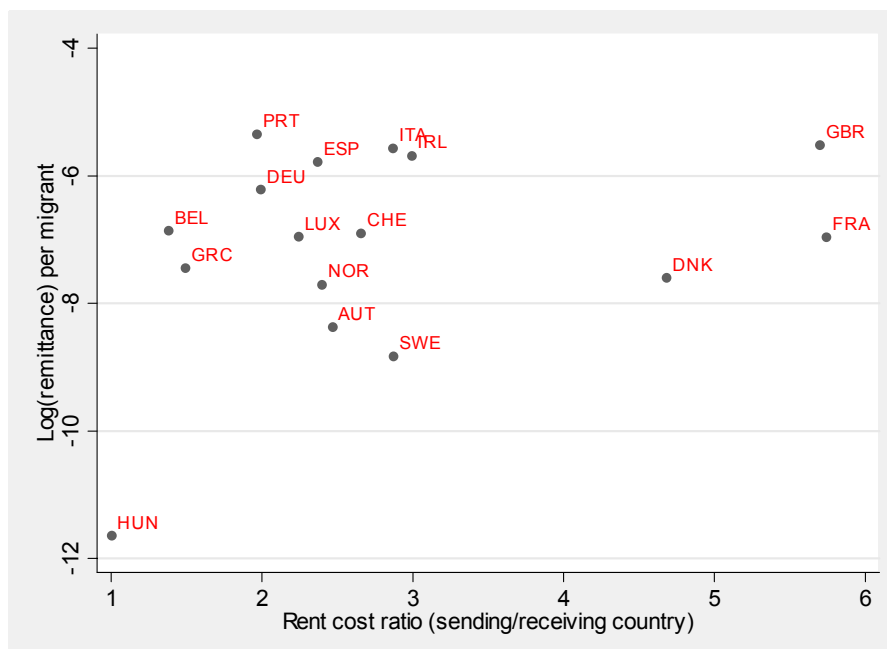
<sup>12</sup> For example, at least 60% of remittances to Morocco were sent through Groupe Banques Populaires, a majority state-owned bank with an extensive network of branches in Morocco and in Europe (Orozco 2002). In other regions, the most important players appear to be money transfer agencies.

<sup>13</sup> A difficulty with this variable is reverse causality, as money transfer agencies will move to regions with high remittance activity. Hence, the coefficient may also capture the effect of remittances on the development of a banking network.

<sup>14</sup> We thank Martin Eiglsperger for pointing this out.

are not useful for countries with rent controls. For example, relative rent costs for an unfurnished two-bedroom residential apartment in the capital cities of 16 sending countries and Bucharest are uncorrelated with average remittances to Romania in the first quarter of 2005 (Chart 3).<sup>15</sup> This leaves the question whether they are a bad proxy for house prices or whether house price differentials are orthogonal to remittance flows.

**Chart 3: Average remittance and relative real estate prices**



Sources: See Table 4 in the Appendix.

## 5. Estimation results

We estimate the relation between the variables discussed above and workers' remittances using an unbalanced panel estimator. To account for unobservable variation across individuals and time periods, we include time dummies and a dummy for each receiving country. Table 5 in the Appendix presents the estimation results. We also run different combinations of explanatory variables in order to check for robustness across specifications.

The baseline case in column one shows that the income differential has a strong positive impact on the average remittances per migrant, indicating that on average, people remit more the poorer the receiving country is relative to the sending country. This is in line with theories suggesting altruistic motives for remitting. By contrast, the real interest rate differential does not have a significant effect. In combination, these two results suggest that the decision to remit is driven more by altruistic reasons rather than investment motives. We checked for the robustness of this important result by re-estimating the equation as a panel with fixed or random effects for country pairs. The results were extremely robust to these changes.

<sup>15</sup> Data are extracted from EIU City Data.

Columns 2 to 6 include the fraction of unskilled migrants on the right hand side of the regression. The share of unskilled migrants in a country reduces the average amount of remittances, indicating that unskilled migrants have fewer funds at their disposal from which to remit. In addition, unskilled workers prefer countries with a lower earnings inequality.

As discussed in Section 4, we use two measures of the share of unskilled workers in the migrant population. Columns 7 to 11 report the estimates for the share of low and medium skilled workers, as opposed to the share of low skilled workers.

The average remittance is a weighted average of the amounts sent by skilled and unskilled workers, i.e. it depends on the share of low skilled workers but also on the income distribution over the migrant population. We consider this aspect by including the Gini coefficient as a measure of income inequality in the remittance sending country. Increased inequality will affect both the migration composition and the amounts each group can send. On the one hand, skilled workers in more unequal countries will tend to earn more than their counterparts in countries with a more equal income distribution. This will boost the average remittance. On the other hand, the unskilled workers that do come will be paid less than in more equal countries, depressing the average remittance. The absolute skill proportion conditional on the income inequality level determines which one of the two effects is the dominating force.

While we find that a higher share of unskilled labour reduces the average remittance irrespective of the measure used, the sign of income inequality switches. Higher income inequality raises the average remittance if we only account for the share of low skilled workers in the migrant population, i.e. using the narrow measure of unskilled workers. It depresses the average remittance if we consider both low and medium skilled labour. Note that the effect of income inequality is significant across all specifications.

As discussed above, the narrow measure may underestimate the true proportion of migrants earning low wages we consider the broad measure of unskilled labour more appropriate as the educational level is generally higher in remitting countries. In addition, migration often involves a loss in specific knowledge and medium skilled workers are likely to accept lower-paid jobs. It turns out that with this measure, the share of low skilled workers is even more important than in the other case. Finally, the R squared rises by 0.12 across all specifications. We conclude that remittances from countries with a higher share of low skilled immigrants tend to be lower. This is an important result since existing evidence on the relationship

between remittances and migrants' skill composition is very limited.<sup>16</sup> At the same time, the evidence on the effect of income inequality in the sending country is inconclusive.

As another proxy for migrants' income we experimented with the sending country GDP (migrants should earn more if the average income is higher).<sup>17</sup> However, as this variable is positively correlated with the income differential, the effects of both variables were insignificant when including both. When we only included GDP in the sending country, the effect was significantly positive, without affecting any of the other results. This supports our finding that higher average income raises the average amount remitted.

Our set-up also allows us to consider remittance costs between pairs of countries. Remittance costs as proxied by the density of the remission network do not affect the amount of money remitted significantly. In fact, a tighter network seems to depress the amount of remittances (insignificantly). This may seem surprising but has a straightforward explanation: unofficial transfers are particularly easy in countries with common borders. Remittances are more likely to be effected through institutional channels if travelling is more difficult. Consequently, we find that the financial nexus has a positive effect on the amount of remittances if there is no common border between sending and receiving countries. This effect is significantly positive in all regressions, suggesting that the financial linkage has a positive impact on remittances if the distance between countries is sufficiently big. In fact, previous literature has acknowledged the importance of the financial system for remittances but has not found any significant effect in empirical work.

Finally, we also consider the effect of measurement errors by incorporating the magnitude of the unofficial economy in the host country. If unofficial work is linked with unofficial remittances, this should depress the total amount of officially recorded remittances. We do find that a larger share of unofficial activity in the economy lowers the amount of (official) remittances per migrant. This appears to indicate that, as the general level of informal activity rises migrants are more involved in it, just as anyone else.

## 6. Conclusion

The paper looks at the determinants of workers' remittances from Western European countries to a sample of countries in the ENR region. We construct a country-by-country

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<sup>16</sup> Faini (2002) regresses the ratio of remittances to GDP (or to the home country population) on a set of variables that includes the stock of migrants and the skilled composition of migration. Counterintuitively, he finds that remittances decline as the share of migrants with a tertiary education goes up. However, this result should be taken with caution, as the number of observations in his dataset is very small (33 and 38, respectively).

<sup>17</sup> We would like to thank the anonymous referee for suggesting this.

dataset that incorporates non-bank transfers and remittances in small amounts and therefore better reflects the amount remitted by migrating workers. The dataset gives figures for bilateral remittance flows, which allows us to consider various aspects of remittances that previous studies were unable to tackle. Precisely, the data permit controlling for GDP differences between sending and receiving country, the difference in returns to financial assets in the two countries and costs of remittances, proxied by the size of the financial network between two countries. In addition, the dataset incorporates information that has not been used in previous studies, including migrants' skill level, income inequality and the share of the informal economy in the sending country.

We find that the difference in GDP between the host and home countries increases remittances, which we interpret as an indication that altruism is important for remitting. By contrast, the interest rate differential between the countries is insignificant, i.e. the investment motive to remit is weak at best. These results add to a growing literature on the main reasons for remitting. The message from our data is clearly that migrants (at least in our sample) remit for altruistic reasons, not for investment purposes.

We also find that average remittances per migrant increase with the migrants' skill level. Moreover, our results suggest that earning inequality in the host country is more likely to lower average remittances but this effect may also be the opposite if a narrower measure of low-skilled workers is used. The share of the informal economy tends to lower the average remittances per migrant.

Finally, and most important for the efforts to lower remittance costs, we find that lower remittance costs tend to raise remittance flows if countries are sufficiently far apart.

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## Appendix 1. Measuring remittances

The IMF's balance of payments is the principal source of aggregate remittance data. However, the officially recorded remittance flows published in the recipient countries' balance of payments usually underestimate the actual level of remittances. This is due to imprecise either to the accounting methods used (that might lead to imprecise measures of remittances), or to the existence of informal channels for transferring remittance.

The definition of remittance flows depends on the items from the balance of payments that are considered. The narrow definition includes only "workers' remittances" and covers amounts sent by people residing for more than a year in the sending country.

A broader definition includes the amounts sent by temporary workers or "compensation of employees". The IMF definition of a temporary worker (adopted recently by the World Bank, 2003) is a person that works abroad for less than a year and covers border and seasonal workers. However, the broader definition has some problems that are indicated by Kapur (2003). One of them is the practical difficulty of distinguishing between the workers that earn what is called "compensation of employees" and the actual migrants who reside in the sending country. Second, "compensation of employees" includes amounts paid by employers such as insurance, social security or payments to pension funds. The existence of these transfers is likely to overstate the true remittance flows to the recipient country.

Moreover, there are substantial flows of remittances crossing borders that go unrecorded. They include the in-kind transfers and the funds sent through the capital account by overseas residents, such as special savings accounts, which are then withdrawn in local currency. Puri and Ritzema (1999) point out that there are remittance flows which are a portion of funds that migrants bring home in the form of cash or traveller's cheques and convert them into local currency at domestic banks. This clearly leads to an understatement of migrant remittances as foreign currency converted into local currency is recorded as tourist expenditure in the balance of payments accounts.

Another data limitation stems from the different methods for measuring remittances across countries. Therefore, it is unclear whether the reported data are comparable. For example, Timmermann (1997) finds that Portuguese data suggest that remittances are four times higher than German data indicate. A key point is the fact that usually the thresholds for recording remittances are very high, like the €12,500 threshold for the Euro zone since the introduction of euro.

The immediate consequence is that balance of payments data fail to capture the transfers made by low-income migrants, who usually account for the bulk of remitters. This probably explains why the euro area runs a surplus concerning workers' remittances. Euro area workers abroad are more likely to remit larger sums of money than migrants from poorer countries working in the euro area. Accordingly, remittance outflows from the euro area go largely unrecorded (i.e. any transfer of less than €12,500). Moreover, a majority of receiving countries have incomplete data for several years over the last two decades, making it difficult to do rigorous analysis. Recently, efforts to improve the recording procedures have been intensified, spearheaded by the World Bank.

In addition, a considerable volume of remittances is transferred through informal channels. The use of the informal means is encouraged by practical difficulties and the costs of sending money to developing countries. There is evidence that unrecorded remittances are likely to be quite significant, particularly for low-income migrants. The flow of unrecorded remittances is likely to be positively correlated with the magnitude of illegal migration. Illegal migrants tend to be frequent remitters to their native country and are more likely to use informal transfer channels. This aspect is particularly important for the euro area as some countries experienced massive illegal migration from ENR countries.

## Appendix 2 – Additional charts and tables

**Table 2: Summary statistics**

Variable	Mean	Std. dev	Min	Max
Remittances (mn USD)	78.8	217.9	0.0	1606.9
Log(remittances)/migrant	-6.16	1.41	-11.55	-1.11
Stock of migrants	47984.4	143756.9	12	1210557.0
Fraction of low skilled people in total migrants (%)	42.0	18.8	7.6	81.0
Fraction of low and medium skilled people in total migrants (%)	78.1	14.2	33.0	100.0
Real deposit rate, sending	0.96	1.71	-3.59	6.34
Real deposit rate, receiving	1.38	4.00	-7.09	9.70
GDP per capita USD PPP, sending	26131.2	8875.1	10060.5	63608.6
GDP per capita USD PPP, Receiving	7359.6	2552.3	3483.2	11568.0
Number of Western Union agents, sending	2843.6	2863.8	3.0	9780.0
Number of Western Union agents, receiving	1268.5	684.4	49.0	4026.0
Gini coefficient, sending	28.4	3.8	22.0	37.0
Unofficial economic activity (% of GDP)	18.0	4.8	10.2	30.7

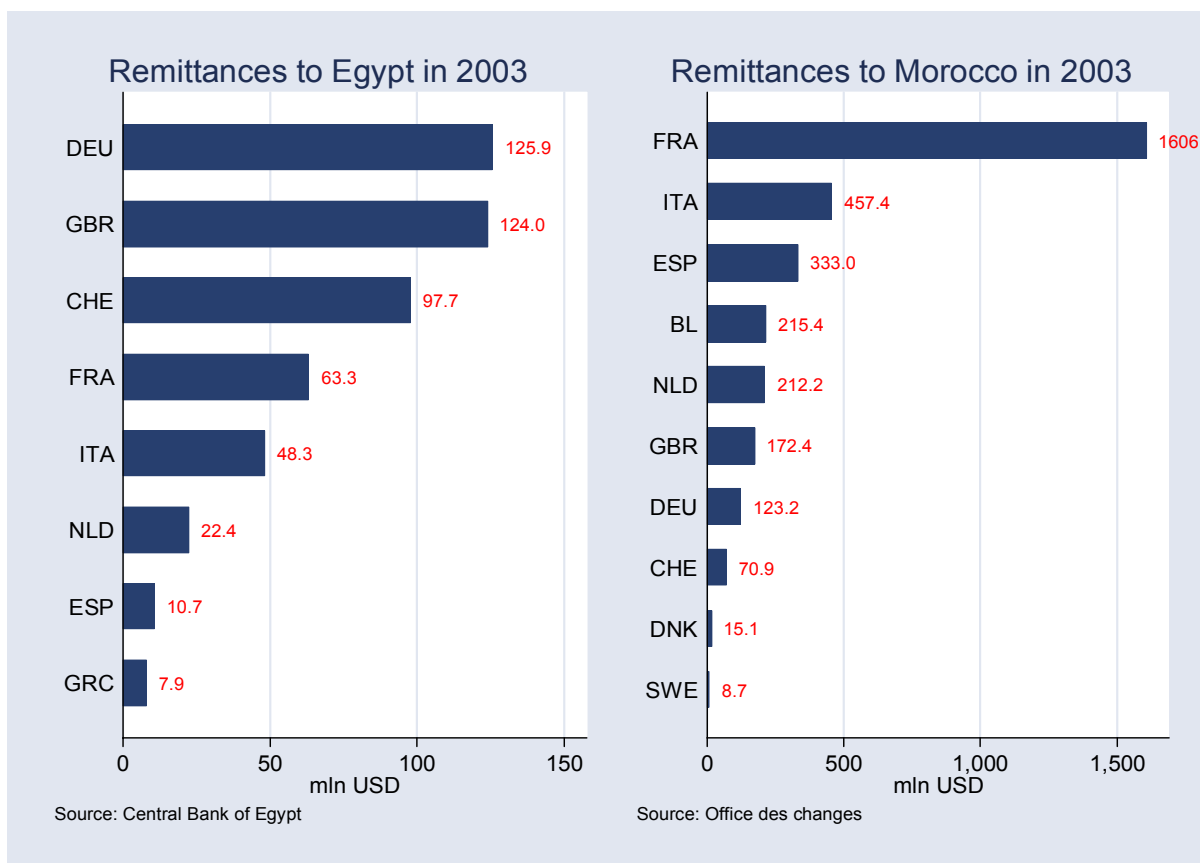
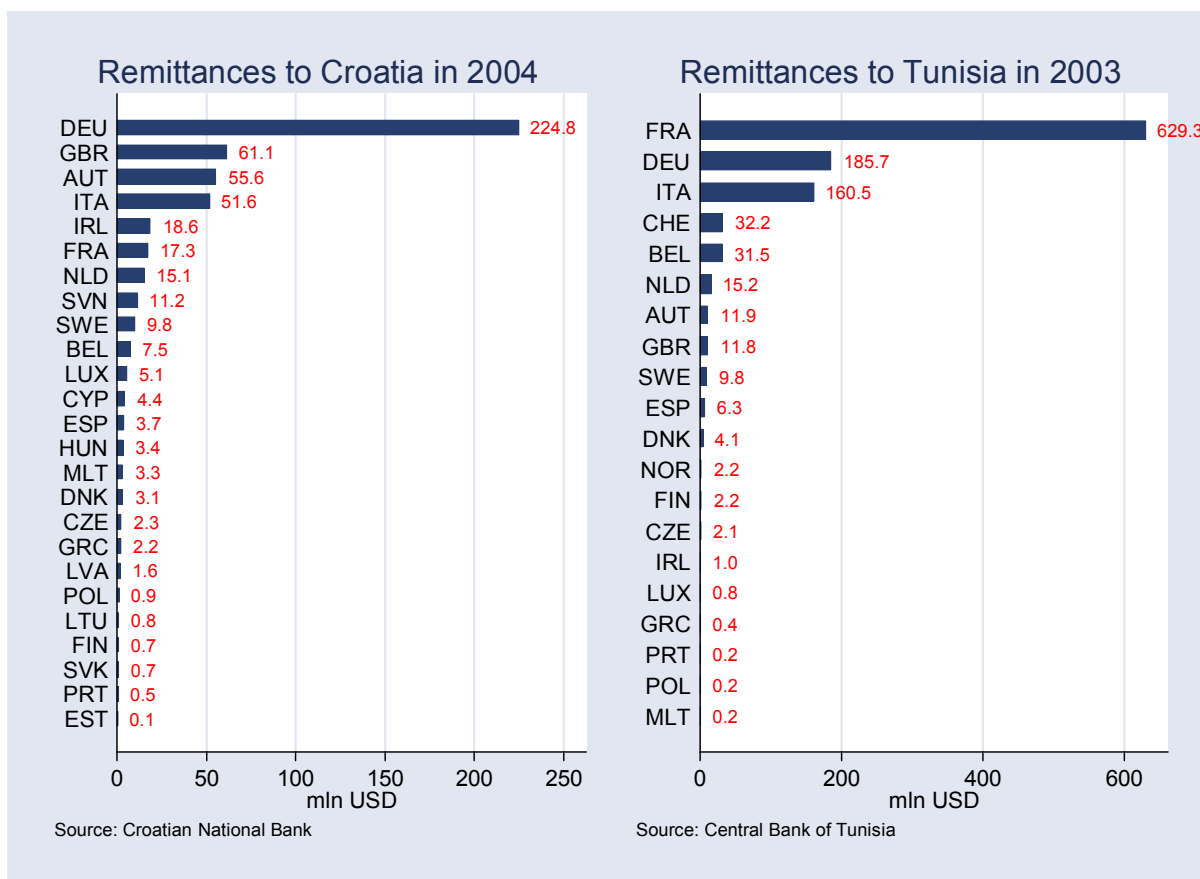
*Notes:* Sending countries: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom. Receiving countries: Algeria, Egypt, Morocco, Tunisia, Croatia, Macedonia, Serbia & Montenegro, Romania, Russian Federation. Estimates on unofficial economic activity are not available for Luxembourg.

Table 3: Countries and periods in the dataset

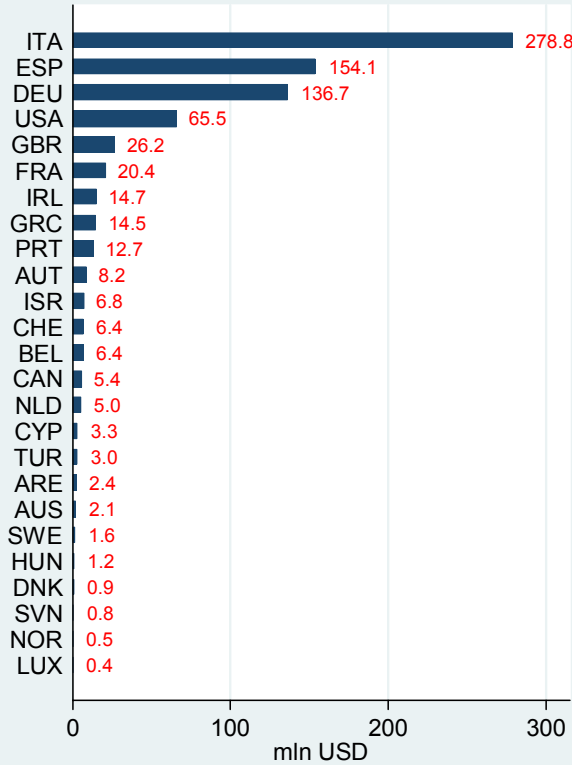
	<i>Algeria</i>	<i>Egypt</i>	<i>Morocco</i>	<i>Tunisia</i>	<i>Croatia</i>	<i>FYR of Macedonia</i>	<i>Serbia &amp; Montenegro</i>	<i>Romania</i>	<i>Russia</i>
<i>Austria</i>				2001-2003	2000-2004	2003-2004	2003-2004	2005	
<i>Belgium</i>				2001-2003				2005	
<i>Czech Republic</i>				2001-2003	2000-2004	2003-2004			2004
<i>Denmark</i>			2000-2003	2001-2003	2000-2004	2003-2004		2005	
<i>Finland</i>				2001-2003	2000-2004	2003-2004			
<i>France</i>	2003-2004	2001-2003	2000-2003	2001-2003	2000-2004	2003-2004	2003-2004	2005	
<i>Germany</i>			2000-2003		2000-2004		2003-2004	2005	
<i>Greece</i>		2001-2003		2001-2003	2000-2004	2003-2004	2003	2005	2004
<i>Hungary</i>					2000-2004	2003-2004	2003-2004	2005	
<i>Ireland</i>				2001-2003	2000-2004	2003-2004	2003-2004	2005	
<i>Italy</i>	2003-2004	2001-2003	2000-2003	2001-2003	2000-2004	2003-2004	2003-2004	2005	2004
<i>Luxembourg</i>				2001-2003	2000-2004			2005	
<i>Netherlands</i>			2000-2003						
<i>Norway</i>				2001-2003				2005	
<i>Poland</i>				2001-2003	2000-2004	2003-2004			
<i>Portugal</i>				2001-2003	2000-2004	2003-2004		2005	
<i>Slovak Republic</i>					2000-2004	2003-2004			
<i>Spain</i>	2003-2004	2001-2003	2000-2003	2001-2003	2000-2004	2003-2004		2005	2004
<i>Sweden</i>			2000-2003	2001-2003	2000-2004	2003-2004	2003-2004	2005	
<i>Switzerland</i>		2001-2003	2000-2003	2001-2003				2005	
<i>United Kingdom</i>		2001-2003	2000-2003	2001-2003	2000-2004	2003-2004	2003-2004	2005	2004

Note: Data for Romania only cover the first quarter of 2005.

**Chart 4: Remittance flows from EU countries to 9 ENR countries (last available year)**

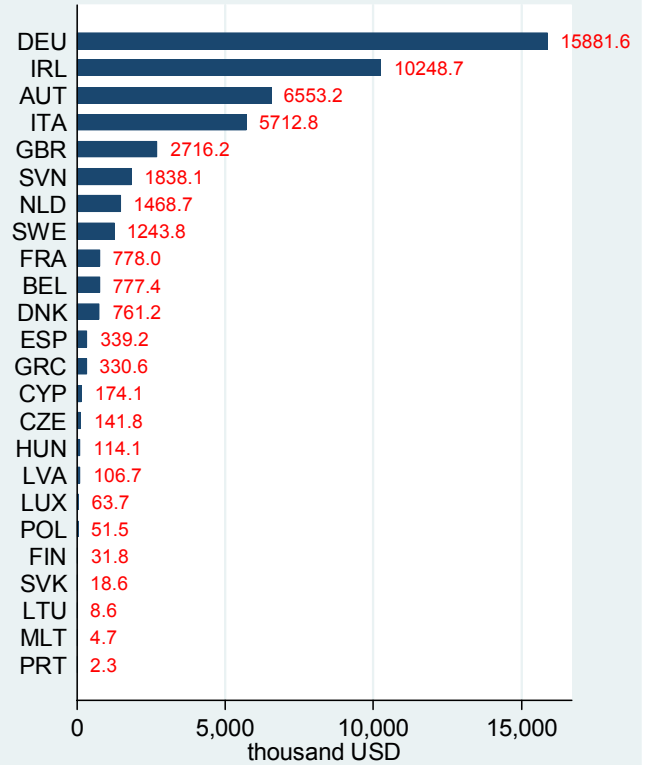


### Remittances to Romania in Q1 2005



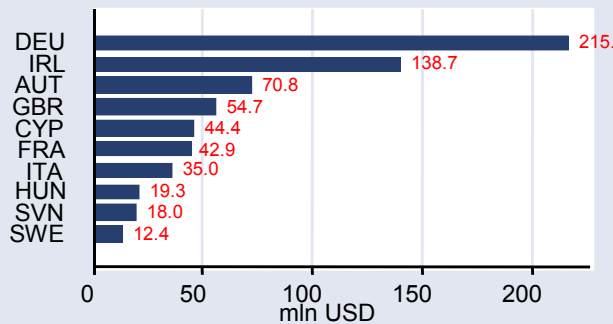
Source: National Bank of Romania

### Remittances to FYR of Macedonia in 2004



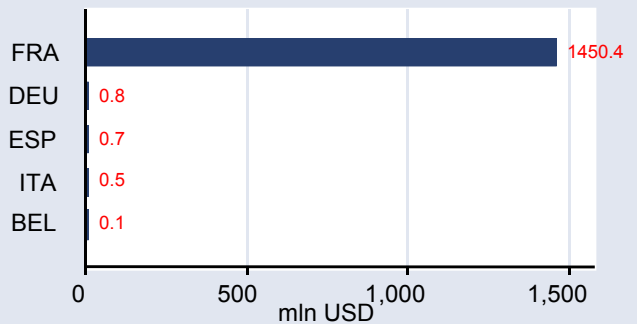
Source: National Bank of Macedonia

### Remitt. to Serbia & Montenegro in 2004



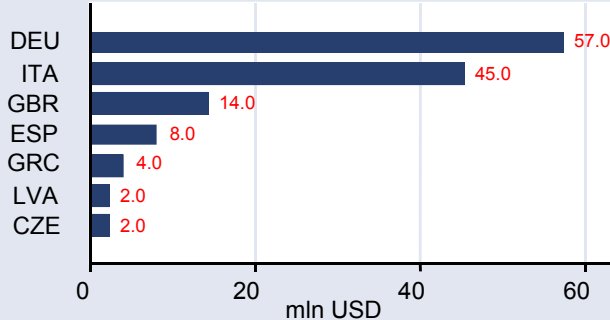
Source: Central Bank of Serbia, National Bank of Montenegro

### Remittances to Algeria in 2004



Source: Central Bank of Algeria

### Remittances to the Russian Federation in 2004



Source: Russian Central Bank

**Table 4: Description and sources of data**

Remittances	<p><b>Tunisia</b> – Central Bank of Tunisia balance of payments 2003 publication (includes cash, in-kind transfers)</p> <p><b>Morocco</b> - Office des changes (banking transfers, postal transfers, cash)</p> <p><b>Algeria</b> - Central Bank of Algeria</p> <p><b>Egypt</b> - Central Bank of Egypt, (transfers via banks and other agencies, remittances in cash only, no thresholds for recording)</p> <p><b>Serbia</b> - Central Bank of Serbia</p> <p><b>Montenegro</b> – Central Bank of Montenegro (data collected through International Transactions Reporting System, includes compensations of employees who have worked abroad for less than a year, the amounts the employees, who have worked abroad for more than a year, have sent, and pensions)</p> <p><b>Croatia</b> – Central Bank of Croatia, bank reports</p> <p><b>Macedonia</b> – Central Bank of Macedonia, reports from deposit-money banks</p> <p><b>Russian Federation</b> – Central Bank of Russia Remittances of Individuals to the Russian Federation via Money Transfer Systems and Post Offices</p> <p><b>Romania</b> - Romanian Central Bank - Bank reports for January-April 2005</p>
GDP per capita USD PPP	World Economic Outlook (IMF)
Stock of migrants	OECD, International Migration Data, Stock of foreign born population by country of birth
Fraction of low/medium skilled migrants in total migrant population	OECD, International Migration Data Stock of foreign born people with less than upper secondary education Stock of foreign born people with upper secondary and post-secondary non-tertiary
Real interest rates	<p>Inflation and deposit rate data for Serbia &amp; Montenegro: National Bank of Serbia (Weighted Deposit Rates of Commercial Banks for households)</p> <p>Inflation and deposit rate data for Czech Republic, Hungary, Poland, Slovak Republic, and all other receiving countries: IMF International Financial Statistics</p> <p>All other sending countries: IMF World Economic Outlook (annual, real short-term deposit rate)</p>
Number of Western Union agents in sending and receiving countries	Western Union website
Gini coefficients for sending countries	World Income Inequality Database V 2.0a June 2005 <a href="http://www.wider.unu.edu/wiid/wiid.htm">http://www.wider.unu.edu/wiid/wiid.htm</a>
Unofficial economic activity as % of GDP, sending countries	<p>"Dodging the Grabbing Hand: The Determinants of Unofficial Activity in 69 Countries" by E. Friedman, S. Johnson, D. Kaufmann, and P. Zoido-Lobaton, Journal of Public Economics, June 2000</p> <p><a href="http://www.worldbank.org/wbi/governance/">http://www.worldbank.org/wbi/governance/</a></p> <p>No data available for Luxembourg</p>



Table 5: Determinants of country-by-country average remittance per migrant

Explanatory variable	1	2	3	4	5	6	7	8	9	10	11
Income differential	1.36*** (6.17)	1.42*** (6.24)	1.44*** (4.87)	1.51*** (5.78)	1.66*** (5.19)	1.62*** (4.97)	1.38*** (6.67)	1.20*** (4.66)	1.12*** (5.31)	1.07*** (4.07)	1.08*** (4.06)
Return on financial assets	0.01 (0.18)	-0.01 (0.16)	-0.01 (0.31)	0.01 (0.28)	-0.00 (0.00)	-0.01 (0.21)	0.01 (0.23)	0.01 (0.27)	0.00 (0.11)	0.02 (0.52)	0.01 (0.24)
Migrant's skill level (fraction of low skilled migrants in total population)		-0.76*** (4.59)	-0.65** (3.44)	-0.62*** (3.45)	-0.70*** (3.56)	-0.61*** (3.09)					
Migrant's skill level (fraction of low and medium skilled migrants in total population)							-3.88*** (8.30)	-3.63*** (7.77)	-4.01*** (8.08)	-4.14*** (8.41)	-4.03*** (8.22)
Income inequality, sending				1.27** (2.21)	1.77*** (3.10)	1.60*** (2.77)			-1.10*** (2.48)	-0.91* (1.90)	-1.02** (2.16)
Remittance cost			-0.04 (0.50)	-0.12 (1.50)		-0.05 (0.66)		-0.06 (0.91)	-0.07 (1.03)		-0.05 (0.81)
Remittance cost (no common border)			0.07*** (3.72)	0.07*** (4.15)		0.06*** (2.91)		0.05*** (3.30)	0.06*** (4.60)		0.06*** (3.70)
Informal economy, sending♦			-0.25 (1.63)		-0.45*** (2.79)	-0.38** (2.33)		-0.24* (1.87)		-0.23* (1.66)	-0.14 (1.03)
R-squared	0.35	0.40	0.43	0.43	0.44	0.45	0.53	0.56	0.55	0.56	0.57
Number of observations	239	239	231	239	231	231	239	231	239	231	231

♦ Unofficial economy data on Luxembourg were not available.

The dataset used in estimation does not include countries for which only one year of data was available (Romania and Russia).

Note: The dependent variable is log remittances divided by the migrant stock in the sending country. All explanatory variables are in logs, except the real deposit rate differential. t-values are reported in parentheses, \*\*\* /\*\*/\* denote significance at the 1%/5%/10% levels

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