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Changes in Migration Patterns and Remittances:
Do Females and Skilled Migrants Remit More?

Maëlan Le Goff & Sara Salomone

Highlights

- Using a new comprehensive dataset of bilateral remittances, this paper investigates whether changes in the composition by gender and education of migration flows may shape remittance patterns.

- The estimations of a simple gravity model of remittances reveal that the share of females and skilled persons in the migration diaspora significantly increases annual remittances received in the country of origin.

- The positive role played by females on remittances is mainly driven by skilled women compared with unskilled women.

RESEARCH AND EXPERTISE
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▌Abstract

Migrants' remittances to developing countries have significantly increased and turn out to be the second largest source of finance for developing countries after foreign direct investment. Besides, the composition of international migration flows has also changed being characterized by a growing feminization and brain drain. In reviewing the literature on remittances, this survey shows that to fully estimate the role of remittances as a lifeline for developing countries the two above recent phenomena cannot be ignored. Indeed, using an original dataset on bilateral remittances and estimating a gravity model in which the gender and the skill dimensions of the migrants are taken into account, we find that both are positively associated with annual remittances received by origin countries. In particular, the main effect seems to be driven by skilled female migrants which presumably represent an important loss in terms of human capital in the perspective of a developing country.

▌Keywords

International migration, Remittances, Brain Drain.

▌JEL

J16, F22.

**Changes in Migration Patterns and Remittances:
Do Females and Skilled Migrants Remit More?**

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1.   Introduction

According to recent estimates by the World Bank (World Bank, 2013), officially recorded remittances to developing countries are estimated at $401 billion in 2012, remaining a key resource flow far exceeding official development assistance as well as private debt and portfolio equity. Moreover, their flow to developing countries is expected to grow at 12.3 percent reaching $515 billion in 2015, thus sustaining development in emerging markets, and serving as a lifeline to the poor.

However, in order to fully agree with these optimistic forecasts two important recent phenomena characterizing international migration need to be taken into account: the increasing feminization and the brain drain. On the one hand, women have started to migrate more independently rather than for family reunification reasons or as dependants of male migrants. This has led the number of women who migrate to become equal to that of men (and even higher in certain regions). On the other hand, the quality-selective immigration biased policies implemented in many traditional destinations have boosted the immigration flows of highly-skilled people.

These new migration patterns have, of course, direct consequences in terms of the economic and social development of the countries of origin through the loss of human capital, but also an indirect impact through remittances. Many papers have addressed the financial contribution of female migrant workers in their country of origin underlining how men and women differ as far as their intentions to remit are concerned. On the one hand, females would remit more both overall and as a percentage of income because they tend to maintain stronger networks with their restricted and extended family (Tacoli, 1999; Richter and Havanon, 1995; Phongpaichit, 1982; Chant and Radcliffe, 1992) and because their remitting behavior is driven more by altruism (Orozco, Lowell and Schneider, 2006). Conversely, women would remit less because of disadvantaged labor market conditions (Cortes, 2011) and family reunifications (Holst, Schafer and Schrooten, 2012).

 The same lack of consensus characterizes skilled migration. At macro level, Faini (2007) and Niimi, Ozden and Schiff (2010) found that migrant remittances decrease with the

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proportion of skilled individuals among emigrants. Dustmann and Mestres (2010) and Duval and Wolff (2011) evidenced the same negative effect of education on remittances but at micro level. Schioupu and Siegfried (2006) showed instead a negative correlation between the share of low-skill workers and remittance receipts, suggesting that in contrast to the results obtained with aggregate data, migrants' skills seem to raise remittances. Optimistic conclusions were also reached by Docquier et al. (2012) who underlined the role of immigration policies in determining the sign and magnitude of the relationship between remittances and migrants' education. At micro level, Bollard et al. (2011) found, instead, a mixed pattern between higher education and the likelihood of remitting, and a strong positive relationship between higher education and the amount remitted conditional on remitting.

The aim of this paper is to jointly reconsider the role of migrants' characteristics (i.e. skill and gender) on bilateral remittances using a recent dataset on bilateral remittances. A standard gravity model is implemented and estimated through a Pseudo Poisson Maximum Likelihood (PPML) estimator which performs better than OLS in the presence of a large number of zeroes in the dependent variable. We find that both the skill and the gender dimension of the migration diaspora are positively associated with annual remittances received by countries of origin. The impact is quite important especially where skilled females are concerned. However, conclusions need to be treated with caution because of two important points.

First of all, the overall effect on poverty and inequality reduction as well as economic growth in recipient countries is not yet clear-cut. In addition, only little research has examined the role of gender and skills in remittance practices and their effect on the development of home countries. While one should expect motivations behind remittances and the way in which they are spent, to vary with the gender and skills of migrants, the empirical literature analyzing the development outcomes of remittances has neglected these parameters.

Second, from an empirical viewpoint, much still remains to be done as far as statistical bilateral data are concerned. The Docquier et al. (2012) bilateral remittances database described in Section 2 is the most recent. It collects and aggregates five available bilateral remittances databases covering the period from 1985 to 2005 from 89 sending to 46 receiving countries. This dataset is used for the empirical analysis whose steps are shown in Section 3. Finally Section 4 concludes.

2.   Data analysis

To the best of our knowledge, the most comprehensive bilateral dataset currently available documenting bilateral remittances is that described in Docquier, Rapoport and Salomone (2012).[1] It merges various second-hand sources to capture bilateral remittances from 89

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[1] The World Bank also provides bilateral remittances estimates for years 2010, 2011 and 2012. These datasets update Ratha and Shaw (2007) by incorporating the latest migration data from 71 destination countries created by the University of Sussex Development Research Centre (Parsons et al., 2005) as described in the Migration and Remittances Factbook 2011.

sending to 46 receiving countries over the period 1985-2005. The amount of remittances sent by transferring country j to recipient country i at time t is denoted by R_{ijt}, and the size and structure of bilateral migration stocks from origin country i to destination country j. By M_{ijt}^{kg}, the stock of migrants with education level k and gender g is denoted.

2.1. Bilateral remittances

The DRS (Docquier, Rapoport and Salomone) bilateral data set combines five existing bilateral databases constructed by other authors or organizations: the EU data as documented in a report by Jimenez-Martin, Jorgensen and Labeaga (2007); the IMF database from Lueth and Ruiz-Arranz (2008); the Romanian database by De Sousa and Duval (2010); the IDB database built by the Inter-American Development Bank and the ECB database as in Schioupu and Siegfried (2006). The merging procedure, as described at length in Docquier et al. (2012), prevents possible self-selection issues and produces a data set covering the period from 1985 to 2005 in which 13865 observations for 1969 country pairs are available.[2]

2.2. Bilateral migration data

Migration data is taken from Artuc et al. (2013) who construct bilateral migration stocks for 1990 and 2000. The matrices are computed for two skill groups: migrants with college (tertiary) education, referred to as high-skill, and with less than college education (primary and secondary), referred to as low-skill. The methodology used in collecting the data consists of three steps. The starting point is the database described in Docquier, Lowell and Marfouk (2009) documenting bilateral migration stock to OECD host countries. It is based on a collection of census and register immigration data by country of birth and educational level in the 30 OECD countries. The second step consists of a collection of similar immigration data from 46 non-OECD destinations in 2000 and 31 destinations in 1990. Finally, data collected in steps 1 and 2 is used to predict the size and structure of migration to the remaining 119 non-OECD host countries in 2000 (and 134 in 1990). Gravity regression models were estimated for the size of bilateral migration from country i to country j in the education group k and gender g. The latter constructed data will not be used in our empirical analysis, which only builds on primary census data. Since the Artuc et al. (2013) dataset refers just to 1990 and 2000, while the DRS (2012) dataset ranges from 1985 to 2005, migration data has been imputed for the missing cells. In particular, since migration data is very persistent, data for the year 1990 has been attributed to the period 1985-1995 and that for the year 2000 to the interval 1996-2005.

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[2] For the complete list of sending and receiving remittances countries included in the dataset, see Docquier et al. (2012).

2.2.1. Some descriptive statistics

After combining data on bilateral remittances with data on bilateral migration, our final dataset includes 52 sending and 46 receiving countries over the period 1985-2005 (8928 observations for 1348 country pairs). The remittance-sending countries are: Australia, Austria, Bahrain, Belarus, Belgium, Canada, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Guinea, Hungary, Iraq, Ireland, Israel, Italy, Japan, Kuwait, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Macedonia, Malaysia, Malta, Morocco, Netherlands, New Zealand, Norway, Oman, Poland, Portugal, Romania, Rwanda, Saudi Arabia, Singapore, Slovak Republic, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, United Arab Emirates, United Kingdom, United States. The recipient countries are: Albania, Algeria, Argentina, Armenia, Bangladesh, Belarus, Bolivia, Brazil, Bulgaria, China, Colombia, Costa Rica, Croatia, Dominican Republic, Ecuador, Egypt, El Salvador, Georgia, Ghana, Guatemala, Indonesia, Israel, Jordan, Kazakhstan, Lebanon, Libya, Macedonia, Moldova, Morocco, Nigeria, Pakistan, Panama, Peru, Philippines, Romania, Russia, Serbia and Montenegro, Slovenia, Suriname, Syria, Tajikistan, Thailand, Tunisia, Ukraine, United States, Venezuela. The only developed countries of origin are Israel, Slovenia and United States (which represents only 5% of the sample) so we can reasonably pursue the analysis just referring to developing countries effects. Figure 1 gives a more accurate idea of the coverage of our dataset, while Figure 2 and Figure 3 refer to the top recipient countries as far as international migration by skill and gender is concerned.

**Figure 1 – Countries included in the DRS (2012) dataset**
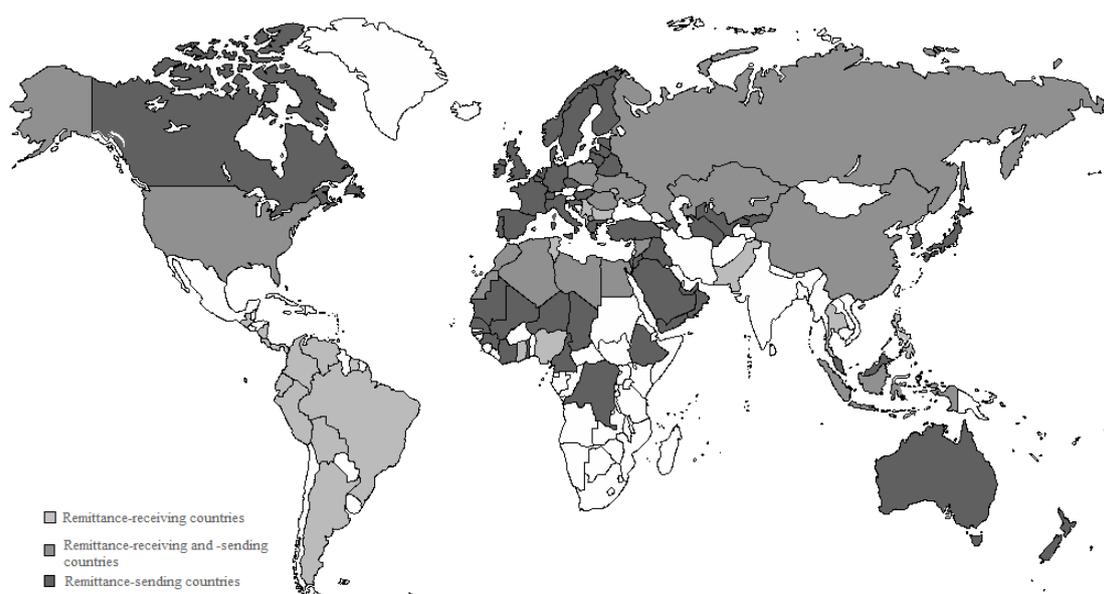
Figure 2 – Top recipient countries of skilled migrants in 2000
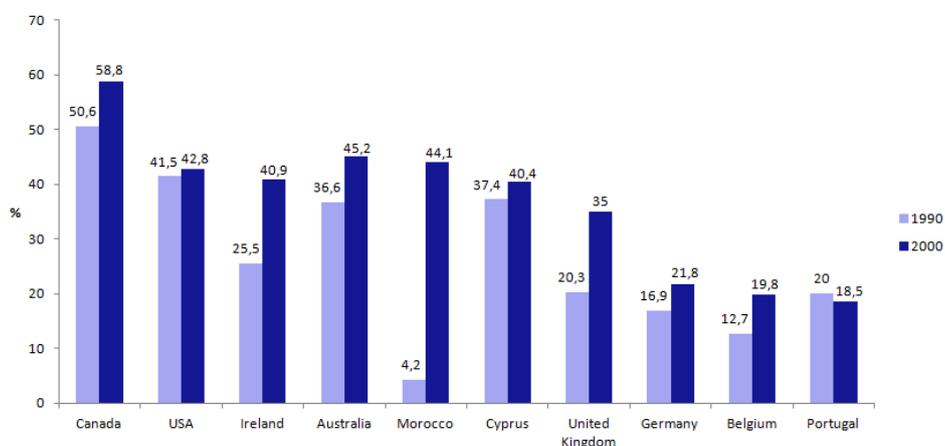
Source : authors'calculations using Artuc et al. (2013)

Figure 3 – Top recipient countries of female migrants in 2000
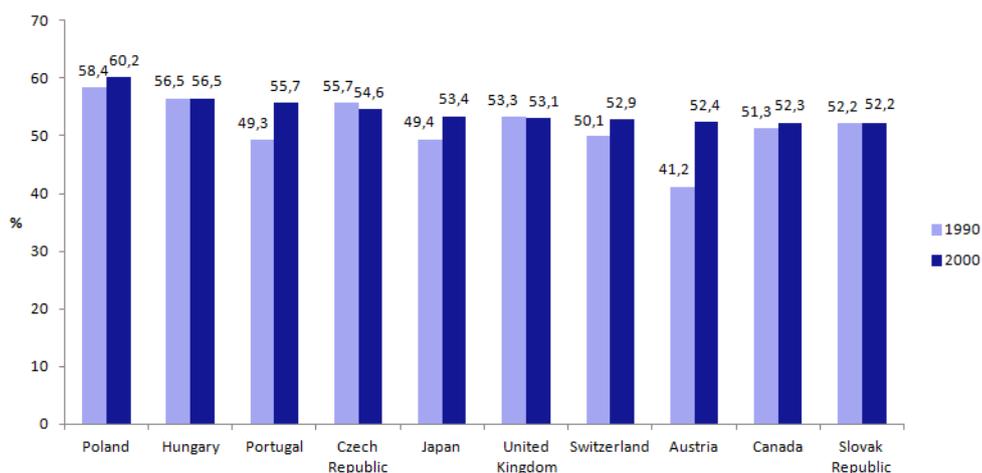
Source : authors'calculations using Artuc et al. (2013)

In accordance with the Artuc et al. (2013) dataset, both female migration[3] and brain drain have increased. On a global scale, the number of women who migrate is equal to that of men, and in certain regions is even higher. In 2000, women amounted to approximately 49 per cent of the total number of migrants in the world. More precisely, migrating women were slightly more numerous than men in developed countries. In developing countries, however,

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[3] While females already represented a significant share of migrants five decades ago, the feminization also refers to changes in the profile of female migrants who include an increasing number of young single women and female family breadwinners in search of greater employment opportunities and better living conditions.

they totalled slightly less than 45 per cent of all migrants. On a regional level, migrant women numerically outnumbered men in Europe, Latin America and the Caribbean, North America and Oceania, while in Africa and in Asia they were generally underrepresented when compared to men. Regarding brain drain, between 1990 and 2000, the stock of skilled immigrants in OECD countries increased by 64 percent. This trend can be partly explained by the general increase of people in education in the World and by the implementation of selective migration policies in developed countries like the United-States, Canada, Australia, but also in Europe. The rise was stronger for immigrants from developing countries (up 93 percent), especially from Africa (up 113 percent) and Latin America and the Caribbean (up 97 percent). Figure 2 and Figure 3 give an idea of this joint increase in female and skilled migration in respective top recipient countries.

Table 1 reports instead some descriptive statistics concerning bilateral remittances and their relationship with the skill level and gender of the migrants. The first set of results deals with the total amount of remittances. The mean level is 5660890 to 7718173 dollars if just high income destinations are considered. If we aggregate remittances by remittance-receiving country, the Philippines occupies the first place with more than six billion dollars per year. The second set of results depicts the amount of remittances per migrant. The third set shows the amount of remittances by skilled migrant as well as share of skilled people among the migrants. The fourth set refers to the amount of remittances by female migrants plus a brief description of the share of women. For each set of results, we consider low and high-income destinations. The average level of remittances per migrant is 1023 dollars (with Suriname-Cyprus being the first South-North corridor), 4509 per skilled individual (with Thailand-Israel occupying first place as South-North corridor) and 2549 dollars per woman (with El Salvador-Spain occupying first place as South-North corridor). Additionally, the dispersion of remittances per migrant is very high, depending on the income nature of the paying country. The same holds if the skill level or the gender of the migrant is taken into account. Let us now examine the skill and gender composition of the migrant Diaspora.[4] The mean level of the skill share is 0.23 with slightly higher level if high-income countries are chosen, meaning that some kind of positive self-selection is in place. Conversely, if low income destinations are considered, the level of skilled persons drops dramatically. Concerning women instead, the mean level of female share is 0.37 to 0.48 in high income destinations and 0.16 in poor countries, showing a clear feminization of migration to developed countries. Table 2 to Table 4 offer a more bilateral perspective. Table 2 and Table 3 indicate the 10 corridors where females and skilled people represent the most important share among migrants. The most feminized corridor is Dominican Republic-Greece while that to which the more skilled migrants belong to is Macedonia-United-States. Table 4 represents the top ten remittance corridors in 2000 and the respective share of skilled and female migrants. It appears that the most important remittance corridors in 2000 were: the Philippines-United States (almost four billion dollars), Bangladesh-Saudi Arabia (almost one billion dollars), the Philippines-Saudi Arabia (about half a billion dollars) and the Philippines-Japan (around 0.4 billion dollars). Among these corridors, the share of females among migrants exceeded the sample average of 0.38 in six countries. However, the share of skilled persons among migrants outnumbers the average (0.22) in only in three corridors.

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[4] The skill and the female share of migrants have been calculated respectively as the ratio of tertiary educated migrants and females over total migrants for each corridor.

Table 1 – Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Total bilateral remittances					
Full dataset	8838	5660890	2.41e+07	0	2.81e+08
From low income countries	556	6089	44365.2	0	500000
From high income countries	5594	7718173	2.79e+07	0	2.81e+08
Remittances per migrant					
Full dataset	6822	1023	4108	0	56854
From low income countries	190	25.6	206	0	1907
From high income countries	6632	1051	4163	0	56854
Remittances per skilled migrant					
Full dataset	6610	4509	14867	0	155000
From low income countries	176	99	762	0	6787
From high income countries	6434	4629	15050	0	155000
Share of skilled					
Full dataset	8826	0.23	0.21	0	0.88
From low income host countries	556	0.06	0.13	0	0.54
From high income host countries	5614	0.30	0.21	0	0.88
Remittances per female migrant					
Full dataset	6619	2549	9979	0	123406
From low income countries	190	59	480	0	4438
From high income countries	5148	2526	9706	0	109412
Share of females					
Full dataset	8827	0.37	0.28	0	0.99
From low income host countries	556	0.16	0.23	0	0.89
From high income host countries	5630	0.48	0.24	0	0.99

Source : authors'calculation using DRS (2012)

Table 2 – Main corridors of skilled migrants

Main corridors of skilled migrants	Share of skilled migrants
Macedonia → *The United-States*	88.4
Philippines → *Canada*	80.9
Slovenia → *Singapore*	80.8
Bangladesh → *Australia*	80.7
Bolivia → Greece	80
Hungary → *Singapore*	80
Venezuela → *Latvia*	80
Macedonia → *Malta*	79.4
Bengladesh → *Malta*	77.8
Philippines → *Ireland*	77.2

Source : authors'calculation using DRS (2012)

Table 3 – Main corridors of skilled migrants

Main corridors of female migrants	Share of female migrants
Dominican Rep. → *Greece*	98.8
Thailand → *Luxembourg*	97
Bangladesh → *Portugal*	96.1
Philippines → *Cyprus*	96.1
Thailand → *Italy*	94.1
Thailand → *Finland*	93.8
Thailand → *Norway*	92.2
Thailand → *Austria*	92.2
Thailand → *Malta*	91.7
Thailand → *Denmark*	90.9

Source : authors'calculation using DRS (2012)

Table 4 – Top ten remittance corridors in 2000

Main corridors of remittances	Value or remittances (in millions of USD)	Share of skilled migrants in the sending country	Share of female migrants in the sending country
Dominican Rep. → *Greece*	3,940	0.71	0.58
Thailand → *Luxembourg*	936	0.18	0.14
Bangladesh → *Portugal*	494	0.18	0.14
Philippines → *Cyprus*	370	0.28	0.84
Thailand → *Italy*	246	0.19	0.30
Thailand → *Finland*	161	0.16	0.64
Thailand → *Norway*	144	0.17	0.75
Thailand → *Austria*	141	0.10	0.48
Thailand → *Malta*	140	0.19	0.28
Thailand → *Denmark*	134	0.49	0.71

Source : authors'calculation using DRS (2012)

2.2.2. Other data

We use bilateral data on geographical distance, contiguity, colonial and linguistic links. Those variables are time-invariant and come from the CEPII data which is based on population-weighted bilateral distances between the biggest cities at origin and destination (see Clair et al., 2004). For proxying transaction costs, as will be explained at length in section 3.1, we use data on GDP and financial development in both remittance-sending and -recipient countries. We also add other traditional determinants of remittances evidenced in the literature: the bilateral exchange rate between the two countries (see for example Bougha-Hagbe, 2004), which measures the purchasing power of remittances , and the real interest rate in remittance-recipient countries (see for example Adams, 2008), which checks for the possible investment motive of remittances.

3.   Empirical results

As Figures 2 and 3 anticipated in Section 2.2.1, in the last few decades, international migration has been characterized by a rapidly increasing feminization and brain drain. However, there is no consensus in the literature on the joint role of the educational and gender characteristics of migrant Diaspora on remittances. The aim of this paragraph is to shed some light on it using a simple gravity model first used by Lueth and Ruiz-Arranz (2008) which is now standard in the recent migration literature on bilateral remittances.[5]

3.1.   The gravity model

The econometric model is as follows:

$$R_{ijdt} = \eta_i + \eta_i + \eta_d + \eta_t + \alpha_0 + \alpha_1 lnM_{ijt} + \alpha_2 F_{ijt} + \alpha_3 S_{ijt} + \alpha_4 RER_{ijt} + \alpha_5 i_{it} + \alpha_6 lnD_{ij} + \alpha_7 L_{ij} + \alpha_8 C_{ij} + \alpha_9 Y_{it} + \alpha_{10} Y_{jt} + \varepsilon_{ijt}$$

where R_{ijdt} measures total remittances in US dollars from transferring (i.e. immigration) country j to recipient (i.e. emigration) country i at time t in data set d, lnM_{ijt} is the log of the bilateral migration stock from i to j, F_{ijt} is the share of females over total bilateral migration and S_{ijt} is the share of skilled people over total bilateral migration. The set of control variables exploiting additional information on both migrants' origin and destination country contains nominal GDP at origin and destination (Y_{it} and Y_{jt}), RER_{ijt} which is the real effective exchange rate between i and j, and the real interest rate in country i at time t. Other bilateral variables have been considered: lnD_{ij}, L_{ij} and C_{ij} account for geographical, linguistic and cultural distances respectively. To control for unobservables, origin, destination, time and database fixed effects are included. ε_{ijt} is the standard error term.

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[5] See also Docquier et al. (2012) and Bettin, Presbitero and Spatafora (2014)

The estimation of the equation entails various econometric issues[6] that may lead the OLS estimation to generate biased estimates. Indeed, there is a large proportion of non-randomly distributed zeroes in the dependent variable (bilateral remittances) as a result of the original construction of the dataset as extensively explained in Docquier et al. (2012). To the best of our knowledge, the most appropriate way to estimate the above model is the Poisson regression by pseudomaximum likelihood. The new command PPML in Stata differs from its predecessor called Poisson because it uses the method of Santos Silva and Tenreyro (2010) to identify and drop regressors that may cause the nonexistence of the (pseudo-) maximum likelihood estimates. All the PPML models are estimated by default with robust standard errors.[7]

Table 5 and Table 6 report estimation results from the equation. In both tables estimation results are provided considering first only the gender composition of the Diaspora (first column), then taking into account only the skill level (second column), and finally considering both of them (third column). The fourth and the fifth columns examine separately the effect of skilled females and unskilled females. The total migration Diaspora is always positive and highly significant, as well as the share of females at destination. While the share of skilled migrants[8] is positive and significant in the second column, this result does not hold when considering the share of females simultaneously (third column). This finding suggests that the remittance-increasing effect of skilled migrants is primarily due to skilled females. Similarly, columns 4 and 5 show that the remitting propensity by females, is clearly driven by skilled women compared with unskilled women.[9]

On the validity of the gravity factors (Lueth and Ruiz-Arranz, 2008), geographical distance is negative but not significant, linguistic and colonial links which proxy for cultural proximity and access to credit at destination are positive and highly significant. As far as nominal GDP variables are concerned, the positive sign for both the level of GDP at origin and that at destination confirms that larger countries receive (and send) larger volumes of remittances in dollar terms. However, the real interest rate and the real exchange rate have no significant impact on remittances, suggesting first that remittances are not significantly driven by investment motives and that the `substitution' and `wealth' effect[10] of the exchange rate cancel each other out.

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[6] There may for instance be an endogeneity issue due to the relationship between remittances and female migration. In the micro literature the presence of an implicit family loan arrangement can hide circular family migration due to remittances (see Poirine, 1997) and this can imply that the intention to remit is endogenous.

[7] Errors have been also clustered at origin/destination bilateral level. Results are robust and available upon request.

[8] In Docquier et al. (2012) the skill ratio was used in order to be consistent with the theoretical part.

[9] To test the robustness of our results, we first excluded the three developed recipient countries (Israel, Slovenia and the United-States). We also tested our basic specification by keeping only one observation by country-pair. Our results hold to all these different specifications.

[10] See Bougha-Hagbe (2004).

When Table 6 introduces a proxy for transaction costs, results hold as in Table 5. Indeed, an important determinant of remittances is the cost of remitting (Freund and Spatafora, 2008).[11] Following Beck and Peria (2011), we have controlled in Table 5 for most of the significant determinants of remittances cost within each corridor (i.e. the number of migrants and the level of development in both receiving and sending countries). In addition, Table 6 controls for financial development in both receiving and sending countries (calculated as credit to private sector over GDP as in Schioupu and Siegfried, 2006; or in Lueth and Ruiz-Arranz, 2008), a possible determinant of remittance cost. While we expect that remittances depend negatively on transfer costs, the role of financial development is a priori ambiguous (Bettin, Presbitero and Spatafora, 2014). On the one hand, countries with more developed credit markets should attract greater remittances, as a result of either lower transaction costs (Freund and Spatafora, 2008), or the capacity of an efficient banking system to channel profit-driven remittances towards growth-enhancing projects (Bettin and Zazzaro, 2012). On the other hand, remittances and financial development may be substitutes: migrants whose relatives have limited access to financial resources at home may transfer resources to relax liquidity constraints and fund either consumption or investments in physical and human capital (Giuliano and Ruiz-Arranz, 2009). Table 6 shows a positive and significant role of financial development in the country of origin, while financial development at destination is not significant.

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[11] The best way to control for remitting costs would be using the World Bank's dataset *remittanceprices.worldbank.org*, which provides information on the cost to send 200 dollars in several migratory corridors. Unfortunately, this is only available from 2010 to 2014.

Table 5 – Poisson estimations accounting for gender and education

	R_{ijdt} (1)	R_{ijdt} (2)	R_{ijdt} (3)	R_{ijdt} (4)	R_{ijdt} (5)
Stock of migrants at dest. (log)	0.771***	0.820***	0.795***	0.795***	0.778***
	(0.033)	(0.037)	(0.036)	(0.033)	(0.033)
Share of females at dest.	1.217***		1.161***		
	(0.382)		(0.375)		
Share of skilled people at dest.		0.967*	0.813		
		(0.552)	(0.548)		
Share of skilled females at dest.				2.312***	
				(0.633)	
Share of unskilled females at dest.					0.652*
					(0.388)
GDP at origin (log)	2.417***	2.336***	2.444***	2.510***	2.300***
	(0.875)	(0.894)	(0.876)	(0.887)	(0.884)
GDP at dest. (log)	1.534***	1.529***	1.523***	1.474***	1.555***
	(0.318)	(0.320)	(0.321)	(0.322)	(0.315)
Interest rate	-0.022	-0.022	-0.022	-0.022	-0.023
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Exchange rate	-0.023	-0.016	-0.020	-0.019	-0.022
	(0.019)	(0.018)	(0.019)	(0.018)	(0.019)
Contiguity (dummy)	0.962***	1.123***	0.944***	1.134***	1.054***
	(0.311)	(0.289)	(0.311)	(0.289)	(0.304)
Distance (log)	0.012	-0.000	0.010	-0.002	0.007
	(0.019)	(0.019)	(0.018)	(0.019)	(0.019)
Common language (dummy)	0.523***	0.514***	0.446**	0.377**	0.633***
	(0.175)	(0.188)	(0.192)	(0.187)	(0.172)
Colony (dummy)	0.722***	0.592***	0.716***	0.665***	0.647***
	(0.181)	(0.174)	(0.179)	(0.182)	(0.173)
Constant	-66.89***	-65.52***	68.03***	-68.57***	-64.18***
	(19.67)	(19.99)	(19.68)	(19.92)	(19.81)
Origin FE	yes	yes	yes	yes	yes
Destination FE	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes
Database FE	yes	yes	yes	yes	yes
Pseudo log-likelihood	3,699e+10	3,995e+10	3,959e+10	3,959e+10	4,00e+10
Observations	6,789	6,789	6,789	6,789	6,789
R-squared	0.927	0.927	0.927	0.927	0.927

* Significant at the 10% level ** 5% level *** 1% level

Robust standard errors in parentheses below the estimates.

Table 6 – Poisson estimations accounting for gender, education and remitting cost

	R_{ijdt} (1)	R_{ijdt} (2)	R_{ijdt} (3)	R_{ijdt} (4)	R_{ijdt} (5)
Stock of migrants at dest. (log)	0.770***	0.819***	0.795***	0.794***	0.777***
	(0.033)	(0.036)	(0.035)	(0.033)	(0.033)
Share of females at dest.	1.177***		1.117***		
	(0.381)		(0.374)		
Share of skilled people at dest.		0.994*	0.838		
		(0.550)	(0.547)		
Share of skilled females at dest.				2.284***	
				(0.626)	
Share of unskilled females at dest.					0.617
					(0.389)
GDP at origin (log)	1.833***	1.750***	1.867***	1.943***	1.703***
	(0.828)	(0.840)	(0.829)	(0.839)	(0.832)
GDP at dest. (log)	1.469***	1.473***	1.460***	1.418***	1.491***
	(0.319)	(0.320)	(0.322)	(0.321)	(0.315)
Financial dev. at dest.	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Financial dev. at origin	0.010***	0.010***	0.010***	0.010***	0.010***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Interest rate	-0.026*	-0.026*	-0.025*	-0.025*	-0.027*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Exchange rate	-0.022	-0.015	-0.020	-0.018	-0.022
	(0.019)	(0.018)	(0.019)	(0.018)	(0.019)
Contiguity (dummy)	0.962***	1.114***	0.943***	1.127***	1.052***
	(0.313)	(0.294)	(0.314)	(0.294)	(0.307)
Distance (log)	0.011	-0.000	0.010	-0.002	0.007
	(0.019)	(0.019)	(0.018)	(0.019)	(0.019)
Common language (dummy)	0.509***	0.492***	0.429**	0.3760*	0.615***
	(0.174)	(0.187)	(0.191)	(0.186)	(0.172)
Colony (dummy)	0.725***	0.599***	0.719***	0.670***	0.652***
	(0.179)	(0.172)	(0.177)	(0.180)	(0.172)
Constant	-53.25***	-51.96***	-54.59***	-55.42***	-50.29***
	(18.77)	(18.93)	(18.77)	(18.98)	(18.82)
Origin FE	yes	yes	yes	yes	yes
Destination FE	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes
Database FE	yes	yes	yes	yes	yes
Pseudo log-likelihood	3,699e+10	3,995e+10	3,959e+10	3,959e+10	4,00e+10
Observations	6,789	6,789	6,789	6,789	6,789
R-squared	0.931	0.931	0.932	0.931	0.931

* Significant at the 10% level ** 5% level *** 1% level

Robust standard errors in parentheses below the estimates.

3.2. Interpretation and changes expected

For the interpretation of the results, Poisson coefficients have to be interpreted as proportionate increase.

Given the exponential function form of the conditional mean, it means for example that a single-unit change in independent variable of interest leads to a proportionate increase of $\left(e^{\beta} - 1\right)$ or a percentage change of $100 \times \left(e^{\beta} - 1\right)$ in bilateral remittances, where β is the estimated coefficient. So, summing up estimation results from Table 3 and Table 4, a single-unit change in the share of females and skilled in the migration Diaspora leads respectively to an increase of 2.3% and 1.6% in bilateral remittances. The difference is not statistically significant when transaction costs are also taken into account (2.22% and 1.6% respectively) or in robustness estimates. If skilled females are instead considered, remittances increase by 8.7%.

From these results, we can calculate the effect that the evolution of migration patterns between 2000 and 2010 would have had on total remittances received by developing countries in our sample if all other parameters had remained constant. According to the Artuc et al. (2013) dataset, the average share of skilled persons over total bilateral migration in our sample has increased from 20 percent in 1990 to 25 percent in 2000. If we suppose the same variation between 2005 and 2015 (a five-unit change), all things remaining equal, we expect total remittances received by our sample to grow from 11.7 billion dollars in 2005 to 12.6 billion dollars in 2015. If we now consider a 1.7-unit change (similar to the change that took place between 1990 and 2000) in the share of females among migrants, remittances would grow by about 4 percent and reach 12.2 billion dollars in 2015. However, the steeper rise would come from skilled females: if the share of skilled females rises by four units from 2005 to 2015 (as during the 1990-2000 decade), total remittances received by our sample would amount to more than 15 billion in 2015.

4. Conclusions

Using a new comprehensive dataset of bilateral remittances from 89 sending countries to 46 receiving economies over the period 1985-2005, this paper investigates whether changes in the composition by gender and education of migration flows may shape remittance patterns. The estimations of a simple gravity model of remittances reveal that the skills and gender of migrants significantly matter in determining remittance flows. First, our results show that the share of females and skilled persons in the migration Diaspora significantly increases annual remittances received in the country of origin. Moreover, we found that the positive role played by females on remittances is mainly driven by skilled women compared with unskilled women. Given these findings, we could expect a positive effect of the recent feminization and the increasing qualification of migrants on annual remittance inflows received by developing countries.

Beside their effect on remittance amounts, the composition of migration could also affect the impact of remittances on poverty (if skilled persons mainly come from more affluent households) and economic growth (if motivations and the use of remittances tend to vary with the characteristics of migrants, for example). However, empirical studies on these issues are very scarce and mainly based on specific countries.[12] To better understand the possible effects of the recent evolution in the composition of international migration on the development of recipient economies, this strand of literature needs to be further investigated.

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[12] See for example, Bélanger and Rahman (2012) on the United Arab Emirates-Bangladesh corridor.

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