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Miao Grace Wang

Marquette University, [grace.wang@marquette.edu](mailto:grace.wang@marquette.edu)

M. C. Sunny Wong

University of San Francisco

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# Inward FDI, remittances and out-migration

Miao Wang

Department of Economics, Marquette University, Milwaukee, WI

M.C. Sunny Wong

Department of Economics, University of San Francisco, San Francisco, CA

## Abstract

In this study, we look at the relationship between remittances received at home, inward Foreign Direct Investment (FDI) and out-migration of individuals with different levels of education. Using the bilateral international migration data in 1990 and 2000, we find that inward FDI tends to deter the out-migration of individuals with secondary and tertiary education, but has no significant impact on the out-migration of individuals with primary education. In addition, remittances received at home induce the out-migration of individuals with primary education, but not the out-migration of individuals with secondary and tertiary education. The stock of existing migrants in a foreign country encourage future out-migration regardless of migrants' levels of education.

## I. Introduction

There has been a remarkable increase in the international migration in the past several decades. From 1960 to 2005, the stock of international migrants has gone up by 155%, from 75 to 191 million (United Nations, [2006](#)). Such a growth has attracted attention from both academic researchers and policymakers. Many studies have focused on the impact of inward Foreign Direct Investment (FDI) on the out-migration (Sassen, [1988](#); Borjas, [1999](#); Hayase, [2001](#); Aroca and Maloney, [2005](#)). For instance, Sassen

(1988) shows that starting in the 1960s, there was a striking upsurge in migration from countries in Latin America and Asia together with large flows of US investments into those regions.

In this article, we focus on the impact of inward FDI and remittances on the out-migration of individuals with different levels of education from a country. Migration Dialogue from University of California–Davis considers that ‘remittances are the monies that migrants return to the country of origin. If labor is considered an export, then remittances are that part of the payment for exporting labor services that returns to the country of origin.’<sup>1</sup> To most Less-Developed Countries (LDCs), remittances have become their second largest source in external funds received, following FDI. It is generally agreed that the sizable remittances help reduce poverty rate at home and close the divide between less-developed and developed countries (Adams and Page, 2005). But there are also concerns that remittances might reduce work efforts at home (Appleyard *et al.*, 2008). It is still unclear whether remittances encourage or deter the out-migration.

Prospective migrants in the home country are heterogeneous in terms of their skills or level of education, which are often ignored in previous studies. By including both inward FDI and remittances in our model, we are able to explore whether these two types of financial flows may have heterogeneous effects on the out-migration of individuals with different levels of education.

Based on the international migration data from 35 LDCs and 15 high-income OECD countries in 1990 and 2000, we find that inward FDI deter the out-migration of individuals with secondary and tertiary education, but does not have a significant impact on the out-migration of individuals with only primary education. Remittances received, on the contrary, do not significantly impact the out-migration of individuals with secondary and tertiary education while encouraging the out-migration of individuals with primary education. In addition, we find that the stock of existing migrants have a positive impact on future migration regardless of migrants' levels of education.

The rest of our article is organized as follows: [Section II](#) presents our empirical specification and data. [Section III](#) discusses the empirical results. [Section IV](#) concludes.

## II. Empirical Specification and Data

Our migration variable is obtained from Docquier and Marfouk (2004), which has information in 1990 and 2000 ‘on immigration structure by education attainment and country of birth from all OECD receiving countries’ (p. 5). Docquier and Marfouk divide migrants into three groups based on their education attainment, namely, primary education (0–8 years of schooling), secondary education (9–12 years of schooling) and tertiary education (13 years and above). They define stock of emigrants from a home country as individuals aged 25 years and above with a certain level of education, born in the home country but living in another country as of 1990 and 2000. They do not consider emigrants' occupation, where the education took place or when the migrants arrived in the country of destination. To better access the magnitude of migration, they standardize the stock of emigrants with a certain level of education by the total population with the same level of education in the emigrants' home country in 1990 and 2000, respectively.

Our empirical model specification is as follows

$$\begin{aligned} \Delta migration_{ji}^e &= \alpha + \gamma migration_{ji,1990}^e + \beta FDI_{ij,1990} + \theta remittances_{j,1990} \\ &+ \delta Z_{1990} + \varepsilon_{ji} \end{aligned} \tag{1}$$

where the dependent variable is the change in stock of emigrants from country  $j$  to country  $i$  with education level  $e$  between 1990 and 2000.  $migration_{ji,1990}^e$ , measures the stock of emigrants with education level  $e$  from  $j$  to  $i$  as of 1990. We include the stock of migrants as of 1990 to control for the social network effect. Social capital theory envisions that ‘... ties to current or former migrants represent a valuable social asset since these connections can be used to acquire information and assistance that reduce the costs and risks of (international migration)’ (Massey and Espinosa, 1997, p. 951).

FDI is the expression of interest in ownership and control by a foreign investor in an existing enterprise. The Bureau of Economic Analysis defines this interest as the foreign investor acquiring at least 10% ownership of the domestic enterprise. The same numerical guideline is used by the IMF. In our study, the FDI variable is measured as the inward FDI stock in country  $j$  from country  $i$  as of 1990 as a share of country  $j$ 's GDP. FDI stock is obtained from the *International Direct Investment Statistics* database from SourceOECD.

Remittances, measured as remittances received in country  $j$  as a share of country  $j$ 's GDP, are from Migration Dialogue from the University of California–Davis. The remittances measure includes three components: (1) worker remittances, which are monetary transfers sent home from workers abroad for more than a year, (2) gross earnings of foreigners residing abroad for less than a year and (3) migrants transfer, which is the net worth of migrants who move from one country to another. The three streams of money flows included in remittances are also published by the IMF annually in its Balance of Payments Statistical Yearbook.

Other control variables commonly used in the literature are included in the  $Z$  vector (Greenwood and McDowell, 1991; Obstfeld and Rogoff, 1996). They are (with expected signs attached) the income level in migrants' destination ( $i$ ) and home countries ( $j$ ) measured as the log of real GDP per capita (*income destination* +, *income home* –), unemployment rate (*unemployment destination* –, *unemployment home* +), inflation rate (*inflation destination* –, *inflation home* +). These data are obtained from *World Development Indicators*, published by the World Bank and *World Economic Outlook* published by the IMF. We also include a trade openness variable (*openness* +). Openness is measured by the bilateral trade value between country  $j$  and  $i$  as a share of both countries GDP and obtained from *Monthly International Trade* database from SourceOECD.

We include a measure of political freedom (*political freedom* +) from different issues of *Freedom in the World*, published by the Freedom House. We take a log difference of political freedom between the home country and the destination country to obtain a measure of relative political freedom. The larger the value of this variable, the more political freedom the destination country has relative to the home country.

Geographical and cultural variables are included as well: distance between the home country and the destination country (*distance* –); whether home and destination countries share a common language (*common language* +); whether home and destination countries share a common border (*common border* +); whether a country is landlocked (*landlock destination* –, *landlock home* –); geographic location dummies for countries. These data are provided by the Centre D'Etudes Prospectives Et D'Informations Internationales.

Our sample includes 35 LDCs as home countries for migrants and 15 OECD countries as countries of destination. The coverage is solely determined by data availability. Summary statistics are reported in Table 1.

**Table 1. Descriptive statistics**

Variables	Mean	SD	Minimum	Maximum
Tertiary Migration <sub>1990</sub>	0.022208	0.077485	2.63E-06	0.6748145
Secondary Migration <sub>1990</sub>	0.002718	0.0058828	1.29E-07	0.0311086
Primary Migration <sub>1990</sub>	0.002043	0.0066652	1.05E-07	0.0479461
Tertiary Migration <sub>2000</sub>	0.016657	0.0534033	0.000027	0.4554721
Secondary Migration <sub>2000</sub>	0.00294	0.005438	8.17E-06	0.0252891
Primary Migration <sub>2000</sub>	0.001775	0.005627	1.79E-07	0.0388493
FDI <sub>1990</sub>	0.022358	0.0845134	-0.000019	0.7321748
Remittances <sub>1990</sub>	0.017585	0.027326	0	0.0993266
Distance (in log)	8.793254	0.7964436	5.78335	9.815211
Political Freedom	-0.91884	0.4147976	-1.9459	0
Income <sub>1990</sub> Destination (in log)	10.06954	0.3232054	8.98311	10.73535
Income <sub>1990</sub> Home (in log)	7.963708	0.9309412	5.85873	9.792468
Unemployment <sub>1990</sub> Destination (%)	6.369512	2.546733	0.5	11.4
Unemployment <sub>1990</sub> Home (%)	6.135366	3.342298	1.7	15.8

Trade <sub>1990</sub> (%)	0.003426	0.0066063	6.79E-06	0.0403291
Inflation <sub>1990</sub> Destination (%)	5.295488	2.15272	2.454	10.377
Inflation <sub>1990</sub> Home (%)	484.5554	993.9249	2.618	2947.73

### III. Empirical Results

We use the Seemingly Unrelated Regressions (SUR) technique for estimation. The SUR system includes three regressions. Dependent variables in these regressions are out-migration of individuals with tertiary, secondary and primary education, respectively. We refer the three regressions as the tertiary, the secondary and the primary. The SUR system estimates the three regressions simultaneously, allowing for potential correlation among error terms. Given that there can be unobserved factors affecting the out-migration of individuals with different levels of education at the same time, SUR is an appropriate technique for our model. In addition, all estimates use White-adjusted SEs.

Panels A, B and C in Table 2 report the estimation results for the tertiary, the secondary and the primary regression, respectively. For the purpose of brevity, we report estimated coefficients on our main variables of interest: FDI, remittances and migration as of 1990. Coefficients on other control variables have the expected signs and are available upon request.

**Table 2. The impact of FDI and remittances on international migration**

	SUR1	SUR2	SUR3	SUR4	SUR5
Panel A: Tertiary regression					
FDI <sub>1990</sub>	-0.07087*** (0.02394)	-0.09788*** (0.02515)	-0.07094*** (0.02388)	-0.07032*** (0.02387)	-0.06648*** (0.02374)
Tertiary Migration <sub>1990</sub>	-0.25581*** (0.02682)	-0.23029*** (0.02762)	-0.25552*** (0.02680)	-0.25668*** (0.02678)	-0.26247*** (0.02630)
Remittances <sub>1990</sub>	-0.01452 (0.04297)	-0.02172 (0.04193)	-0.00582 (0.04467)	-0.02026 (0.04311)	0.01157 (0.04406)
R <sup>2</sup>	0.9373	0.9429	0.9378	0.9381	0.9405
Panel B: Secondary regression					
FDI <sub>1990</sub>	-0.00589*** (0.00189)	-0.00634*** (0.00193)	-0.00539*** (0.00186)	-0.00592*** (0.00183)	-0.00577*** (0.00203)
Secondary Migration <sub>1990</sub>	-0.10233*** (0.02665)	-0.09738*** (0.02686)	-0.09921*** (0.02565)	-0.10423*** (0.02626)	-0.10734*** (0.02916)
Remittances <sub>1990</sub>	0.01153 (0.00791)	0.00988 (0.00805)	0.01350* (0.00805)	0.00896 (0.00770)	0.0123 (0.00837)
R <sup>2</sup>	0.3663	0.3785	0.3958	0.4106	0.3643
Panel C: Primary regression					
FDI <sub>1990</sub>	-0.00125 (0.00120)	-0.00174 (0.00123)	-0.00104 (0.00113)	-0.00148 (0.00117)	-0.0018 (0.00120)
Primary Migration <sub>1990</sub>	-0.17017*** (0.01676)	-0.16513*** (0.01694)	-0.17207*** (0.01551)	-0.16632*** (0.01658)	-0.17287*** (0.01630)
Remittances <sub>1990</sub>	0.00749** (0.00378)	0.00678* (0.00383)	0.01086*** (0.00369)	0.00637* (0.00369)	0.00581 (0.00385)
R <sup>2</sup>	0.7965	0.802	0.8216	0.8091	0.8093
Observations	82	81	82	82	82

Notes: SEs are in parentheses. \*\*\*, \*\* and \*Denote significance at 1%, 5% and 10% levels, respectively.

SUR1: Common language, distance, political freedom, landlocked, income and unemployment.

SUR2: Control variables in SUR1 and trade.

SUR3: Control variables in SUR1 and inflation.

SUR4: Control variables in SUR1 and common border.

SUR5: Control variables in SUR1 and regional dummies.

Overall, Table 2 results show that FDI and remittances indeed have heterogeneous impacts on international migration. In addition, they both affect the out-migration of individuals with different levels of education differently.

The coefficient on FDI is negative and significant at the 1% level in tertiary and secondary regressions, but not statistically different from zero in primary regressions. This indicates that inward FDI tends to reduce the out-migration of individuals with tertiary and secondary education. However, it does not have any significant impact on the out-migration of individuals with primary education. Furthermore, in absolute value, the coefficient on FDI in tertiary regressions is significantly larger than the coefficient on FDI in secondary regressions.

The deterring effect of inward FDI in tertiary and secondary regressions are consistent with findings from previous studies (Barba Navaretti and Venables, 2004), which argue that foreign affiliates are more productive than domestic firms. Consequently, inward FDI increases the demand for high-skilled labour relative to low-skilled labour and raises the income of high-skilled labour in the host country of FDI (Feenstra and Hanson, 1997). In other words, individuals with tertiary or secondary education are more likely to be employed by affiliates of multinationals and take advantage of the higher wages and better job opportunities. Better income prospect provides an incentive for individuals with secondary or tertiary education to stay in the home country, thus deter the out-migration. Therefore, inward FDI should have a stronger (negative) effect on tertiary migration or secondary migration than primary migration.

The coefficient on remittances in most regressions in Panels A and B is not significantly different from zero. In contrast, the coefficient on remittances in Panel C is positive and significant in four of the five regressions. The results indicate that remittances received tend to encourage the out-migration of individuals with primary education, whereas they do not affect secondary and tertiary migration. A possible reason for this result might be that individuals with primary education are not employed by multinationals and remittances might not help to improve their living standard significantly. Instead, remittances provide the means for them to cover the fixed cost of the trip of international migration and induce international migration.

Furthermore, the migration from  $j$  to  $i$  as of 1990 is positively correlated with migration as of 2000 from  $j$  to  $i$  across different regressions, regardless of the level of education. Based on Equation 1, the actual effect of migration as of 1990 on migration as of 2000 would be  $1 + \gamma$ .<sup>3</sup> For example, the estimates from SUR2 in Panel A suggest that initial tertiary migration is positively correlated with future tertiary migration with a magnitude of  $1 + (-0.23) = 0.77$ . Intuitively, if there is already a well-established community of migrants from  $j$  in  $i$ , then new migrants can find themselves relatively easily connected with the local community. As a result, migrants from country  $j$  are more likely to stay in country  $i$  and obtain a good job. This will further encourage future migration from  $j$  to  $i$ .

## IV. Conclusions

Our study explores the impact of inward FDI and remittances on the international migration of individuals with different levels of education. We find that these two types of financial flows have heterogeneous effects on the out-migration from a home LDC. Inward FDI reduces the out-migration of individuals with secondary and tertiary education from LDCs, but has no significant impact on the out-migration of individuals with primary education. Remittances induce the out-migration of individuals with primary education, but do not seem to affect out-migration of individuals with secondary and tertiary education. In addition, ties with existing migrants tend to encourage migration, regardless of the level of education.

## Notes

<sup>1</sup> <http://migration.ucdavis.edu/mn/data/remittances/aboutremit.html>

<sup>2</sup>  $\Delta migration^e_{ji} = migration^e_{ji,2000} - migration^e_{ji,1990}$ , with  $e =$  primary, secondary and tertiary education.

<sup>3</sup> Equation 1 is equivalent to  $migration^e_{ji,2000} = \alpha + (1 + \gamma) migration^e_{ji,1990} + \beta FDI_{ji,1990} + \theta remittances_{j,1990} + \delta Z_{1990} + \varepsilon_{ji}$

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