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International Migration and FDI: Can Migrant Networks Foster Investments toward Origin Countries?

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Abstract

With the growing trends of international migration, the literature looking at the economic impact of migrants has also expanded, focusing on both the perspectives of the host and the origin countries in regard to various aspects such as labor force growth, GDP growth, and poverty rates. In the specific literature investigating the impact of migrants on origin countries, FDI is a key factor that cannot be overlooked, as it can play an essential role in the economic development of origin countries. Studies in this area have hypothesized that migrants' impact on FDI is positive, since the information about the origin countries that migrants can provide to potential investors outside of those countries could help reduce information asymmetries and facilitate FDI flows. Through a panel regression spanning 2000-2017, this paper estimates the above relationship, focusing on migrant networks in the US and US FDI to the migrants' origin countries, using migration data from the American Community Surveys for 86 countries of origin. The estimation, which controls for a set of gravity specifications and FDI determinants, finds a significant migrant network effect on US FDI, which is stronger for highly educated migrants.

JEL classification: F21; F22; O11; O15
Keywords: International migration; Foreign direct investment; United States; Economic development

I. Introduction

International migration officially became a part of the United Nations' 2030 Agenda for Sustainable Development on September 25, 2015. This agenda was adopted by 150 world leaders, and 6 out of 17 development goals in the agenda wove migration issues into their targets (United Nations, 2015; United Nations Development Programme, 2015). The inclusion of migration into the newest set of global development goals is crucial, considering the current magnitude and trends of migration around the world. Specifically, in 2017, there were approximately 257.7 million international migrants, up 50% compared to 2000. About 34.5% of these people migrated from less developed regions to more developed regions, reflecting 60% of the increase in international migrants in the more developed regions (United Nations, 2017). As migrants leave their country of origin to live in a host country, they become a part of the host country's economy, consequently affecting not only the labor markets of both countries, but also the flow of capital resources between them. This impact may vary, though, depending on the migrants' age, skill level, occupation, and resources accumulated previously in the origin country as well as currently in the host country. As a result, the significant increase in international migration raises important questions regarding the economic impact of migrant flows.

Researchers have specifically looked at the positive relationship between migration and labor force growth in host countries that have received large migrant influxes (McKinsey Global Institute, 2016), as well as the positive impact of migrant flows on GDP growth rates of host countries over the long run (Bove and Elia, 2015). From the perspective of the origin countries, migrant workers' remittances have been shown to be effective in reducing poverty in less developed regions, especially in rural areas (Taylor et al., 2005; Bertoli and Marchetta, 2014).

However, when assessing the economic impact of migration on origin countries, it is necessary to look at other aspects that are important to development, besides poverty and how it correlates with monetary remittances from migrant workers. Among those, foreign direct investment (FDI) is a factor that can play an essential role in the economic growth of origin countries. Since FDI is a channel through which technology transfers from more developed countries to less developed ones, it can stimulate domestic investment and human capital improvements, which leads to economic development in the origin country that receives FDI (Makki and Somwaru, 2004).

The flow of FDI to the migrants' origin country, however, can be obstructed by barriers such as investors' lack of knowledge about the country's consumption and input markets, as well as their cultural and legal environments. Such barriers could effectively discourage FDI, but even when that is not the case, the existing information asymmetry could cause investors to be overcharged by local businesses, who have more possession of and access to information about the local environments. Additionally, without adequate knowledge to break down these information barriers, investors could be inefficient in their allocation of resources due to their failure to forecast market demand and adapt to the local supply and distribution networks, as well as to the labor and contract laws of the FDI destination country (Gordon and Bovenberg, 1996). This is where migrant networks could play a significant role in aiding the flow of FDI.

Such a role is possible because depending on their age, education, occupation, as well as family and social connections in their origin country, the information that migrants possess about their origin country can benefit potential investors in the host country. This information may range from investment opportunities, to their knowledge about the social, cultural, and institutional aspects of the origin country, all of which can help mitigate the asymmetry in

information that exists for investors in the host country. Due to the migrants' presence in the host country, they are also able to gain first-hand experience and knowledge about the country's business and legal environments, which could benefit potential investors in terms of analyzing the similarities and differences between the home and origin countries and foreseeing future problems that may affect their FDI projects. Moreover, migrants in the host country are able to connect with migrant networks from the same origin country in other host countries, adding to their repository of information, which could be valuable to investors. As a result, the presence of migrant networks could help reduce the information barriers discussed above, which in turn facilitates the flow of FDI.

This study will focus on the United States as a migration host country, as it has consistently ranked first among the top 10 migration destinations since 1990, hosting 49.8 million migrants in 2017, or 19% of the world's total migrant population. Between 1990 and 2017, the US also experienced the largest increase in migrant stock with an extra million of migrants added to the stock each year (United Nations, 2017). Moreover, besides being the top migration destination country, the US has also been the largest net supplier and investor of FDI (Lipsey et al., 1999; Jackson, 2017). Compared to other countries, it had the biggest annual FDI outflow in 2017 at USD 342 billion, more than twice the amount of second-ranking Japan's outflow in the same year at USD 160 billion (UNCTAD, 2018). Given the large size of both the migrant networks in and FDI outflows from the US, this study will thus investigate the impact of migrant networks in the US on FDI from the US to those migrants' origin countries.

Within the existing literature, three studies have asked a similar research question where the US is the migration host and FDI source country (Kugler and Rapoport, 2007; Bhattacharya

and Groznik, 2008; Javorcik et al., 2011). The migration data for these studies, however, were obtained from decennial censuses which constrained them to cross-sectional or limited panel analyses over only a few periods[1]. This study extends their work by using more recent migration data that are available in annual frequency and span 18 years from 2000-2017. In addition, it adopts a gravity model to control for certain similarities between the US and the migrants' origin countries, as well as controlling for several FDI determinants that could impact FDI flows. The findings confirm a strong migrant network effect on US FDI, even over the longer time period of analysis.

The rest of the paper is organized as follows. Section II reviews the literature that is relevant to the research question. Section III presents the empirical model, summarizes the data, and provides descriptive statistics. Section IV analyzes the results of the panel regression, while Section V concludes the paper with a broader discussion of its findings.

II. Literature Review

II.1. Theoretical background

The existing literature that studies the impact of international migration on FDI originated from a line of work focusing on the trade creation effect of migration. There are many channels through which migration can affect trade flows, and at least two of them were identified in early theoretical works, the *enforcement effect* and the *information effect*. The former was established by Greif (1993), where networks of migrants with the same ethnic origins can serve as communities to sanction trade term and contract violations, thus creating a positive impact on

[1] Kugler and Rapoport (2007) conducted a cross-sectional analysis for the year 2000 with several independent variables in initial levels using 1990 data. Bhattacharya and Groznik (2008) conducted both cross-sectional and limited-panel analyses using 1970, 1980, 1990, and 2000 data. Javorcik et al. (2011) conducted a 2-year panel analysis with 1990 and 2000 data.

trade in international situations where the legal environment is weak. The second channel through which migration can affect trade – the *information effect* – was emphasized in the later work of Rauch and Casella (2003). Through this alternative mechanism, migrants from a foreign country living in a host country can help both countries overcome information barriers or asymmetries in trade. This is possible given the migrants' knowledge of both the foreign and host countries' business environments, as well as any business connections that they have between the two, and their language skills.

The second mechanism has been studied extensively in the empirical trade literature, and can be applied directly to FDI[2]. This is because many of the factors that can increase the transaction costs of international trade are also factors that can drive up the transaction costs of FDI projects. Similarly to how the migrant networks' knowledge of the relevant business environments, as well as their connections and language skills, can ensure more efficient matching and referrals in trade, the presence of these networks can also help to achieve efficient distribution, procurement, transportation, and satisfaction of regulations in FDI (Docquier and Rapoport, 2012; Rapoport, 2016). Specifically, migrants can provide investors with crucial information regarding their investment which may be otherwise costly or difficult to obtain, such as industry-specific insights, knowledge of common practices, and understanding of legal environments. They can also help bridge any communication barriers due to their knowledge of the languages spoken, cultural differences as well as similarities, and ways of thinking in both the origin and the host countries. Moreover, since studies have found that information

[2] See Gould (1994), Head and Ries (1998), Rauch and Trindade (2002), Combes, Lafourcade, and Mayer (2005), Iranzo and Peri (2009), and Felbermayr and Toubal (2012) for studies where migration and trade were found to be complements. See also Felbermayr and Jung (2009) for one that considered the skill levels of migrants.

asymmetries between partner countries decrease international capital flows (Portes and Rey, 2005), the ability of migrants to fill in the gaps of knowledge for both the origin and host countries may be particularly important to the deployment of FDI in locations where information movement is slow.

II.2. Review of the empirical literature

The theoretical developments in Greif (1993) and Rauch and Casella (2003) have motivated several empirical studies focusing on the impact of international migration on FDI. The literature in this particular branch of work varies in terms of the different directions of FDI that are analyzed. Consider the country to which the migrants have migrated as the home (or host) country, and the migrants' place of origin as the foreign country. Then, a direction of FDI that has been investigated is (1) outward FDI from the home country to the foreign country[3]. For instance, one of the studies examining this direction of FDI looked at how outward FDI coming from 68 different home countries to China, the foreign country, was impacted by the Chinese migrant networks that were present in the home countries (Gao, 2003). Alternatively to this FDI direction, studies have also looked at (2) inward FDI from the foreign country to the home country[4]. An example of the literature in this category studied whether the FDI coming into Japan, the home country, was influenced by the migrant networks from 29 different foreign countries that were present in Japan (Tomohara, 2017).

The two FDI directions mentioned above are bilateral, since the FDI source and destination countries are both known in the analysis. In addition to these directions, Tong (2005)

[3] See Gao (2003), Kugler and Rapoport (2007), Bhattacharya and Groznik (2008), Leblang (2010), Javorcik et al. (2011), Flisi and Murat (2011), Simone and Manchin (2012), Gheasi et al. (2013), and Cuadros et al. (2016)
[4] See Flisi and Murat (2011), Foad (2012), Gheasi et al. (2013), Tomohara (2017), and Cuadros et al. (2019)

also considered FDI occurring between two home countries of two different migrant groups from the same origin country, where the migrants' origin country was not included in the analysis[5]. Specifically, this study looked at the Chinese migrant networks in 70 different home countries and investigated whether they had an impact on FDI occurring between those home countries. Alternatively to examining bilateral FDI, studies have also abstracted the FDI source or destination countries from the analysis and considered non-bilateral FDI. Among the different types of non-bilateral FDI, the FDI coming into the foreign countries, abstracting the FDI source countries, has been given more attention in the literature[6]. For example, Ivlevs and De Melo (2010) examined the impact of migrants from 102 countries of origin on the FDI coming toward those countries, regardless of where the FDI came from.

Since this study analyzes the US as the migration home and the only FDI source country, the literature in category (1) that studied bilateral outward FDI from the home country to the foreign country is particularly relevant. The following sections will review the literature in this category in more detail, focusing on how these studies have attempted to investigate migrants' impact on FDI.

II.2.a. Migrant network effects and migrants' skill levels

As mentioned above, migrant networks in a home country can aid the bilateral FDI outflow from the home to the foreign country of their origin by reducing the information asymmetry about the foreign country that exists for investors in the home country. In estimating this impact, most studies in the literature have used logged migrant stocks as the explanatory

[5] Tong (2005) seems to be the only paper in the literature to have looked at this FDI direction.
[6] See Docquier and Lodigiani (2010), and Ivlevs and De Melo (2010)

variable of interest[7]. The reason is because migrant stocks capture the cumulative number of people who have ever migrated from a foreign country to the home country at any point in time, and are thus indicative of the total presence of the particular migrant networks analyzed in the home country. Alternatively to the total migrant stock, a specification where the migrant stock was divided by the home country's population was used by Gao (2003). Since Gao studied the impact of Chinese migrant networks in multiple home countries, each of the migrant stocks in the different home countries was scaled by the population of each home country. In general, most studies in the literature found that increases in migrant stocks exert a significant and positive impact on bilateral outward FDI. Interestingly, this result has been consistent among different types of analyses, whether they examined (i) one home country and multiple foreign countries (Bhattacharya and Groznik, 2008; Gheasi et al., 2013), (ii) multiple home countries and one foreign country (Gao, 2003), or (iii) multiple home and foreign countries (Simone and Manchin, 2012; Cuadros et al., 2016).

When assessing migrants' impact on bilateral outward FDI, however, one cannot overlook their skill levels. This is because migrants' skills can dictate their occupations and presence in particular business environments of the home country, thus affecting the amount of meaningful information and connections that migrants are able to provide to potential investors. Several studies have controlled for the skill dimension of migrant networks using different specifications to measure migrants' skills and finding various results. Among the different studies and specifications, only Javorcik et al. (2011) used the share of migrants with a specific level of educational attainment of interest (tertiary) to supplement the migrant stock variable.

[7] See Bhattacharya and Groznik (2008), Javorcik et al. (2011), Simone and Manchin (2012), Gheasi et al. (2013), and Cuadros et al. (2016)

Their study, however, did not find a significant impact of the total stock of migrants, nor the share of highly educated migrants on bilateral outward FDI on an aggregate level. On the other hand, in their estimation looking at US FDI on a sectoral level, both the total stock of migrants and the share of highly educated migrants were found to have significant and positive impacts on the FDI that was related to the sectors in which the migrants were employed. Alternatively, studies have also removed the total migrant stock variable from the estimation equation and replaced it with migrant stocks with different levels of educational attainment (Kugler and Rapoport, 2007; Flisi and Murat, 2011; Javorcik et al., 2011; Gheasi et al., 2013). Among these studies, the ones that included migrant stocks with both higher and lower educational attainment in the estimation found that low-skilled migration could hurt bilateral outward FDI from the UK (Flisi and Murat, 2011; Gheasi et al., 2013) and manufacturing FDI from the US (Kugler and Rapoport, 2007). On the other hand, high-skilled migration was found to enhance FDI from the UK and Spain (Flisi and Murat, 2011; Gheasi et al., 2013), as well as FDI in the manufacturing and service sectors from the US (Kugler and Rapoport, 2007).

Leblang (2010) took a different approach from the above studies, replacing the migrant stock variable with both the share of migrants with tertiary education and the share of migrants employed in a group of industries that included finance, insurance, and real estate. These industries were selected due to the assumption that migrants employed in those industries are able to involve themselves more in the investment process than those who are not. Leblang found that while the impact of highly educated migrants on FDI was not statistically significant, the positive impact of migrants employed in said industries was.

II.2.b. Gravity model specification

All of the aforementioned bilateral studies that examined outward FDI from the home to the foreign country have used a gravity model specification in their analysis. In its simplest form, the gravity model includes only two variables, GDP and distance. This model theorizes that as countries grow in economic size (GDP), they are attracted to trade with each other, but the geographical distance between them weakens this attraction (Frankel, 1997). As mentioned in Tong (2005), due to its success in the trade literature (Anderson, 1979; Deardorff, 1995), the gravity model was quickly adapted into the FDI literature to predict bilateral FDI (Eaton and Tamura, 1994; Morsink, 1998). In the analysis of bilateral FDI, the distance specification is assumed to slow down the speed of information exchange between countries and increase the cost of obtaining information that is crucial for investment. Therefore, geographical distance is expected to have a negative impact on FDI. The GDP specification, on the other hand, is expected to have a positive impact on FDI, because as the two economies grow bigger, bilateral investment activities between them are also expected to increase. This specification can be expressed in various forms: as two separate GDP variables, one for the home and one for the foreign country (in total terms)[8], and/or as the product or difference of the home and foreign countries' total GDP[9], or just as the foreign country's total and/or per capita GDP when the analysis includes one home country and multiple foreign countries[10].

[8] See Simone and Manchin (2012)
[9] See Leblang (2010) and Cuadros et al. (2016)
[10] See Kugler and Rapoport (2007), Javorcik et al. (2011) and Gheasi et al. (2013)

To supplement the standard gravity model, studies have also included other variables to capture the qualitative proximity between the home and foreign countries in their analysis[11]. These variables can be geographical in nature (whether the two countries have a common border, language, or legal origin), demographical (the percentages of population with the same race or religion), or they can be indicative of the similarities in governance and policies (whether the two countries are in a trade agreement or investment treaty). While the GDP specification has been found to be statistically significant with the expected sign by most studies in the bilateral outward FDI category, this consistent significance of the estimation results is less marked for the geographical distance specification and even less so for the supplemental gravity variables.

II.2.c. FDI determinants

In addition to the literature that specifically examines the impact of migration on FDI, there exist a considerable number of empirical studies that focus more generally on identifying the factors that could attract FDI into a country. This broader FDI literature considers various incentives for FDI, whether that be the pursuit of particular resources, assets, markets, efficiency, etc. The studies in this literature, therefore, include in their analysis FDI determinants that are theorized to fundamentally affect FDI flows rather than the standard gravity variables. Some of the more commonly used determinants include the degree of openness to trade of the FDI destination country, its macroeconomic stability, its level of financial development, its infrastructure, its institutional quality, etc. (Chakrabarti, 2001). Trade openness is theorized to have a positive impact on FDI, since it reflects fewer restrictions in trade policies, hence implying larger trading and consumption markets in the FDI destination countries, making them

[11] See Gao (2003) Bhattacharya and Groznik (2008), Leblang (2010), Javorcik et al. (2011), Flisi and Murat (2011), and Cuadros et al. (2016)

more attractive to investors. Macroeconomic stability is also expected to increase the flow of FDI into a country, as a more stable economy often indicates lower risks in potential returns to investors (Chakrabarti, 2001). The levels of financial development and infrastructure of the FDI destination countries capture the efficiency of both their financial markets as well as their input and intermediate good markets, and are thus expected to positively correlate with FDI (Gouidar and Nouira, 2014; Yasmin, Hussain, and Chaudhary, 2003). The institutional quality of the FDI destination countries is also expected to increase FDI inflows, as better institutions imply less uncertainty, higher rates of return, and more productivity growth for the investors (Bénassy-Quéré et al., 2007).

Some of these FDI determinants in the broader FDI literature have also been incorporated in the studies that investigate the impact of migrants on bilateral outward FDI. Within these studies, institutional quality, specifically, is one of the more commonly included FDI determinants. This variable has been measured through an aggregation of indicators developed by Kaufmann et al. (2004; 2009) that constitute multiple dimensions of governance, from voice and accountability, political stability, to regulatory effectiveness and corruption (Javorcik et al., 2011; Flisi and Murat, 2011; Gheasi et al., 2013). Another commonly included FDI determinant is the foreign country's openness to trade, which is measured as the sum of imports and exports as a percentage of GDP (Flisi and Murat, 2011; Bhattacharya and Groznik, 2008). The estimation results of both of these variables are rather inconclusive, where some studies found them to be significant and positive drivers of FDI (Flisi and Murat, 2011; Gheasi et al., 2013) while the others did not (Bhattacharya and Groznik, 2008; Javorcik et al., 2011). Additionally, Bhattacharya and Groznik (2008) and Javorcik et al. (2011) also controlled for macroeconomic

stability, measured in terms of deviations in real exchange rates in the former study and inflation rates in the latter. However, both studies found this control variable to be insignificant in determining bilateral outward FDI. Bhattacharya and Groznik (2008) also controlled for the levels of financial development (domestic credit to private sector as a percentage of GDP, stock market size, stock trading volume, etc.) and infrastructure (air freight, roads freight, telephone lines, etc.) in the foreign countries, which on average were found to have a significant and positive impact on FDI.

II.2.d. The US Focus

Among the studies examining the impact of migrants on bilateral outward FDI, three studies specifically analyzed the impact of migrant networks in the US on bilateral US FDI toward the migrants' origin countries (Kugler and Rapoport, 2007; Bhattacharya and Groznik, 2008; Javorcik et al., 2011). In order to obtain the stocks of migrants in the US, all three of these studies used decennial census data from the US Census Bureau, which included information about the respondents' birthplaces. Consequently, these analyses were constrained to cross-sectional regressions or limited panel regressions covering the starting years of the decades in which the censuses were produced.

Out of the studies mentioned above, Kugler and Rapoport estimated a cross-sectional model for the year 2000, using GDP as a gravity specification and focusing on how migrants with different levels of educational attainment (as opposed to the total migrant stock) impact FDI. In addition to examining the migrant network effects on total FDI, they also investigated whether these migrant network effects would hold for FDI going to the manufacturing and services industries of the origin country in two separate estimations.

Bhattacharya and Groznik extended this study by including an extensive set of FDI determinant variables in their cross-sectional estimations for 1970, 1980, 1990, and 2000. While also using a gravity model, they focused on the effect of the total stock of migrants on total FDI instead of the effect of their education levels like in Kugler and Rapoport. In addition, Bhattacharya and Groznik ran a panel regression spanning the 4 years given above, where the time-invariant gravity specifications that were included in the cross-section were removed.

Javorcik et al., on the other hand, estimated a total of three models to examine the impacts of (i) only the total migrant stock, (ii) only the stock of highly educated migrants, and (iii) both the total stock and share of highly educated migrants on total FDI. They included both time-variant and time-invariant gravity specifications in their panel regressions, and repeated these estimations for only FDI that was related to the sectors where the migrants were employed. Compared to Bhattacharya and Groznik, their panel analysis only spanned 2 years (1990 and 2000), and only the origin country's institutional quality, and macroeconomic and political stability were included as FDI determinants.

The findings of these studies varied due to the different specifications. A positive and significant impact of highly educated migrants on total FDI was found in both Kugler and Rapoport and Javorcik et al. A positive impact of the total stock of migrants on total FDI, on the other hand, was found to be significant only in Bhattacharya and Groznik. Moreover, all of the FDI determinants were found to be insignificant in Javorcik et al., while financial development and infrastructure were positive and significant FDI determinants in Bhattacharya and Groznik but openness was negative and significant.

This study extends the three papers mentioned above in two ways. Firstly, instead of using the decennial census data, the migration data in this study are obtained from the American Community Survey (ACS) database which are available annually through the Integrated Public Use Microdata Series for the US (IPUMS USA) from 2000-2017. Secondly, this study controls for both the total stock of migrants and their educational attainment, while also incorporating several FDI determinants into the gravity model specification, instead of focusing more on one aspect over the other. The specific empirical model of this study as well as the description of the data are discussed in the next section.

III. Empirical Model and Data

III.1. Econometric framework

As stated previously, this study investigates whether migrant networks in the US can impact FDI coming from the US (home country) to the migrants' origin (foreign) countries. To analyze this relationship, a panel regression covering the years from 2000-2017 is run using pooled Ordinary Least Squares (OLS) estimation, where gravity and FDI determinant variables are both included to control for certain characteristics of the foreign countries. The regression specification is as follows:

$$\begin{aligned} ln\,FDI_{f,t} = {} & \alpha + \beta_1 ln\,Migrants_{f,t-1} + \beta_2 ln\,Educated\,Migrants_{f,t-1} + \beta_3 ln\,GDP\,per\,capita_{f,t-1} \\ & + \beta_4 ln\,Distance_f + \beta_5\,Common\,Language_f + \beta_6 ln\,Trade_{f,t-1} \\ & + \beta_7 ln\,Private\,Credit_{f,t-1} + \beta_8\,Business\,Freedom_{f,t-1} + \beta_9 ln\,School\,Enrollment_{f,t-1} \\ & + \lambda_t + \varepsilon_{f,t} \end{aligned} \quad (1)$$

where subscript *f* denotes the foreign country, λ_t denotes the time-fixed-effect specification, and $\varepsilon_{f,t}$ is the error term. Following standard practices in the existing literature[12], all variables enter the equation in natural logarithm form, except for *Business Freedom* and *Common Language*, which are an index and dummy variable, respectively. In addition, to help address reverse causality, all time-variant dependent variables are lagged by one year following Cuadros et al. (2019). While Cuadros et al. lagged their time-variant independent variables by 3 years, this study does so by only one year to minimize the loss of observations[13]. Therefore, the first available (base) year in the 2000-2017 sample is 2001, as indicated in the equation. Table 1 at the end of this paper provides a summary of the variable descriptions and expected signs, which are discussed in detail in the following paragraphs.

For the dependent variable in the equation, *FDI*, this study follows the work of Gao (2003), Tong (2005), Leblang (2010), Flisi and Murat (2011), Simone and Manchin (2012), and Gheasi et al. (2013) and uses the cumulative stock of FDI. The data for this variable are retrieved in annual frequency from the Bureau of Economic Analysis (BEA), which records the stock (also referred to as the position) of US FDI abroad. This data set measures the US investors' equity in, and net outstanding loans to, the foreign affiliates in the foreign countries on a historical-cost basis from 1989 to 2017.

FDI on a historical cost basis provides the total cost of the direct investments at the price levels at which each of the investments was made, as opposed to a market-value basis which

[12] See Tong (2005), Docquier and Lodigiani (2010), Ivlevs and De Melo (2010), Leblang (2010), Javorcik et al. (2011), Simone and Manchin (2012), Gheasi et al. (2013), and Cuadros et al. (2016)

[13] Cuadros et al. (2019) lagged their independent variables following the studies on the trade-creation effect of migration by Bratti et al. (2014) and Peri and Requena-Silvente (2010). While Cuadros et al. did so by 3 years, the former referenced study actually lagged the independent variables by one year and the latter did so by one or two years depending on the country.

revalues the equity portion of the direct investments at the time it is reported using prevalent stock market indexes[14] (Borga and Howell, 2014). When compared to the market value, the historical cost has the advantage of portraying the amount of investment that US investors actually report on their financial statements. The historical cost also tends to be less volatile over time, since it is not as directly influenced by the stock market as the market value (Punatar and Yook, 2014). There is, however, one limitation to using this FDI stock. Since the positions provided by the BEA also include net outstanding loans from US investors to their foreign affiliates, negative FDI positions can appear when the net outstanding loans are negative and have exceeded the US investors' equity in the affiliates. In other words, this happens when the loans from the foreign affiliates to the US investors are larger than the loans and equity capital given by the investors to the affiliates (BEA; OECD). Since the dependent variable enters the equation in log form, the 10 observations with negative values are excluded from the estimation.

In other to estimate the migrant network effects on bilateral outward FDI from the US, this study considers both the number of migrants from the foreign countries in the US and their educational attainment - *Migrants* and *Educated Migrants*, respectively. As for *Migrants*, this study follows Gao (2003) and divides the total migrant stock from each foreign country by the US population. Scaling the size of the different migrant stocks by the US population is necessary since this population varies over time. As for migrants' educational attainment, this study adds the share of migrants from the foreign country in the US with at least tertiary education to the equation (*Educated Migrants*). Adding this variable, as opposed to substituting the stock variable

[14] The BEA used to provide the current-cost basis for the positions/stocks of US FDI abroad but has discontinued the publication of this data set since 2014 (Borga and Howell, 2014).

with it, allows for the comparison between the impact of migrants within this group and that of the total stock of migrants, and is in line with Javorcik et al. (2011).

The data for both of the migrant network effect variables are derived from the annual American Community Survey (ACS) data sets, which are available from 2000-2017 through the Integrated Public Use Microdata Series for the US (IPUMS USA). The ACS data records individual-level responses from each year's respondent sample of the US population and provides information regarding various characteristics of the respondents including their age and demographics, birthplace, educational attainment, occupation, etc. It then attaches a "person weight" to each of the respondents to reflect the estimated number of people in the US that each respondent represents. As the purpose of this study is to examine migrant networks in the US, individual-level data for the foreign-born population aged 25-64 in the US is collected on a yearly basis, grouped by birthplace, and multiplied by each respondent's person weight to obtain the stock of migrants in that age group for each year. The assumption is that adult working-aged migrants (25-64) will have more of an impact on FDI due to their presence in the labor force and business environments.

As for the migrants' educational attainment, individual data on each of the respondents' education level is used to calculate the share of migrants aged 25-64 that have completed tertiary education. The ACS data set provides 16 different levels of educational attainment, ranging from no schooling completed, partial or complete primary schooling attained, partial or complete secondary schooling attained, as well as partial or complete tertiary schooling and post-graduate education attained. Although the duration of each educational level varies depending on the location where the migrants receive their education, this paper follows the International Standard

Classification of Education (ISCED) developed by the UNESCO to include the educational levels that are equivalent to having earned either an Associate's degree, a Bachelor's degree, a professional degree beyond a Bachelor's degree, a Master's degree, or a Doctoral degree[15]. The signs of both the *Migrants* and *Educated Migrants*' coefficients are expected to be positive assuming that migrant network effects exist for bilateral outward FDI.

A limitation of the ACS data on foreign-born population is that it includes people born outside of the US who are US nationals. However, it is common practice in the literature to treat the foreign-born population as migrant stocks, even though it may include home-country nationals who are born abroad[16]. Another limitation of the ACS data is that for the years prior to 2006, the data set does not provide information regarding people living in group quarters, including institutional group quarters (correctional facilities for adults, nursing homes, and hospice facilities) and noninstitutional group quarters (college/university student housing, military quarters, and group homes). This is a minor caveat and is expected to not have much impact on the estimation results, however, since the group quarter population in the US is rather small (2.6% of the total population based on the 2010 US Census). Furthermore, migrants living in group quarters can be reasonably expected to not have much of an impact on FDI due to their absence from business environments. Therefore, the limitations of the ACS data certainly do not outweigh its advantages in terms of providing rich and detailed information on migrant networks in the US (US Census Bureau; IPUMS USA).

[15] The UNESCO classifications for the equivalent levels of educational attainment include ISCED 5: Short-cycle tertiary education, ISCED 6: Bachelor's degree or equivalent tertiary education level, ISCED 7: Master's degree or equivalent tertiary education level, and ISCED 8: Doctoral degree or equivalent tertiary education level (2011).
[16] See Kugler and Rapoport (2007), Javorcik et al. (2011), Gheasi et al. (2013), and Cuadros et al. (2016)

Following the gravity model, this regression also includes variables such as *GDP per capita*, *Distance*, and *Common Language* to control for the economic mass of the foreign country, the speed of information movement between the home and foreign country, as well as communication barriers between the two, respectively. Since the US is the only home country in the analysis, this study captures the GDP variable using the GDP per capita of the foreign country, which is in line with Javorcik et al. (2011) and Gheasi et al. (2013). As the estimation involves a sample of 18 years, data on annual GDP per capita of the foreign countries are obtained from the World Bank in constant 2010 US dollars. This variable is expected to have a positive coefficient, as foreign countries with bigger market sizes are expected to attract more FDI from the US. The *Distance* variable, on the other hand, is measured by the distance between the most populous city in the foreign country and the most populous city in the US, which is in line with Leblang (2010) and Gheasi et al. (2013). These data are obtained from the CEPII database[17], where the distances are measured in kilometers and calculated using the great circle formula to capture the shortest distance between two points on a sphere. Since larger distances between countries lower the speed of information movement and increase the cost of obtaining information for both the home and foreign countries, the *Distance* variable is expected to have a negative coefficient. For *Common Language*, this study follows Leblang (2010) and Cuadros et al. (2016) and obtains data also from the CEPII on common official language. This variable is coded with a "1" if the foreign country has English as an official language, and a "0" if it does not. Since having the same official language can facilitate more efficient communication between the two countries, the coefficient for *Common Language* is expected to be positive.

[17] CEPII stands for "Centre d'Études Prospectives et d'Informations Internationales", which can be roughly translated to "The Center for Prospective Studies and International Information".

To control for factors in the foreign countries that are theorized to fundamentally affect FDI, this study also includes several FDI determinant variables in the estimation equation: *Trade*, *Private Credit*, *Business Freedom* and *School Enrollment*. As discussed in the literature review section, *Trade* measures the foreign country's openness to trade, and is calculated as exports plus imports as a percentage of the foreign country's GDP. *Private Credit* measures the level of financial development of the foreign economy, and is calculated as the amount of domestic credit going to the private sector as a percentage of the foreign country's GDP. *School enrollment* is used as a proxy for human capital in the foreign country, and is measured as the number of people enrolled in secondary education as a percentage of the population in the age group that officially corresponds to secondary education in the foreign country. There are limitations in using this measure, however, due to the existing gaps in the data, as well as the fact that this is not the best measure for human capital levels. Nevertheless, *School Enrollment* is included in the estimation since the data for this variable actually have more available observations over the 2000-2017 period when compared to other preferred measures, such as tertiary educational attainment and labor participation rates (Barro-Lee; World Bank). The data for the above mentioned FDI determinant variables are obtained from the World Bank, and are available annually from 2000-2017. The last FDI determinant variable that is included in the analysis, *Business Freedom,* captures the regulatory efficiency of the business environment in the foreign country. Obtained from the Heritage Foundation in annual frequency, this index ranges from 0-100, where bigger values reflect more preferable conditions. Overall, since all of these FDI determinant variables are expected to attract US FDI into the foreign country, their

coefficients are expected to be positive. The next section will analyze the data set in more detail and provide descriptive statistics.

III.2. Data summary

The panel data set for this study covers 18 years from 2000-2017 and 86 foreign countries, all of which have at least 5 years of data. Table 2 at the end of this paper provides a summary of how the countries are distributed in terms of geographical regions and income groups according to the World Bank's classifications[18]. Since the income classification of each country can change over time, the countries are classified based on the income groups they belonged to for the majority of the 18 years in the sample. Please note that two countries (Croatia and Hungary) from the total data set are excluded from Table 2, since these countries' income groups were split evenly between middle-income and high-income over the 18 years.

Out of the 11 countries in the East Asia and Pacific region, there are 3 Oceania countries: Fiji, Samoa, and New Zealand. The former two countries are classified as middle-income, while the last is a high-income country. Additionally, Canada is included in the Latin America, North America, and the Caribbean country group. Overall, the countries in the sample are more concentrated towards the middle-income group. Moreover, while most countries in the high-income group are located in Europe, about half of the countries in the middle-income group are Latin American and Caribbean countries. A detailed list of all the countries included in the sample is provided in Table A1 in the Appendix.

[18] In 2000, the GNI per capita ranges (in USD) for the income groups included in the classification were as follows: Low-income: ≤ 755, Middle-income: 756-9,265, and High-income: > 9,265. In 2017, the income ranges were: Low-income: ≤ 995, Middle-income: 996-12,055, and High-income: > 12,055.

It is important to note that, due to missing data, the panel data set is not balanced for the 18 years and 86 countries of the sample. As aforementioned, *School Enrollment* is the variable with the most missing observations. Out of the total number of observations in the sample, there are 71 countries that have at least 10 observations (years of data) each, while the remaining 15 countries each have 5 to 9 observations.

The stock of US FDI in each foreign country from 2000-2017 averages around USD 29.4 billion. Greece has the smallest FDI stock from the US with negative USD 584 million in 2013. As previously mentioned, the negative FDI stock indicates that US investors' equity in and loans to Greek affiliates are smaller than the loans from the Greek affiliates to the US investors. This negative value, as well as the other 9 negative observations, are however not included in the regression, since the dependent variable *FDI* is logged. The maximum US FDI stock, on the other hand, belongs to the Netherlands at USD 936.7 billion in 2017. Moreover, the stocks of US FDI in the Netherlands as well as in the UK remain high during the whole sample period, which is expected given the magnitude of these economies' market size in terms of GDP per capita.

When considering the stock of migrants as a percentage of the US population, Mexico has the highest percentages for all 18 years in the sample, peaking at 2.93% in 2014. Mexico's percentages also trend upwards during the 18 years with slight dips around 2003-04, 2007-08, and 2016-17. Mexico is followed by India, Philippines, El Salvador and China. While the percentages for Mexico stay above 2% during the entire sample period, the other 4 countries' percentages range only between 0.3-0.7%.

Interestingly, though Mexico has the largest percentage of migrants in the US over the 18 years, it is one of the countries with low values for its migrants' tertiary educational attainment.

Compared to the average of 49.1% for the entire sample, Mexico's shares of adult working-aged migrants that have attained a higher level of education range between 6.9-10.5% during the entire period, although they have increased over time. The maximum percentage, on the other hand, belongs to Saudi Arabia in 2000 at 88.96%. This data point, however, is based on the weights applied to only 6 respondents, 5 of whom had tertiary education. India is actually the country that consistently has high percentages of migrants with tertiary educational attainment, ranging from 75-85%, with an ever-increasing respondent sample of about 1,000-17,000 adult working-aged migrants over the entire period.

In regard to the FDI determinants, Hong Kong has the highest value of imports and exports as a percentage of total GDP, ranging between 241-443% during the 18 years. It also has values of 100 for *Business Freedom*, along with Denmark and the Bahamas. On the other hand, the mean value of *Common Language* indicates that 25.6% of the countries in the sample have English as an official language. The descriptive statistics for each variable are provided in Table 3 at the end of this paper, while the estimation results based on this data set will be discussed in the next section.

IV. Results

Graphs 1 and 2 at the end of this paper provide the scatter plots of the migrant network effect variables, *Migrants* and *Educated Migrants*, against *FDI*, all of which are in logarithmic form, along with the correlation coefficients. The fitted trend line with a 95% confidence interval in both graphs seems to be upward-sloping, suggesting a positive symmetrical relationship between migrant stocks in the US, as well as the shares of highly educated migrants, and US FDI to the migrants' origin countries. Moreover, the Pearson correlation coefficients for both the

Migrants and *Educated Migrants* variables (0.425 and 0.221, respectively) are positive at a 1% significance level, suggesting co-movements between US FDI and the size of the migrant networks in the US, as well as US FDI and the shares of highly educated migrants. This expected relationship is further confirmed through an OLS estimation, whose results are reported in Column 1 of Table 4 at the end of the paper, with FDI regressed only on the migrant network effect variables. The coefficients for both *Migrants* and *Educated Migrants*, which are positive at a 1% significance level, indicate that both the migrant stocks and the shares of highly educated migrants in the US positively impact US FDI toward the migrants' origin countries.

However, as aforementioned, there exist many macroeconomic variables that can affect FDI flows into a country. The estimation model presented in Equation (1) takes into account those variables by controlling for several characteristics of the foreign/origin country that could attract US FDI into that country, as well as for the physical and qualitative proximity between that country and the US. The estimation results of this second model are reported in Column 2 of Table 4 at the end of the paper. Given the panel structure of the data set, this study also estimated a third model using the same set of variables but correcting for nonstationarity in the data series. Since the panel data set is unbalanced, the Im-Pesaran-Shin test was used to check for panel unit roots. The test results, reported in Table A2 in the Appendix, indicate that all variables do not have a unit root in logarithmic form except for *GDP per capita*, *Business Freedom*, and *School Enrollment*, which are however found to be stationary in first order differences. Therefore, all variables enter this third regression as logarithms except for those three variables, which are first-differenced. The results of the third model are reported in Column 3 of Table 4 at the end of this paper.

As seen in the results, both the *Migrants* and *Educated Migrants* variables are found to have statistically significant and positive coefficients in both Models (2) and (3). Whether correcting for nonstationarity or not, a 1% growth in the previous year's stock of adult working-aged migrants from a foreign country in the US increases the current year's stock of US FDI in that foreign country by 1.145%, which translates to a current-year increase of about 337 million dollars on average in the FDI stock toward the foreign country. This impact, however, is still not as strong as the significant and positive effect that the share of highly educated migrants in the same migrant stock has on US FDI toward that foreign country, which is even stronger when the model takes into account panel unit roots. In fact, the coefficient for the *Educated Migrants* variable in this third model is significantly greater than 1 at a 99% confidence level, indicating that US FDI responds elastically to increases in the shares of highly educated migrants in the US. For Model (2) instead, both coefficients for the migrant network effect variables are significantly greater than 1, but only at a 90% confidence level[19]. These results indicate that the migrant networks in the US indeed have a positive impact on bilateral US FDI stocks, but the responsiveness of US FDI to the changes in the migrant network effect variables is stronger and more elastic for highly educated migrants. Although in line with the majority of the bilateral outward FDI literature, these findings differ from those of Javorcik et al. (2011), which was the only study that also controlled for both the migrant stock and their educational attainment levels. Interestingly, their results did not find either variable to have a significant impact on aggregate FDI (although the opposite was true for sectoral FDI) in the specification that controls for both.

[19] The p-values for these t-tests are provided in Table A3 in the Appendix.

As for the gravity variables, the coefficient of *GDP per capita* has the expected sign when considering the second model, indicating that a 1% growth in last year's per capita income of a foreign country creates a 1.865% (or on average, a 548.9-million-dollar) increase in the current stock of US FDI in that country. When the variable is first-differenced following the panel unit root test, however, the coefficient becomes negative, capturing the adverse impact of the previous year's increase in GDP per capita growth rate (or the acceleration of GDP per capita) of the foreign country on the current stock of US FDI in that country. *Distance*, on the other hand, is only statistically significant in the third model that takes into account panel unit roots. The coefficient of this variable implies that when a foreign country is 1% further away from the US in terms of geographical distance, the stock of US FDI in that country is lowered by 1.178% (or about 346.7 million dollars, on average). Interestingly, whether a foreign country has English as an official language does not have a significant impact on that country's US FDI stock in both models. These results are largely consistent with the existing literature, where the GDP per capita variable always has a significant and positive coefficient when it is in logarithmic form (Bhattacharya & Groznik, 2008; Javorcik et al., 2011); while on the other hand, the significance and signs of the geographical distance and common language variables are not consistent across the literature. The significant and positive impact of GDP per capita on FDI, moreover, is also evident in the broader FDI determinant literature, where this variable is a proxy for the market size of the FDI destination country (Chakrabarti, 2001).

In the second model, the only significant FDI determinant variable is *School Enrollment* but with a negative sign. This unexpected result, however, is no longer there in the third model that takes into account panel unit roots, as that variable now becomes insignificant after it is

first-differenced. It is also worthwhile to note that although *Private Credit* is not a significant variable in the second model, the third model's results indicate otherwise. Specifically, a 1% growth in the domestic credit going to the foreign country's private sector as a percentage of the country's GDP in the previous year increases the current stock of US FDI in that country by 1.399% (or about 411.8 million dollars, on average). *Trade* and *Business Freedom*, on the other hand, are not significant in both models. Overall, these results are in line with the broader FDI determinant literature, where the trade openness, financial development, human capital, and institutional quality variables are included as standard FDI determinants but their significance and signs are inconclusive (Chakrabarti, 2001; Gouidar & Nouira, 2014; Githaiga et al., 2015; Al-Sadig, 2009; Noorbakhsh et al., 2001; Gemmell, 1996).

In summary, the migrant network effects are found to be significant, positive, and stronger for highly educated migrants, whether the model corrects for nonstationarity in the data series or not. When correcting for nonstationarity, US FDI toward the foreign country is found to be negatively impacted by both the acceleration in the country's GDP per capita and the geographical distance between the two. The foreign country's domestic credit to the private sector, on the other hand, seems to be significant in attracting FDI in this model. As for the second model that does not correct for unit roots, only one variable in each of the gravity and FDI determinant categories is found to be significant: the per capita income, and secondary school enrollment in the foreign country. While the former variable is significant in attracting FDI, as expected, the latter seems to decrease FDI toward the foreign country.

The unexpected sign of the *School Enrollment* variable, which is used as a measure of the human capital level in the foreign country, could be attributed to the following reasons. First of

all, as previously stated, secondary school enrollment is not the best proxy for human capital. Secondly, the group of countries considered in this study are diverse in many aspects, which could affect the estimation results. While it is not straightforward to address the first issue due to data limitations, the second issue could be investigated further by splitting the country sample into different income groups: low, middle, and high. By estimating Equation (1) separately for each group, the assumption is that each of the different income groups has its unique characteristics that could affect FDI inflows which are not controlled for in the set of independent variables. The results of these estimations are presented in Table 5 at the end of this paper, where all variables enter the regression in logarithmic form. These regressions are also run having corrected for nonstationarity as a robustness check, and at least one of the two migrant network effect variables is found to be significant and positive for each income group. The results where nonstationarity has been addressed are reported in Table A4 in the Appendix.

When considering the regression results for the 29 high-income countries, which are reported in Column 3 of Table 5, it can be seen that the coefficients for the migrant network effect variables still hold their significance and signs, as compared to the full-sample results reported in Column 2 of Table 4[20]. The magnitude of the *Migrants* and the *Educated Migrants* variables have decreased but minimally (from 1.145 to 1.013, and 1.420 to 1.240, respectively). *GDP per capita*, however, seems to have a slightly stronger impact on US FDI coming to the high-income foreign countries than to all countries in the sample. Specifically, a 1% growth in the GDP per capita of the foreign country in the previous year increases the high-income foreign country's current US FDI stock by 2.223%, instead of 1.865%.

[20] Since the low-income group only has 6 countries, the estimation results for these countries are not discussed as those results are obtained from such a small number of observations.

Interestingly, the coefficient for the *School Enrollment* variable in the high-income estimation is now positive while still holding its significance, as compared to the full-sample results. This variable's coefficient indicates that secondary school enrollment in high-income foreign countries is an important factor in attracting US FDI at the 5% significance level. Additionally, the degree of trade openness of the foreign country now becomes a significant variable at the 90% confidence level, where a 1% increase in last year's exports plus imports as a percentage of GDP in the foreign country makes the current US FDI stock in that country increase by 0.628%.

When considering the estimation results of the middle-income group, which are reported in Column 2 of Table 5 and cover 49 out of 86 countries in the full sample, the impact of the *Migrants* variable on US FDI in the foreign country is still significant and positive, as found in both the full-sample and high-income countries' estimation results. On the other hand, although the coefficient for the *Educated Migrants* variable is still significant and has the same sign, it is smaller in magnitude compared to that of the full sample and the high-income countries ($0.981 < 1.420$ and 1.240). Another coefficient that has not changed in regard to its significance and sign from the full-sample and high-income countries' estimations is that of *GDP per capita*. In this case, similarly to the high-income countries, the foreign country's GDP per capita becomes slightly more important in attracting US FDI when considering just the middle-income group, as compared to the full country sample. Instead, the coefficient of *School Enrollment* for the middle-income group still holds its significance but is negative, as found in the full-sample estimation. The absolute magnitude of the coefficient, however, has increased, indicating that the

negative impact of secondary school enrollment in the foreign country on the US FDI stock toward that country is slightly more prominent for the middle-income group.

Overall, the estimation results for both the full country sample and the different income groups suggest a positive and significant migrant network effect on bilateral outward FDI from the US. The results also indicate that among the gravity specifications, only GDP per capita (in logarithmic form) is a consistently significant variable across all models, exerting a strong positive impact on US FDI toward the foreign countries. Splitting the countries into different income groups, however, reveals that among the FDI determinant variables, trade openness and secondary school enrollment increase US FDI toward high-income foreign countries, which is not the case for the full-sample and middle-income estimations. As for the middle-income countries, the FDI determinants were either insignificant (*Private Credit* and *Business Freedom*) or significant but had unexpected signs (*Trade* and *School Enrollment*). Given the large number of middle-income countries among the full sample of countries, it can be reasonably concluded that the middle-income countries are what drive the unexpected sign for the *School Enrollment* variable in the full-sample estimation.

V. Conclusion

This study asks whether migrant networks in the US can impact bilateral outward FDI from the US to the migrants' origin countries. To investigate this impact, the study utilizes a panel data set in annual frequency covering 18 years from 2000-2017 for 86 countries. This data set is used in a gravity model estimation that controls for both the stock of migrants and their educational attainment, as well as several FDI determinants. The estimation results indicate that there exists a statistically significant and positive migrant network effect on US FDI toward the

migrants' origin countries. These findings confirm the results found in the literature, even though the study covers a longer time span and includes both gravity and FDI determinant variables, as compared to the existing studies. Moreover, the significant and positive impact of migration on US FDI is stronger for migrants with at least tertiary educational attainment, which holds even when the countries in the sample are split into different income groups. As a result, these findings imply that countries may receive more investments from the US by utilizing and/or strengthening their respective migrant networks in the US, especially for countries with a larger share of highly educated migrants.

This study also confirms that the levels of GDP per capita of the foreign countries play a crucial role in attracting US FDI. As for the FDI determinants, the results are as expected in regard to the high-income foreign countries, where their human capital levels and openness to trade attract more FDI from the US. The results of the FDI determinants for the middle-income countries, on the other hand, are not as expected. This could be attributed to the inaccuracy of secondary school enrollment as a measure for human capital levels in these countries, or to the issue of omitted variables. Therefore, it may be of interest for future research to identify a better proxy for human capital and to investigate whether there are particular characteristics that are specific to middle-income countries that could influence their FDI inflows.

Given the more elastic responsiveness of FDI to changes in the shares of highly educated migrants that is found in this paper, another potential avenue for future research is to consider different aspects of migrants in the US, besides their educational attainment, which could impact their ability to mitigate information asymmetries. Given the richness of the ACS data which includes information on a number of different attributes of the migrant population, in addition to

their age, birthplace, and skill level, it is possible to investigate whether there are other characteristics that could affect migrants' ability to acquire and provide meaningful information and connections to potential US investors. For instance, migrants' educational levels should drive their occupational choices and their presence in particular business environments in the US, but it is likely that migrants are unable to find employment in areas that accurately reflect their educational attainment. Additionally, the amount of time that migrants have spent living in the US could impact their ability to form relationships that are meaningful to US investors. Due to time constraints, this study unfortunately only controlled for the age and skill level of migrants, but it would be of interest for future research to investigate whether other migrant attributes could influence the migrant network effects on outward US FDI.

References

Al-Sadig, A. (2009). The effects of corruption on FDI Inflows. Cato Journal, 29, 267-294.

Anderson, J. E. (1979). A Theoretical Foundation for the Gravity Equation. The American Economic Review, 69, 106–16.

Barro, R., & Lee, J. W. (2013). A New Data Set of Educational Attainment in the World, 1950-2010. Journal of Development Economics, 104, 184-198.

Bénassy‐Quéré, A., Coupet, M., & Mayer, T. (2007). Institutional determinants of foreign direct investment. The World Economy, 30(5), 764-782.

Bertoli, S., & Marchetta, F. (2014). Migration, Remittances and Poverty in Ecuador. The Journal of Development Studies, 50 (8), 1067-1089.

Bhattacharya, U., & Groznik, P. (2008). Melting pot or salad bowl: some evidence from US investment abroad. Journal of Finance and Marketing, 11 (3), 228–258.

Borga, M., & Howell, K. (2014). The Comprehensive Restructuring of the International Economic Accounts: Changes in Definitions, Classifications, and Presentations. Survey of Current Business, 94, 1-19. Retrieved from: http://bea.gov/scb/pdf/2014/03%20March/0314_restructuring_the_international_economic_accounts.pdf.

Bove, V., & Elia, L. (2017). Migration, Diversity, and Economic Growth. World Development, 89, 227-239.

Bratti, M., De Benedictis, L., & Santoni, G. (2014). On the pro-trade effects of immigrants. Review of World Economics, 150(3), 557–594.

Bureau of Economic Analysis (2018). U.S. Direct Investment Abroad: Balance of Payments and Direct Investment Position Data [Data file]. Retrieved from: https://www.bea.gov/international/di1usdbal.

Chakrabarti, A. (2001). The determinants of foreign direct investments: Sensitivity analyses of cross‐country regressions. Kyklos, 54(1), 89-114.

Cuadros, A., Martín-Montaner, J., & Paniagua, J. (2016). Homeward bound FDI: Are migrants a bridge over troubled finance? Economic Modelling, (58), 454–465.

Cuadros, A., Martín-Montaner, J., & Paniagua, J. (2019). Migration and FDI: The role of job skills. International Review of Economics and Finance, 59, 318–332.

Deardorff, A. V. (1995). Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World. NBER Working Paper No. 5377, 1-28.

Docquier, H., & Rapoport, F. (2012). Globalization, Brain Drain, and Development. Journal of Economic Literature, 50(3), 681–730.

Eaton, J., & Tamura, A. (1994). Bilateralism and Regionalism in Japanese and US Trade and Direct Foreign Investment Patterns. Journal of the Japanese and International Economies, 8, 478–510.

Flisi, S., & Murat, M. (2011). The hub continent. Immigrant networks, emigrant diasporas and FDI. The Journal of Socio-economics, 40(6), 796–805.

Frankel, J. A. (1997). Regional Trading Blocs in the World Economic System (1-243). Washington, DC: Institute for International Economics .

Gao, T. (2003). Ethnic Chinese networks and international investment: evidence from inward FDI in China. Journal of Asian Economics, 14, 611–629.

Gemmell, N. (1996). Evaluating the impacts of human capital stocks and accumulation on economic growth: some new evidence†. Oxford bulletin of economics and statistics, 58(1), 9-28.

Gheasi, M., Nijkamp, P., & Rietveld, P. (2013). Migration and foreign direct investment: Education matters. The Annals of Regional Science, 51(1), 73–87.

Githaiga, P., Nyauncho, J., & Karibu, C. G. (2015). Foreign Direct Investments and Economic Growth: The Primary Drivers. Asian Journal of Finance & Accounting, 7(2), 93-106.

Gordon, R., & Bovenberg, L. (1996). Why is capital so mobile internationally? Possible explanations and implications for capital income taxation. American Economic Review, 86 (5), 1057–1075.

Gouidar, A., & Nouira, R. (2014). The Impact of Misalignment on FDI in the Developing Countries. International Journal of Economics and Financial Issues, 4(4), 784-800.

Greif, A. (1993). Contract Enforceability and Economic Institutions in Early Trade: the Maghribi Traders' Coalition. American Economic Review, 83, 525–48.

Ivlevs, A., & De Melo, J. (2010). FDI, the brain drain and trade: Channels and evidence (pp. 103–121). Annals of Economics and Statistics/Annales d' Économie et de Statistique.

Jackson, J. K. (2017). U.S. Direct Investment Abroad: Trends and Current Issues. Congressional Research Service, 1-15.

Javorcik, B., Ozden, C., Spatareanu, M., Neagu, C. (2011). Migrant networks and foreign direct investment. Journal of Development Economics, 94, 231–241.

Kugler, M., & Rapoport, H. (2007). International labor and capital flows: complements or substitutes? Economics Letters 92 (2), 155–162.

Leblang, D. (2010). Familiarity Breeds Investment: Diaspora Networks and International Investment. American Political Science Review, 104 (3), 585-600.

Lipsey, R. E., Feenstra, R. C., Hahn, C. H., & Hatsopoulos, G. N. (1999). The role of foreign direct investment in international capital flows. In International capital flows (pp. 307-362). Chicago: University of Chicago Press.

Makki, S.S., & Somwaru, A. (2004). Impact of Foreign Direct Investment and Trade on Economic Growth: Evidence from Developing Countries. American Journal of Agricultural Economics, 86 (3), 795-801.

McKinsey Global Institute (2016, September). People on The Move: Global Migration's Impact and Opportunity. Retrieved from https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Employment%20and%20Growth/Global%20migrations%20impact%20and%20opportunity/MGI-People-on-the-Move-Executive-summary-December-2016.ashx

Morsink, R.L.A. (1998). Foreign Direct Investment and Corporate Networking: A Framework for Spatial Analysis of Investment Conditions (New Horizons in Environmental Economics) (1-257). Edward Elgar Publishing.

Noorbakhsh, F., Paloni, A., & Youssef, A. (2001). Human capital and FDI inflows to developing countries: New empirical evidence. World development, 29(9), 1593-1610.

Peri, G., & Requena-Silvente, F. (2010). The trade creation effect of immigrants: Evidence from the remarkable case of Spain. Canadian Journal of Economics/Revue Canadienne d'Éeconomique, 43(4), 1433–1459.

Portes, R & Rey, H. (2005). The determinants of cross-border equity flows. Journal of International Economics, 65 (2), 269–296.

Rapoport, H. (2016). Migration and Globalization: What's in it for Developing Countries? IZA Discussion Papers No. 10109 (1-24). Institute for the Study of Labor (IZA)

Rauch, J.E., & Casella, A. (2003). Overcoming Informational Barriers to International Resource Allocation: Prices and Ties. The Economic Journal, 113 (484), 21-42.

Simone, G. D., & Manchin, M. (2012). Outward Migration and Inward FDI: Factor Mobility between Eastern and Western Europe. Review of International Economics, 20 (3), 600–615

Taylor, J.E., Adams, R., Mora, J., & López-Feldman, A. (2005). Remittances, Inequality and Poverty: Evidence from Rural Mexico. eScholarship, University of California. Retrieved from: https://escholarship.org/uc/item/9s14452d

The Center for Prospective Studies and International Information/Centre d'Études Prospectives et d'Informations Internationales (2018). Gravity CEPII [Data file]. Retrieved from: http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=8

The Heritage Foundation (2018). Index of Economic Freedom [Data file]. Retrieved from: https://www.heritage.org/index/explore

The Integrated Public Use Microdata Series USA (2018). American Community Surveys [Data file]. Retrieved from: https://usa.ipums.org/usa/

The United Nations Educational, Scientific and Cultural Organization (2018). International Standard Classification of Education (ISCED) [Data file]. Retrieved from: http://uis.unesco.org/en/topic/international-standard-classification-education-isced

The World Bank (2017). World Bank Development Indicators [Data file]. Retrieved from: https://data.worldbank.org/data-catalog/world-development-indicators

Tomohara, A. (2017). Does immigration crowd out foreign direct investment inflows? Tradeoff between contemporaneous FDI-immigration substitution and ethnic network externalities. Economic Modelling, 64, 40–47.

Tong, S. Y. (2005). Ethnic networks in FDI and the impact of institutional development. Review of Development Economics, 9(4), 563–580.

United Nations (2015). Integrating migration into the 2030 Agenda for Sustainable Development (Publication No. 2015/5). Department of Economic and Social Affairs, Population Division.

United Nations (2017). International Migration Report 2017. Retrieved from: http://www.un.org/en/development/desa/population/migration/publications/migrationreport/docs/MigrationReport2017.pdf

United Nations Conference on Trade and Development (2018). 2018 e-Handbook of Statistics. Retrieved from: https://stats.unctad.org/handbook/EconomicTrends/Fdi.html

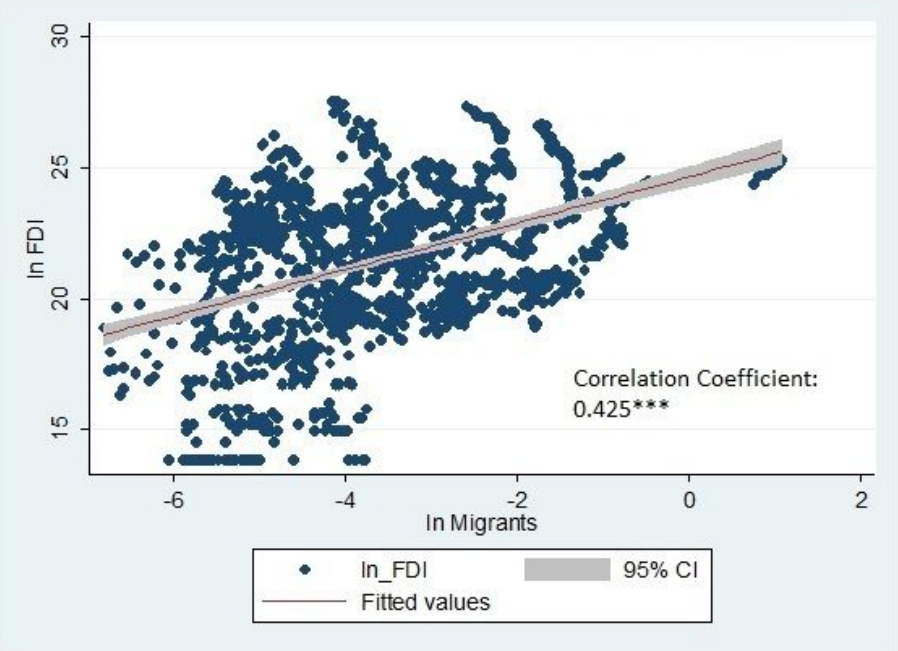
United Nations Development Programme (2015, September 25). World leaders adopt Sustainable Development Goals. Retrieved from: http://www.undp.org/content/undp/en/home/presscenter/pressreleases/2015/09/24/undp-welcomes-adoption-of-sustainable-development-goals-by-world-leaders.html

United Nations Educational, Scientific and Cultural Organization. International Standard Classification of Education (ISCED 2011). Retrieved from: http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf

United States Census Bureau (2010). 2010 Census. Available from: https://www.census.gov/programs-surveys/decennial-census/decade.2010.html

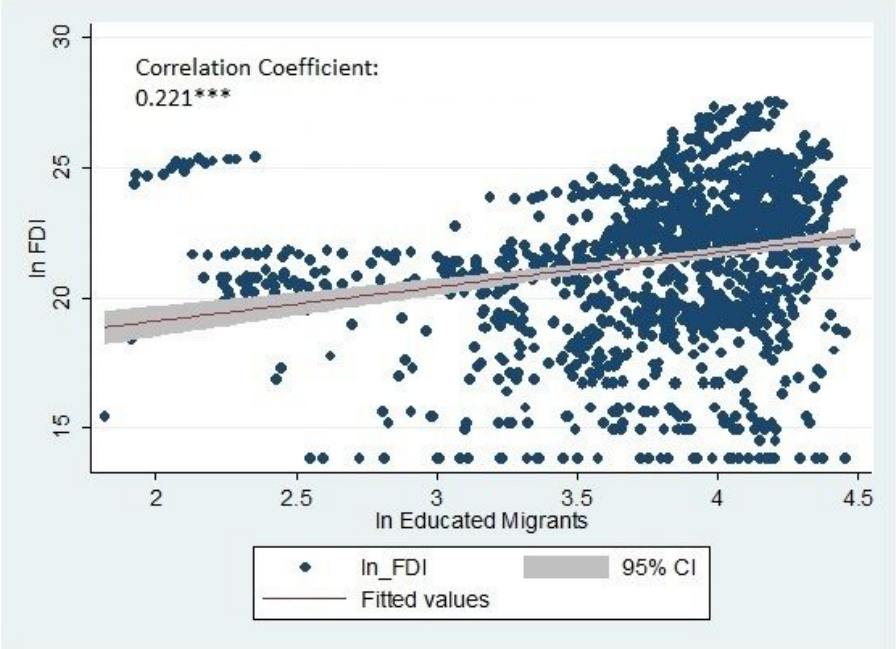
Yasmin, B., Hussain, A., & Chaudhary, M. A. (2003). Analysis of factors affecting foreign direct investment in developing countries. Pakistan Economic and Social Review, 59-75.

Graph 1
Correlation between FDI and Migrants in Logarithms



*** Significant at a 1% level

Graph 2
Correlation between FDI and Educated Migrants in Logarithms



*** Significant at a 1% level

Table 1
Summary of Variable Descriptions and Expected Signs

Variable	Description	Expected signs	Source
FDI (USD)	FDI stock from the US (USD)	N/A	BEA
Migrants (%)	Migrant stock in the US / US population	+	IPUMS
Educated Migrants (%)	Migrants with higher education / Migrant stock	+	IPUMS
GDP per capita (USD)	GDP per capita (constant 2010 USD)	+	WB
Distance (km)	Distance to the US (km)	-	CEPII
Common Language	1 = Has English as an official language 0 = Does not have English as an official language	+	CEPII
Trade (%)	(Imports + Exports) / GDP	+	WB
Private Credit (%)	Domestic credit to private sector / GDP	+	WB
Business Freedom	Business freedom index	+	Heritage Foundation
School Enrollment (%)	Enrollment in secondary school education / Secondary-school-aged population	+	WB

Table 2
Frequency Distribution of Countries in the sample by Geographical Region and Income Group

	Low income (6 countries)	Middle income (49 countries)*	High income (29 countries)	Percentage
South Asia	3 countries	2 countries		**6.0%**
East Asia and Pacific		7 countries	4 countries	**13.1%**
Europe and Central Asia		10 countries	20 countries	**35.7%**
Middle East and North Africa		5 countries	2 countries	**8.3%**
Sub-Saharan Africa	3 countries	3 countries		**7.1%**
Latin America, North America, and the Caribbean		22 countries	3 countries	**29.8%**
Percentage	**7.1%**	**58.3%**	**34.5%**	**100%**

* The middle-income group includes countries in the lower-middle- and upper-middle-income groups of the World Bank's classification.

Table 3
Descriptive Statistics

Variable	Obs.	Mean	Std.Dev.	Min	Max
FDI (USD)	1,495	29,431,787,291	88,633,870,579	-584,000,000	936,728,000,000
Migrants (%)	1,524	.091	.301	.001	2.931
Educated Migrants (%)	1,524	49.051	17.605	6.148	88.955
GDP per capita (2010 USD)	1,543	16,220.540	18,624.630	339.633	91,617.280
Distance (km)	1,548	7,539.742	3,348.445	548.395	16,180.320
Common Language	1,548	.256	.436	0.000	1.000
Trade (%)	1,535	83.717	46.620	19.798	442.620
Private Credit (%)	1,493	65.621	47.363	3.591	253.262
Business Freedom	1,508	69.499	13.564	35.500	100.000
School Enrollment (%)	1,342	87.954	23.780	12.773	163.931

Table 4
OLS Results for the Entire Sample

Years: 2000-2017	**Dependent Variable**		
	FDI		
	(1)	**(2)**	**(3)**
Migrant network effects			
Migrants$_{t-1}$	**1.137*****	**1.145*****	**1.145*****
	(0.181)	(0.106)	(0.161)
Educated Migrants$_{t-1}$	**2.291*****	**1.420*****	**2.449*****
	(0.417)	(0.270)	(0.410)
Gravity specifications			
GDP per capita$_{t-1}$		**1.865*****	**-8.857****
		(0.228)	(3.974)
Distance		0.159	**-1.178****
		(0.328)	(0.458)
Common Language		0.085	-0.560
		(0.345)	(0.489)
FDI determinants			
Trade$_{t-1}$		-0.013	0.043
		(0.305)	(0.476)
Private Credit$_{t-1}$		-0.023	**1.399*****
		(0.271)	(0.267)
Business Freedom$_{t-1}$		-0.015	-0.011
		(0.016)	(0.012)
School Enrollment$_{t-1}$		**-1.345****	1.307
		(0.626)	(2.026)
Constant	17.077***	9.408***	21.663***
	(1.424)	(3.201)	(3.660)
No. of Observations	1385	1177	1059
No. of Countries	86	86	86
R-squared	0.322	0.727	0.493
Time-fixed effects	Yes	Yes	Yes

Robust standard errors are given in parentheses

*** Significant at 1%; ** significant at 5%; * significant at 10% levels

Table 5
OLS Results by Income Group

Years: 2000-2017	**Dependent Variable** FDI		
	Low-income	**Middle-income**	**High-income**
Migrant network effects			
Migrants$_{t-1}$	1.475**	**1.148*** **	**1.013*** **
	(0.418)	(0.116)	(0.117)
Educated Migrants$_{t-1}$	-1.171	**0.981*** **	**1.240*** **
	(1.143)	(0.286)	(0.374)
Gravity specifications			
GDP per capita$_{t-1}$	7.087**	**2.000*** **	**2.223*** **
	(2.508)	(0.389)	(0.409)
Distance	4.979	**0.815***	-0.636
	(3.124)	(0.414)	(0.464)
Common Language	-0.971	-0.662	0.818
	(1.147)	(0.411)	(0.507)
FDI determinants			
Trade$_{t-1}$	-0.324	**-0.825** **	**0.628***
	(0.785)	(0.355)	(0.325)
Private Credit$_{t-1}$	-0.895*	0.411	0.188
	(0.376)	(0.362)	(0.371)
Business Freedom$_{t-1}$	-0.028*	-0.019	-0.033
	(0.012)	(0.022)	(0.020)
School Enrollment$_{t-1}$	1.241	**-2.132*** **	**2.311** **
	(1.754)	(0.748)	(1.045)
Constant	-61.430	10.023**	-7.384
	(48.923)	(4.086)	(7.936)
No. of Observations	62	679	405
No. of Countries	6	49	29
R-squared	0.955	0.689	0.760
Time-fixed effects	Yes	Yes	Yes

Robust standard errors are given in parentheses

*** Significant at 1%; ** significant at 5%; * significant at 10% levels

Appendix

Table A1
List of Countries in Sample by Geographical Region and Income Group

	Low income	Middle income		High income	
South Asia	Afghanistan Bangladesh Nepal	India Pakistan			
East Asia and Pacific		China Fiji Indonesia Malaysia	Philippines Samoa Thailand	Hong Kong SAR, China Japan Korea, Rep. New Zealand	
Europe and Central Asia		Armenia Bulgaria Georgia Macedonia, FYR Moldova Poland Romania Russia Turkey Ukraine		Austria Belgium Cyprus Czech Republic Denmark Estonia Finland France Germany Greece	Ireland Italy Netherlands Norway Portugal Slovak Republic Spain Sweden Switzerland UK
Middle East and North Africa		Algeria Egypt, Arab Rep. Jordan	Lebanon Morocco	Israel Saudi Arabia	
Sub-Saharan Africa	Ghana Kenya Senegal	Cameroon Nigeria South Africa			
Latin America, North America, and the Caribbean		Argentina Belize Bolivia Brazil Chile Colombia Costa Rica Dominican Republic Ecuador El Salvador Guatemala	Honduras Jamaica Mexico Nicaragua Panama Paraguay Peru St. Lucia St. Vincent and the Grenadines Uruguay Venezuela, RB	Bahamas Barbados Canada	

Table A2
Im-Pesaran-Shin Panel Unit Root Test Results (W-statistic)

Years: 2000-2017		
Variable	**Levels Statistic**	**First Order Differences Statistic**
FDI	**-4.10*** **	--
Migrants	**-15.91*** **	--
Educated Migrants	**-18.56*** **	--
GDP per capita	-1.13	**-10.35*** **
Trade	**-1.29***	--
Private Credit	**-1.63***	--
Business Freedom	0.46	**-18.72*** **
School Enrollment	0.82	**-11.58*** **

Notes: The null hypothesis is that panels contain a unit root. The number of lags selected based on the Schwarz Information Criterion is 0 to 3.
*** Significant at 1% level

Table A3
One-tailed t-test results for Migrant network effect variables for Models (2) & (3)

Ho: Coefficient ≤ 1
Ha: Coefficient > 1

	p-value	
Variable	**Model (2)**	**Model (3)**
$Migrants_{t-1}$	0.088	0.184
$Educated\ Migrants_{t-1}$	0.062	0.000

Table A4
OLS Results by Income Group with First Differences

Years: 2000-2017	**Dependent Variable**		
	FDI	FDI	FDI[(a)]
	Low-income	**Middle-income**	**High-income**
Migrant network effects			
Migrants$_{t-1}$	2.642***	**1.313*** **	0.006
	(0.443)	(0.168)	(0.007)
Educated Migrants$_{t-1}$	-0.581	**1.425*** **	**0.046** **
	(1.101)	(0.351)	(0.020)
Gravity specifications			
GDP per capita$_{t-1}$	-0.853[(a)]	-5.734[(a)]	0.382[(a)]
	(6.841)	(3.509)	(0.488)
Distance	-2.457	0.577	**-0.021** *
	(1.415)	(0.515)	(0.012)
Common Language	1.165*	**-1.571*** **	**0.038*** **
	(0.535)	(0.494)	(0.012)
FDI determinants			
Trade$_{t-1}$	0.781	**-1.642** **[(a)]	-0.002
	(1.131)	(0.681)	(0.015)
Private Credit$_{t-1}$	0.364	**-2.102** *[(a)]	**-0.033** **
	(0.219)	(1.059)	(0.014)
Business Freedom$_{t-1}$	-0.028[(a)]	**-0.030** *[(a)]	-0.002[(a)]
	(0.032)	(0.016)	(0.002)
School Enrollment$_{t-1}$	2.515[(a)]	3.934[(a)]	0.337[(a)]
	(3.934)	(2.421)	(0.273)
Constant	53.049**	15.064***	0.258*
	(15.196)	(3.798)	(0.142)
No. of Observations	54	596	378
No. of Countries	6	49	29
R-squared	0.903	0.514	0.039
Time-fixed effects	Yes	Yes	Yes

Robust standard errors are given in parentheses

*** Significant at 1%; ** significant at 5%; * significant at 10% levels

[(a)] The variable was first-differenced