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Highly-Skilled Migration, Migrant Networks and the Prestige of Academic Institutions

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This research analyzes the connection between highly skilled migration and several determining factors such as migration networks, the prestige of academic institutions and the Gross Domestic Product per capita. The linear regression method has been used to analyze a sample of 207 countries, 25 receiving countries and 182 sending countries from 6 different regions (Africa, Asia, Europe, North America, Central and South America and Oceania). A global analysis including all the countries of the sample and a partial analysis by each world region of origin has been performed. The results at global level showed that migration networks and the prestige of academic institution explain the number of highly skilled immigrants very well. In this sense, prestigious academic institutions of receiving countries imply economic incentives and benefits for skilled migrants. Further, relationships and linkages become an important help for highly skilled migrants. Thus, both would act like external and internal networks attracting highly skilled migrants. Regarding the partial analysis, these factors were also relevant for explaining highly skilled migration, but the results varied depending on each region. In case of Africa and Central & South America, the relevant factor explaining the highly-skilled migration was the prestige of academic institutions of the receiving countries. However, in the regions of Europe, North America, and Oceania results were similar to the global analysis. In Asia all factors were significant.

Keywords: *Highly Skilled Migration, International Migration, Academic Prestige, Migrant Networks, Pull Factors.*

Introduction

The highly-skilled migration is an important, international and growing issue of the last decades (Kazlauskiene & Rinkevicius, 2006; Arslan *et al.*, 2014; Kvedaraite *et al.*, 2015).

This topic has been stressed in the literature from different perspectives such as gain drain (Lien D. & Wan, 2005), brain drain (Kazlauskiene & Rinkevicius, 2006), knowledge workers migration (Daugeliene, 2007) and brain circulation (Daugeliene & Marcinkeviciene, 2009).

Much of this studies focus on the determinants on highly-skilled migration (Daugeliene, 2007). Along with classic economic factors of migration such as the Gross Domestic Product per capita (GDP) (Dreher & Poutvaara, 2006), other aspects were found relevant such as migration networks (Docquier & Lodigiani, 2010; Grossman, 2010; Samet, 2014) and the prestige of academic institutions (Tuckman, 1970; Mixon, 1992; Dreher & Poutvaara, 2006; Fossland, 2013).

Migration of highly skilled workers is articulated by networks that favor flows and settlement of these workers (Docquier & Lodigiani, 2010; Samet, 2014). Moreover, similarly to the case of international companies who decide the best way to access to international new markets, the existence of networks is a key factor for skilled migrants (Dreher & Poutvaara, 2006; Tang & Liu, 2011).

Likewise, a superior reputation and prestige of academic institutions of receiving countries are considered to be pull factors for top skilled migration (Tuckman, 1970; Mixon, 1992; Fossland, 2013; Ngoma & Ismail, 2013).

However, there is a gap in the research about connections between the highly skilled migration, the migration networks and the prestige of academic institutions.

Numerous studies about migration, especially from a theoretical perspective (Massey *et al.*, 1993; Kazlauskiene & Rinkevicius, 2006; Kumpikaite & Zickute, 2012) analyze skilled migration. Yet, literature that includes empirical analysis is scarce and focuses on regional or national scope (Kazlauskiene & Rinkevicius, 2006; Ciarniene & Kumpikaite, 2011; Janotka *et al.*, 2013, Vojtovich, 2013; Berzinskiene *et al.*, 2014). A growing and diverse international migration makes international comparisons crucial (Arslan *et al.*, 2014), especially when international migration has been rapidly changing in the last few decades and also because of the important efforts of governments to manage and protect these flows.

Therefore, the research problem of this research seeks to analyse the relationship of highly-skilled migration, migrant networks and the prestige of academic institutions in the international framework.

The aim of the article is to find the links between the international migration flows of highly skilled migrants, migration networks and the prestige of academic institutions in the receiving countries. The effect of the level of development including the analysis of the GDP per capita has been taken into consideration.

A linear regression (Harrell, 2001; Harris, 2001; Wooldridge, 2002; Harris, 2014) has been used in a sample of 207 countries of the year 2011 in order to find out how the migration networks, the academic prestige of receiving countries and the GDP per capita could predict the number of highly skilled immigrants. In addition to this, a global

analysis that included all the countries of the sample and also an analysis by world regions.

The article includes a theoretical analysis followed by the methodology and discussion of results and finally the conclusions are drawn.

Theoretical Framework

Despite changes in the economic cycles, migration has been continuously growing during the last decades, especially migrants with tertiary education (OECD, 2011; Arslan *et al.,* 2014; Berzinskiene *et al.,* 2014).

Highly skilled migration is an international phenomenon (figure 1) that uses to be higher than total emigration rates in majority of the countries highlighting that migration discerns educational attainment, especially in countries with low and middle incomes (Grossman, 2010; Arslan *et al.,* 2014).

Figure 1. Highly Skilled Migration by sources. OECD, 2011

A long-term migrant is a person who moves to another country for permanent residence at least for a year (OECD, 2011). Highly skilled migration defines emigration of people with ISCED 5 and 6 education levels that include master and doctoral level (UNESCO, 2006).

Qualified migrations (ISCED 5/6) became the interest of scientific research since the 50s. The South-North migration from Latin America and countries of the old continent to the United States and Canada seriously affected the economies of the sending countries. Therefore, in 1963 the British Royal Society described this problem as the "brain drain" to explain the exodus of British scientists to the US, but this term became generalized for migration of academics and professionals from the Third World (Dunae, 1983). The term refers to emigration of professionals and scientists trained at universities in their home country to other nations (Kazlauskiene & Rinkevicius, 2006). On the contrary, immigration of technically qualified persons is defined as the "gain brain" (Lien & Wan, 2005). The term "brain drain" is usually associated with knowledge workers who "accumulate, create and disseminate knowledge during the performance of job" (Daugeliene, 2007, 59).

The migration of knowledge workers is rising all the time. It has both positive consequences and important negative costs for sending countries (Lien D. & Wan, 2005; Daugeliene, 2007). The skilled migration has changed over the time based on the economic cycles and depending on the country (Arslan *et al.,* 2014). The first emigration of human talent from the South to the North turned into a return flow because of governments' effort to deal with the brain drain problem. However the economic crisis and imbalances encouraged the highly skilled migration between developed economies in the North together with the traditional movement from lower developed countries to higher ones (Kazlauskiene & Rinkevicius, 2006; Daugeliene & Marcinkeviciene, 2009). It could be viewed as a growing skilled migration in both directions called brain circulation (Daugeliene & Marcinkeviciene, 2009).

Determining factors of the highly skilled migration decision are economics and non-economics (Zimmermann, 1996; Dreher & Poutvaara, 2006; Daugeliene, 2007). The Gross Domestic Product (GDP) per capita (Zimmermann, 1996; Dreher & Poutvaara, 2006; Vojtovich, 2013; Berzinskiene *et al.,* 2014) is usually considered as economics factors. It represents expected relative increases in the income of immigrants, so the higher GDP per capita in the receiving country indicates the more attractive picture of immigration (Dreher & Poutvaara, 2006).

Furthermore, highly skilled migration leads to innovation and higher productivity (Daugeliene, 2007). So any small changes in productivity could have a greater impact on the level of GDP per capita of the receiving country (positively) and the sending country (negatively) (Zimmermann, 1996; Vojtovich, 2013; Berzinskiene *et al.,* 2014).

According to the Human Capital Theory, immigrants with tertiary education and experience can access the same labor market as the locals in the country (Becker, 1983).

Therefore, when skilled migration is higher (Arslan *et al.*, 2014) it would have an important effect on the GDP per capita.

In addition, scientific literature points out the existence of migrant networks in the host countries as other important reason of migration for highly skilled migrants (Docquier & Lodigiani, 2010; Grossman, 2010; Samet, 2014). In this sense, the theory of migration network stresses that the probability of the international migration should be greater for those who are related to individuals with previous foreign migration experiences, or those connected with other subjects currently living abroad (Massey *et al.*, 1993). Thus, once achieved a sufficient critical mass of immigrants, the migration costs and risks decline (Daugeliene, 2007). Migrant networks also help to explain why migration continues even when income differentials or recruitment policies disappear, but also it could explain cross-country changes in migration rates because the existence of previous networks that helps new migrants (Grossman, 2010).

The cumulative causation theory points out the migration process to be selective (Massey et al., 1993). Thus, the best qualified workers have higher probability of success and, therefore, they are the first to migrate. The accumulation of human capital abroad facilitates the arrival of immigrants with different skills and forms networks in the receiving country. The higher barriers to immigration, the more importance of these networks is visible. Thus, the migration network constitutes an excellent predictor of international migration (Samet, 2014) In addition to this, migration networks establish a reputation for the same-origin workers encouraging others to migrate (Docquier & Lodigiani, 2010). It also reduces transaction and information costs.

Furthermore, if the network-based multinational enterprise theory is taken into consideration, multinational companies use internal and external networks in order to access to new markets (Tang & Liu, 2011). Internal networks would be the subsidiaries and participants of the organization and external networks would be all organizations that interact with the company. All these nodes (individual and organizations), relationships and linkages of the company constitute a network that is crucial for the successful establishment of the company in the new market (Grossman, 2010).

So using the analogy of the network-based multinational enterprise theory, migrants constitute external nodes, relationships and linkages with institutions, governments, associations, companies, but also internal networks with other migrants (Haugh, 2008). These networks become very important for a successful settlement of highly skilled migrants of the receiving country acting as pull factors.

According to the theory of human capital, people make an economic investment expected to be recovered choosing where to go to get a job or to improve their skills and, thus, maximize their future income (Mixon, 1992; Massey *et al.*, 1993). Human capital improvement allows the skilled migrants to access the labor market in comparable conditions that local people in the host country (Becker, 1983). Therefore the prestige of the academic institution plays an important role in highly skilled migration from human capital perspective (Tuckman, 1970; Mixon, 1992; Dreher & Poutvaara, 2006). The need for national and international comparison that makes the level and quality of the studies is required to achieve a significant factor to facilitate the incorporation and integration into international labor markets (Fossland, 2013).

Qualifications, credentials and skills obtained from prestigious academic institutions have a growing importance in a time of great need of high-skilled professionals (Tuckman, 1992; Mixon, 1992; Fossland, 2013).

Ngoma & Ismail (2013, 747) summarized the most important benefits that are associated with the top prestigious academic institutions that act as pull factors for skilled migrants. The authors define that "better economic prospects, higher salary and income, better career expectations, better research facilities, modern educational system and better opportunity from higher qualification, prestige of foreign training, intellectual freedom, better working condition and better employment opportunities, relative political stability, presence of a rich scientific and cultural tradition, availability of experienced and supporting staff, technological gaps, and allocation of substantial fund for research" are the pull factors for skilled migrants.The opportunity to increase training benefits exists when academic institutions differ across countries (Tuckman, 1970). A bigger number of prestigious academic institutions in a country should reduce the incentive to migrate to another country (Mixon, 1992).

Methodology

This research focuses on the sample of 207 countries, 25 receiving countries and 182 sending countries from 6 different regions (Africa, Asia, Europe, North America, South and Central America, and Oceania). The sample has been collected from the Database on Immigrants in OECD and non-OECD Countries (DIOC) that compile population censuses of OECD countries from the year 2000. The sample corresponds to the emigration rates by skill level of 2011, the last recent data available. In addition, the prestige of the host universities, the existence of migrants networks and the gross domestic product have been obtained from the international academics rankings such as ARWU[1], QS and THE, and also the OECD database, respectively.

The aim of this paper determines the methodology of the research and seeks to analyze the number migrants who possess ISCED 5/6 education levels in the receiving countries and its relationship with several important factors to migrate. The research focuses on the explanatory variables that are identified below:

- Prestige of academic / research institutions. This is a qualitative variable that will be used as an indicator of prestige of the academic/research institutions of the host country (Tuckman, 1970; Mixon, 1992; Fossland, 2013; Ngoma & Ismail, 2013). It takes the value 1 if

[1] *World universities ranking (2015): ARWU Center for World-Class Universities of Shanghai Jiao Tong University. British Quacquarelli Symonds (QS). Times Higher Education (THE).*

the university is in at least one of the three international rankings of research quality of universities (and therefore will be considered more prestigious), and 0 when it is not.

- Rate of foreign population. This is a quantitative variable that reflects the percentage of foreign population in the country where the host university is located. The variable rate of foreign population tries to collect pre-existing networks that migrants find when they come to this country (Dreher and Poutvaara, 2006; Docquier & Lodigiani, 2010; Grossman, 2010; Samet, 2014).
- The Gross domestic product per capita of the receiving country (in $ PPP of 2005), GDP is a quantitative variable used for international comparisons of the level of economic development (Tuckman, 1970; Dreher & Poutvaara, 2006; Vojtovich, 2013; Berzinskiene *et al.,* 2014).

To analyze the relation between the dependent and explanatories variables a linear regression (Harrell, 2001; Harris, 2001; Wooldridge, 2002; Harris, 2014) model has been used. The data achieved the assumptions of linearity, collinearity, normality, homocedasticidity (Cook, 1977, 1979; Hoaglin & Welsch, 1978; Belsley *et al.,* 1980; Harrel, 2001; Harris, 2001; Wooldridge, 2002).

Firstly the global analysis including all the countries of the sample has been performed. That is the migration flow of ISCED 5/6 from 182 countries to the 25 that receive more immigrants (OECD, 2011) has been analyzed. And then the partial analysis by region of origin to the 25 receiving countries in order to analyze similarities and differences in the international migration flow has been analyzed

Discussion

In order to perform the global analysis a model that includes independent variables has been introduced. Table 1 shows that the model fits well the design of the research. The adequacy of the model to the data, the regression ANOVA (Table 2) point the same direction, i.e. covariates of the research significantly correlate with the independent variables. This demonstrates that the linear relationship exists between them.

Table 1

Summary of the model. Global Analysis

Model	R	Adjusted R^2	Standard Error
1	,979[a]	,959	29376,055
[a]Predictors: (Constant), Foreigners stock (%), Universities in top 500 ranking, GDP per capita (PPP $ of 2005)			

Table 2

ANOVA[a] Global Analysis

Model		Sum of Squares	df	Root-Mean-Square	F	Sig.
1	Regression	380674316957,949	5	76134863391,590	88,226	,000[b]
1	Residual	16396099943,891	19	862952628,626		
1	Total	397070416901,840	24			
[a] Dependent variable: TOTAL MIGRATION [b] Predictors: (Constant), Foreigners stock (%), Universities in top 500 ranking, GDP per capita (PPP $ of 2005)						

The equation (1) demonstrates the results of the regression. The dependent variable (DV) is established according to the covariates. Table 3 below indicates the influence of each covariate to build this equation in order to get an explanation or prognosis of DV (the number of immigrants).

Table 3

Coefficients. Global Analysis

	Unstandardized Coefficients		Standardized coefficients	t	Sig.
Model	B	Standard Error	BETA		
Constant	-9,290	10,527		-,882	,398
GDP per Capita	1,056	,942	,144	1,121	,289
Universities in ranking top 500 (Prestige)	1,001	,162	,699	6,193	,000
Foreigners stock (networks)	1,485	,381	,464	3,897	,003
a Dependent variable: TOTAL MIGRATION					

In accordance with the coefficients, the equation would look like: the number of ISCED 5/6 migrants = -9.290 + 1.056 (GDP) + 1.001 + (Prestige) + 1.485(migration networks). (1)

B coefficients are the increase in each variable. That is, the number of immigrants is directly proportional to the number of universities in the international academic rankings and the existence of migrant networks in the destination.

The results reveal that academic prestige and migration networks are important to explain the number of highly skilled immigrants. As Table 3 shows, a one-unit increase in the variable "Foreigner stock" produces an increase of almost 50% (48.5% for B = 1.485) in the total immigration. In the same manner, a unit increase in the number of universities in the top 500 ranking produces a one-point increase in total immigration.

In this sense, the human capital theory addresses that the higher education set diverse benefits such as better labor opportunities and better salaries (Mixon, 1992). Moreover, prestigious colleges of receiving countries imply economic incentives and other benefits that attract the top scholars/professors to improve their human resource quality (Tuckman, 1970). The existence of relationship and linkages with receiving countries is an important help for migrants and influences the migration decision (Haugh, 2008).

Both prestigious colleges and relationships/linkages would act like external and internal network attracting highly skilled migrants.

About the analysis by origin world region (Africa, Asia, Europe, North America, South & Central America and Oceania), the results change depending on each region.

Africa

The results related to this region pointed out that the following data, i.e. a significant adjustment and explanation of a percentage of the high variance (adjusted $R^2 = 0,914$).

Examining the data of the region only the variable "Universities" is significant, so that the number of immigrants from the African region is explained by the number of universities included in the top 500 of the receiving country. This relationship would be the following one:

The number of ISCED 5/6 migrants = 239,130+ 223,744 (Universities) (2). That is each unit increase in "Universities" (every increase of one university in the top 500 for each receiving country on the list) results in an increase of 224 points in immigrants from Africa with level of education isced 5/6.

The prestige of the academic institutions of receiving countries plays here the most important role. Thus, it is crucial to pay more attention to international academic rankings. It helps to explain the selectivity of migration destination (Haugh, 2008) since the migrants choose countries with a higher reputation, and consequently, with better expected returns for higher education.

Asia

All independent variables are significant (Wooldridge, 2002; Harris, 2014). They are foreign Stock, Universities and GDP per capita, especially the first two variables (Table 4).

The interpretation means that the increase of one unit in the Asian "Foreigner stock" in the receiving country produces an increase of 52 % (52,6 %, B = 1,526) on immigration there. And in the same manner, the unit increase in the number of "universities in the top 500" in the host region causes the increase of 29 % (28,7 %) on immigration. Further, the increase in the "GDP per capita" in the host region causes increased 149 % (148,7 %) on immigration. The case of Asia is an excellent example of the relevance of the analyzed factors (GDP, prestige, migrant networks) in immigration. Traditionally this region has sharp differences in the level of development of any of its countries. In addition to this, this region has notable migration networks around the world and the most of the universities that belong to the academic ranking are concentrated in one country, China (ARWU; QS; THE, 2015).

Table 4

Coefficients. Asia

Model	Unstandardized coefficients		standardized coefficients	t	Sig.
	B	Standard error	BETA		
Constant	-25,917	13,109		-1,977	,076
GDP per Capita	2,487	1,173	,270	2,120	,050
Universities in ranking top 500 (Prestige)	1,287	,201	,718	6,394	,000
Foreigners stock (networks)	1,526	,474	,381	3,216	,009
a Dependent variable: ASIA MIGRATION					

Europe

A significant adjustment and a high percentage of shared variance between the dependent variable and the covariates is confirmed (adjusted $R^2 = 0,947$, 94 % of the shared variance).

Considering the case of Europe, two variables such as migrant stock and the prestige have been significant. The interpretation of the data indicates that the increase of one-unit in the variable migrant network in the European region produces the increase of 56 % (55,8 %) on immigration. And one unit increase in the number of universities in the top 500 in the region produces the increase of almost 0.8 points (B = 0,782) on immigration. Comparing the results obtained while examining the European region, they were similar to the results of the global analysis.

North America

The results were similar to the global analysis and European results. Two variables, i.e.: migrant networks and academic prestige were significant. The model is significant because F (5, 10) = 18,610, p = 0.001 <0,05 with an adjusted R2 = 0,854.

The interpretation of the results indicates that the increase of one-unit in the "Foreigner stock" variable in the North American region produces the increase of almost 100 % (98,9 %) on immigration. And in the same manner, the unit increase in the number of universities in the top 500 ranking in the region produces the increase of almost 0,9 points (0,916) on immigration.

South & Central America

Only one variable is significant with F (5, 10) = 7,639, p = 0,005 <0,05, with an adjusted R2 = 0,920, the prestige of academic institutions of receiving countries.

Oceania

Similar to the case of the global analysis, Europe and North America two variables: migrant networks and academic prestige were significant. The model is significant because F (5, 10) = 18,610, p = 0,001 <0,05 with an adjusted R2 = 0,703.

It means that the increase of one unit in the variable "Foreign stock" in the North American region produces an increase of almost 165 % (B = 2,655) on skilled immigration. And in the same manner, the increase of the

unit in the number of universities in the top 500 ranking in the region produces the increase of almost 16 % (B = 1,16) on immigration.

Conclusions

This research aimed at analyzing the relationship between the highly-skilled migration, the migrant networks and the prestige of academic institutions. The global analysis that included all the countries of the sample and an analysis by world region.

The results of the global analysis results demonstrate that the existence of migrant network and the prestige of academic institution are the most important factors to explain the highly-skilled migration. The prestigious academic institutions involve economic incentives and benefits for skilled migrants. Moreover, relationships and linkages favor highly skilled migration. Thus, these factors play the role of external and internal networks to attract highly skilled migrants.

The analysis by the region of origin identified that the most relevant factors were the same. However, important differences between the world regions have been observed.

The cases of Africa and Central and South America revealed that the prestige of academic institutions of the receiving countries are the most relevant factor to explain the highly-skilled migration. Thus, the prestige of academic institutions generates important incentives and facilities to attract international talented workers.

The case of Europe, North America and Oceania demonstrates the results to be similar to the global analysis, and the existence of migrant networks becomes the main factor to impact the migration of highly skilled professionals. Relationships and linkages of highly skilled migrants in receiving countries plays the major role in making the decision to migrate. Thus, any initiative and strategy that encourages specifics and international networks such as the cooperation of academics, researchers and business becomes the most crucial factor to migration flows of highly skilled workers.

Finally, the analysis of the case of Asia demonstrates that this region possesses important differences in the level of development of any of its countries, it is an excellent example of the relevance of all analyzed factors that explains the highly skilled migration. Both the external and internal networks constitute important pull factors for top educated migrants.

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