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Macroeconomic Determinants of Peruvian Migration Flows

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Abstract. The objective of this paper is to determine the variables associated with the share of Peruvian migration of total immigration into Chile during 2005-2014. The initial hypothesis is that Peruvian migratory flow has a social and economic component. The results show that a greater increase in the Chilean Human Development Index (HDI) in comparison with Peru increases migratory flow. On the other hand, a higher education budget for Chile relative to Peru decreases the migratory flow of Peruvian citizens. Against expectations, a one percent increase in per capita GDP in Chile decreases the flow of Peruvian migrants by 0.61 percent.

Keywords: migration; human development Index; GDP per capita: relative weight.

Acronyms and abbreviations

GDP	Gross domestic product
HDI	Human Development Index
INEI	National Institute of Statistics and Informatics (Instituto Nacional de Estadística e Informática)
IR	Inflation rate
OECD	Organisation for Economic Co-operation and Development
UNDP	United Nations Development Program
UR	Unemployment rate

Introduction

International evidence shows that migratory flow is closely related to economic conditions, particularly salary differences between countries. From a neoclassical perspective, international migration is the result of economic factors, and its causes can be found in the differences in social welfare between countries. This theory emphasizes the economic rationality of individuals who seek to improve their individual welfare. This approach takes into account variables such as income uncertainly and relative deprivation (poverty). In fact, international evidence does show that migrations take place from less developed countries to those whose economic and social stability provide individuals with a better quality of life. Nevertheless, experts on migration argue that the motives that lead individuals to leave their home countries are diverse and complex, and cannot be explained by any single factor (Arango, 2000).

The phenomenon of migration has been studied in different historical periods. The classical school, best represented by Adam Smith (1958, p. 80) and Thomas Malthus (1951, p. 500), argues that migration is necessary for the economic development of nations through the mobility of factors of production, as part of the free choice of individuals to move to other territories, and motivated by greater economic expectations. John Stuart Mill (1978) goes further, proposing that emigration by citizens of colonializing nations could aid in the conquest of new territories. The leader of the Austrian School of Economics, Friedrich Hayek (1997, p. 50) points to the importance of individual mobility in the development of nations: to his mind, mobility enriches cultures. On the other hand, Ernst Georg Ravenstein (1885, p. 170) notes that repressive countries in which economic and social stability does not improve the welfare of individuals give rise to migratory outflows. Meanwhile, a more recent theory contends that migratory processes arise from the need of more developed countries to hire cheaper and less qualified workers who are willing to do work that people in developed countries are not (Piore, 1979, p. 150).

In the case of Chile, and since the return to democracy in 1990, international migration increased from about 83,000 migrants in 1982 to 411,000 migrants in 2014 according to visa application information. Based on this data, the percentage of migrants in Chile, grew from 0.7% in 1982 to 2.3% in 2014 (DEM, 2014). However, according to 2017 census information, there were 745,774 immigrants living in Chile. According to this census, 81% of the international immigrants residing in Chile were from the following countries: Peru (25.2%), Colombia (14.1%), Venezuela (11.1%), Bolivia (9.9%), Argentina (8.9%), Haiti (8.4%), and Ecuador (3.7%).

From these statistics, it seems that the increase in Chile's foreign population is related to migrants' need for greater economic stability. In fact, the following studies, listed in chronological order, provide empirical evidence on the importance of economic factors (low salaries) when deciding to immigrate: Borjas (1999, p. 600); Castro (2010, p. 66); López (2011, p. 86). Other studies have found that the difference between macroeconomic indicators, such as per capita GDP and the rate of unemployment, incentivize migratory flow from poor countries to those with better macroeconomic indicators (Moreno & López, 2004, p. 4; Figueroa et al., 2012, p. 836). In order to uncover further reasons for migratory flows, other researchers have incorporated variables related to human development and governance indices. For example, Algado and Ruiz (2009, p. 156) and Casado, Molina and Oyarzun (2003, p. 10) analyze the importance of the Human Development Index (HDI) as an incentive for migration for a set of countries in Latin America, Europe, and Africa during the period 1990–2009. They found a positive correlation between the migration rate and the corresponding human development classification: the higher the index on a scale of 0 to 1 (or level of development), the higher the rate of migration from sending countries. On the other hand, political instability can also have a significant influence on migratory flows. Thus the results make it clear that the welfare and stability of receiving countries are incentives to migrations. Another indicator that has attracted interest from the economics literature is inequality in the countries of origin, as measured by the Gini index and migratory flows. This is estimated in a study by Groizard (2008, p. 20) for a set of countries outside the OECD. The results indicate that differences in income between sending and receiving countries are a first-order causal factor related to migration. Moreover, the study found that differences in the purchasing power of salaries is an important determinant of migrations, even when salary differences are expressed in purchasing power parity (PPP) units; that is, the lower the purchasing power in the country of origin, the higher the migration rate (Karemera, Orguledo, & Davis, 2000, p. 1746).

To further investigate the causes of migratory flows to more developed countries from less developed ones, Ayvar and Armas (2013, p. 32) employ various macroeconomic variables to determine the factors associated with Mexican migration to the United States. The study examines the population of 113 municipalities in the state of Michoacán that experienced high levels of poverty or marginalization in 2010. Their dependent variable was the number of homes containing migrants who received remittances. The independent variables were: private homes with only outdoor access to water, private homes without electricity, private homes without a sewerage

connection, private homes with dirt floors, illiterate population aged 15 years and older, population living on two minimum salaries, population without entitlement to healthcare, and unemployed economically active population. The results show that the variables of homes without electricity, homes with a dirt floor, and level of education were the factors that incentivize individuals to migrate to the United States. On the other hand, it was also found that the higher the level of education, the lower the desire to emigrate. The employment variables confirm the argument that when they have less employment and lower income, people from Michoacán decide to leave their municipalities to seek a better income in order to meet their families' basic subsistence needs. The results of this study are in line with traditional economic theory, which states that migration is closely related to the living conditions of families in their home countries (Docquier & Marfouk, 2004, p. 30).

The goal of the present study is to determine the economic factors associated with Peruvian migration to Chile between 2005 and 2014. It is hoped that it will provide a more in-depth understanding of the variables related with human development indicators. The endogenous variable is Peruvian nationals who received permanent residence permits as a percentage of the total number of permits issued. The exogenous variables of both countries were the HDI, education spending, per capita GDP in purchasing power parity, unemployment rate, the GINI index, and the inflation rate.

Table 1 provides a summary of the main incentives for migration outflows and inflows.

Table 1
Summary of the main incentives to migration outflows and inflows

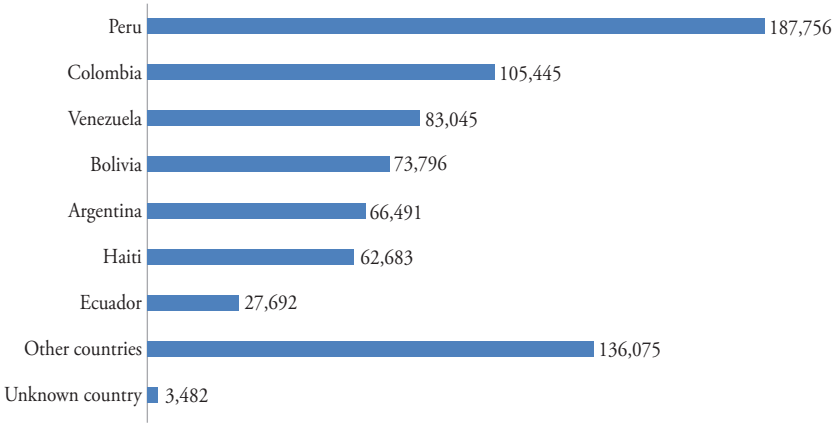
Incentives for migration outflows	Incentives for migratory inflows
Economic factors	Economic factors
Poverty / low salaries	Demand for labor
High taxes	High salaries
High unemployment	Generous welfare benefits / high HDI
Overpopulation	Good health and educational systems
	Strong economic growth
Non-economic factors	Technology
Discrimination	Low cost of living
Poor health services	
War or oppression	Non-economic factors
Corruption	Family and Friends / networks
Crime	Individual rights and liberties
Obligatory military service	Property rights
Natural disasters	Law and order
Famine	

Source: compiled by authors based on Bansak, Simpson and Zavodny (2015).

1. Characteristics of Peruvian migration to Chile

Peruvian migration to Chile has a long history for both social and political reasons. According to research by Santander (2006, p. 191), it is estimated that between 1980 and 1996 more than half a million Peruvians emigrated in search of security and job opportunities. As for Chile, it received a large number of Peruvian migrants in the ten years prior to 2017 (Figure 1).

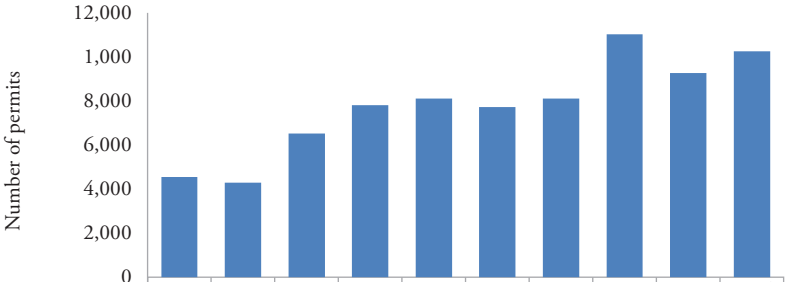
Figure 1
Number of international migrants



Note:
746,465 individuals censused.
Source: compiled by authors on the basis of the 2017 Census.

Out of all Latin American migrants, Peruvian citizens received the largest number of permanent residence permits in the period under study (2005–2014), which demonstrates their significance as a proportion of the total number of foreigners in Chile. Figure 2 shows the increase in the number of permits granted.

Figure 2
Number of permits granted, 2005-2014



Source: compiled by authors based on DEM (2014).

According to censuses over the years, Peruvian migration has historically followed an upward trend (Table 2). In a recent report by Peru's National Institute of Statistics and Informatics (Instituto Nacional de Estadística e Informática, INEI) (2016, p. 20), 34.4% of all Peruvians who migrated abroad chose to go to Chile. In recent decades, Peruvian migration went through three major stages. The first stage (1970-1979) spanned the military governments of Velasco and Morales Bermudez. During this period, large number of Peruvians moved to European countries. Many professional and skilled workers went to Canada and the United States. The second stage (1980-1992) was a period marked by a return to democracy, terrorism, and a severe economic crisis. It was a time when the middle class featured largely in the migratory flow. European countries took in political refugees as well as skilled and unskilled workers. Finally, the third stage, from 1992 to date, which included domestic and international economic problems, including the Asian financial crisis, and some levels of political turbulence, precipitated a new migratory flow of Peruvians to different parts of the world, especially to nearby countries.

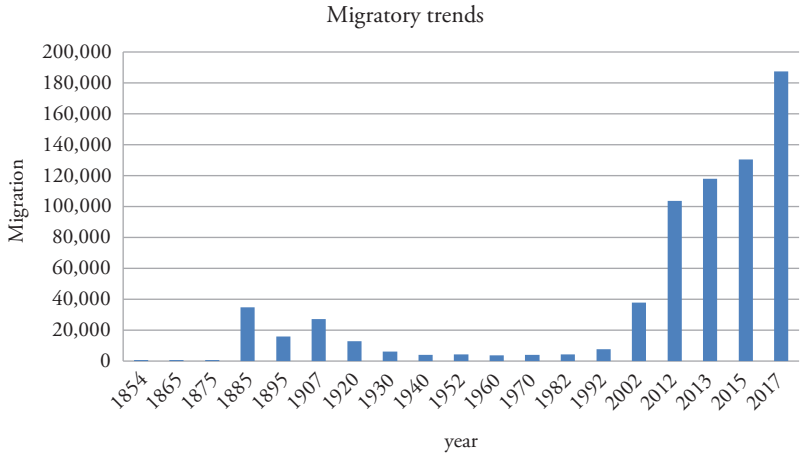
Table 2
Peruvian migration, 1854-2017

Year	Number of migrants	Census (year)
1854	599	Census 1854
1865	571	Census 1865
1875	802	Census 1875
1885	34,901	Census 1885
1895	15,999	Census 1895
1907	27,140	Census 1907
1920	12,991	Census 1920
1930	6,223	Census 1930
1940	3,893	Census 1940
1952	4,432	Census 1952
1960	3,583	Census 1960
1970	3,930	Census 1970
1982	4,308	Census 1982
1992	7,649	Census 1992
2002	37,860	Census 2002
2012	103,624	Census 2012
2013	117,925	Census 2013
2015	130,361	Census 2015
2017	187,612	Census 2017

Source: compiled by authors based on yearly census data.

Figure 3 shows the trends of migratory flow.

Figure 3
Peruvian migration, 1884-2017
Migratory trends

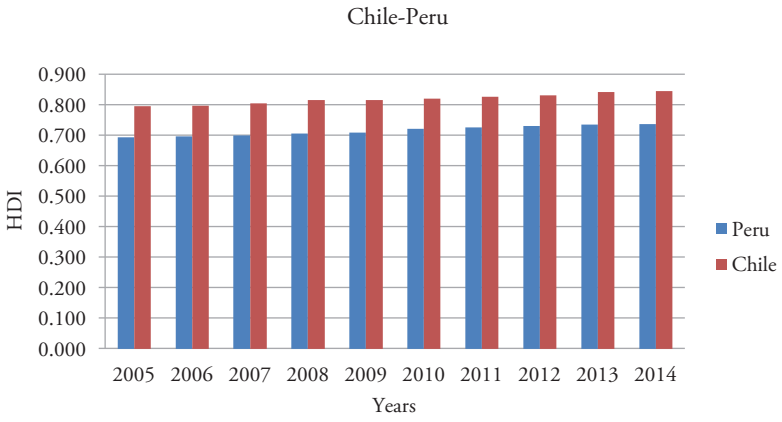


Source: compiled by authors based on yearly census data.

2. Migration and tendencies of principal macroeconomic variables, 2005-2014

Macroeconomic variables are indicators that allow us to understand the economic situation in a given country in relation to its peers. The United Nations Human Development Program's Human Development Index (HDI) and per capita GDP are synthetic indicators that are used to determine the progress of countries. In particular, the HDI serves as a guide to determine level of development across three dimensions: health, education, and income. The HDI has values between 0 and 1; the closer to 1, the greater the level of development, so that each country is classified in the group that corresponds to its level of development. Figure 4 shows the HDI trends for Chile and for Peru. As can be seen, the average HDI for the period studied is 0.81 and 0.71, respectively. This classifies Chile as a "high human development" country and Peru as a "medium human development" country. It should be noted that there is a relationship between HDI and migratory flows.

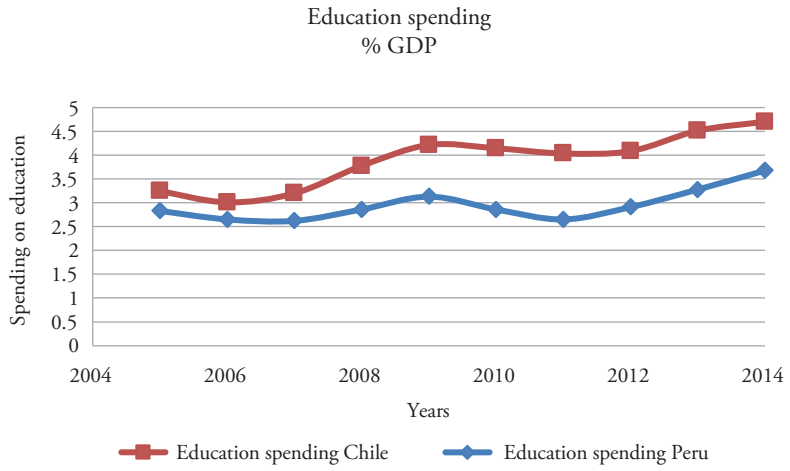
Figure 4
Human Development Index trends, 2005-2014



Source: compiled by authors based on PNUD (2018).

At the same time, education has emerged as one of the most important factors in the socioeconomic development of countries. Human capital is a source of development and has an improvement on the quality of life of individuals. In particular, it was found that there is a positive relationship between education and income; that is, more schooling leads to a higher rate of return, which in turn improves the quality of employment (Rosenzweig, 1990, p. 39; Pardo, 2006, p. 20; Baier, Dwyer, & Tamura, 2006, p. 23; Vásquez, Castillo, & Lera, 2015, p. 327). Figure 5 shows the trends in public spending on education in both countries.

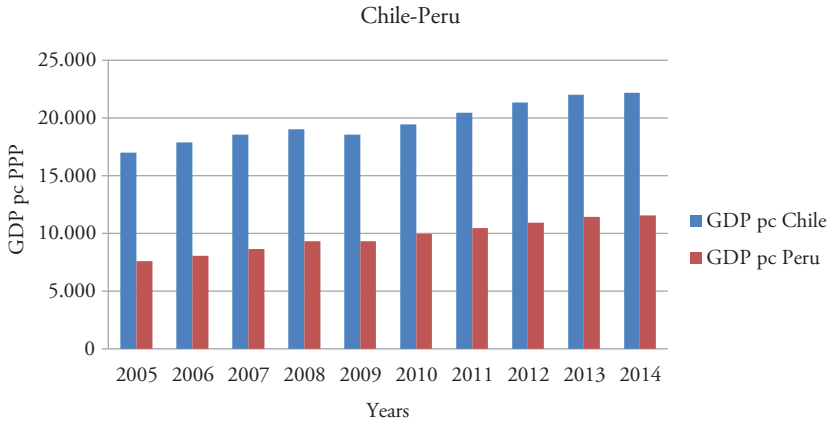
Figure 5
Trends in spending on education, 2005-2014



Source: Banco Mundial (2018).

For its part, per capita GDP is an indicator used to estimate the economic wealth of a country, and is usually used as a proxy variable for earnings. In the case of Chile, per capita GDP has been increasing. Figure 6 shows that in 2005, per capita GDP was US$ 17,077 a year and ten years later it was US$ 22,195.

Figure 6
Per capita GDP trends, 2005-2014



Note: Per capita GDP in purchasing power parity (PPP).
Source: Banco Mundial (2018).

3. Methodology

Database and selection of variables

This study used the data provided by the Studies Section of the Aliens and Migration Department of the Ministry of the Interior for 2005-2014 (DEM, 2014), this being the only up-to-date report that provides detailed information about applications for permanent residency. It should be stressed that it was not possible to broaden the database, because DEM has not updated its own database on regular migration. For the various macroeconomic variables, we used data from the World Bank (Banco Mundial, 2018) and the UNDP (PNUD, 2018). Peruvians as a percentage of all those granted permanent resident permits was used as the endogenous variable. "Migration" is understood as the population that arrives in a country or region other than their place of origin with the intention of settling permanently (Castles, 2000, p. 20). Therefore, the model seeks to explain the relative weight of the permits granted to Peruvians in relation to all the permits that Chile grants to foreigners. To this end, a sample of 19 countries was chosen.[1] The exogenous variables for both countries were as follows: HDI, per capita GDP in purchasing power parity (real GDP), unemployment rate, inflation rate, and education spending as a percentage of GDP. Following the empirical study of Ríos and Rueda (2005, pp. 1-45), these variables transformed into ratios are as follows: HDI Chile-Peru ratio, per capita GDP Chile-Peru ratio, education spending Chile-Peru ratio, unemployment rate Chile-Peru ratio, inflation rate Chile-Peru ratio, Gini Chile-Peru ratio.

A first descriptive analysis allows us to examine the behavior of the variables (Table 3). An upward trend in permanent resident permits granted can be observed. As to the principal macroeconomic indicators, it can be seen that in both countries both per capita GDP and HDI improved over time, However, despite the sustained economic growth in Chile and Peru, the Gini index did not decline. Table 3 provides a detailed description of the variables in this analysis.

1 Bolivia, Colombia, Argentina, Ecuador, China, Spain, Brazil, United States, Venezuela, Uruguay, Cuba, Mexico, Dominican Republic, France, Paraguay, Germany, South Korea, Italy, and the United Kingdom.

Table 3
Descriptive Statistics

	Minimum	Maximum	Average	Standard deviation
Permanent Residency Permits	4,295.00	11,021.00	7,762.9000	2,188.98990
Human Development Index (Peru)	0.69	0.74	0.7152	0.01659
Human Development Index (Chile)	0.80	0.85	0.8191	0.01705
GDP pc Peru	7,595.00	11,547.00	9,726.7000	1,377.06911
GDP pc Chile	17,007.00	22,195,00	19,644.9000	1,773.87852
Education spending Peru	2.63	3.69	2.9570	.33253
Education spending Chile	3.02	4.72	3.9070	.57542
Unemployment rate Peru	5.90	9.70	7.4200	1.09626
Unemployment rate Chile	3.60	8.80	5.5000	1.76761
Gini Peru	0.44	0.57	0.4750	0.04062
Gini Chile	0.47	0.54	0.5120	0.02394
Inflation Peru	1.53	5.79	2.8716	1.28312
Inflation Chile	3.01	8.72	4.3301	2.02024

Note:
N=10.
Source: compiled by authors using SPSS.

Table 4 describes the main variables used in the study.

Table 4
Description of variables, 2005-2014.

Theory	Variables	Description	Values for the countries
Theory of relative scarcity	Human Development Index (HDI)	The HDI is an indicator of human development in countries, prepared by the UNDP. It is a composite indicator that measures the average progress of a country across three basic population dimensions: long and healthy life, access to knowledge, and a decent standard of living. It is measured on a scale from 0 to 1: high human development = levels over 0.80; medium human development = between 0.50 and 0.80; low human development = below 0.50. This is a synthetic social indicator that provides a holistic vision of development and welfare.	According to a UNDP report (PNUD, 2018), the HDI of Peru for the period studied was 0.71 (medium human development) and 0.81 for Chile (high human development)
Neoclassical theory	Per capita GDP in PPP	The relationship between real GDP and the number of inhabitants of a country. This is an indicator commonly used to estimate the economic wealth of a country (proxy variable for salary).	The average per capita GDP in PPP of Peru was 9,726.5 and that of Chile was 19,644 in 2018. Source: Banco Mundial (2018).
Economic theory of migration	Spending on education as a % of GDP	Public spending on education as percentage of GDP includes total public expenditures (current and capital) on education expressed as a percentage of GDP in a given year. Includes government spending on educational institutions (public and private), educational administration, and subsidies or transfers for private entities (students/households and other private entities).	Average spending on education in Chile is 3.9% and 2.9% in Peru. Source: Banco Mundial (2018).

Source: prepared by authors.

Pearson correlation matrix

The Pearson linear correlation coefficient is a statistical index that allows us to measure the strength of a linear relationship between two variables. The closer to 0 the values are, the weaker the relationship; there may even be no relationship between the variables. When there are two variables, the Pearson correlation is defined as:

$$\rho_{xy} = \frac{Cov\,(x, y)}{\sqrt{Var\,(x)}\,\sqrt{Var\,(y)}} \tag{1}$$

Where Var (x, y) indicates the covariance of the variables x, y.

– **Analysis of the Pearson matrix correlation**

The analysis of the correlation matrix provided the magnitude of the coefficients (Table 5) of the principal relationships obtained from the results of the econometric analysis presented in Table 3. Consistent with the international evidence, a positive relationship can be noted between the HDI Chile_Peru ratio and the endogenous variables; that is, the greater the difference in HDI in favor of Chile, the greater the migratory flow (Vázquez et al., 2015, p. 330). In the case of the per capita GDP Chile_Peru ratio, the greater the difference between the per capita of Chile and Peru, the greater the migratory flow. On the other hand, there is an inverse proportional relationship between the education ratio and the endogenous variables; that is, an increase in the budget for education in favor of Chile diminishes the relative weight of migration. Everything seems to indicate that although Chile has average education spending of one percentage point higher than Peru, this is not a determining factor in Peruvian migration (Table 3). It should be noted that the signs of the correlation coefficients only indicate a negative or a positive influence on the endogenous variable; when the sign of the correlation is positive, then the greater the difference of the variable in the destination country (Chile), the greater the migration; with a negative sign, there is less flow. No statistical significance was found in any of the relationships.

Table 5
Pearson correlation matrix of the variables analyzed, 2005-2014

	Permits (%)	HID_ Chile_ Peru ratio	GDP_Chile_ Peru ratio	Education Chile_ Education _Peru ratio
Permits (%)	1.000	0.493	0.335	-0.597
HDI_Chile_Peru ratio	0.493	1.000	0.405	0.121
GDP_Chile_Peru ratio	0.335	0.405	1.000	-0.568
Education_Chile_Peru ratio	-0.597	0.121	-0.568	1.000

Notes: No statistical significance was found. N=10.
Source: compiled by authors using SPSS.

In the second stage, a multiple linear regression model was estimated, introducing variables "by stages." Formally, the general regression model is expressed as follows:

$$\pi_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \cdots \ldots + \beta_k X_K + u_t \qquad (2)$$

where π_t is Peruvians granted permanent residence permits as a percentage of the total permits granted. The standard values of the coefficients $\beta_1, \beta_2 \ldots \beta_k$ indicate the magnitude of the effect that the explanatory variables have on the dependent variable Y. The coefficient β_0 is the constant term, and u_{it} is the error term of the model, so there is assumed to be zero mean and constant variance, with the noncorrelated disturbances $Cov\,(\varepsilon_t, \varepsilon_s) = 0$ for all $\forall t \neq s$.

– **Results of the econometric model**

In this section, a multiple linear regression model was estimated with the introduction of variables "by stages" as an estimation method in order to achieve a good fit. Table 6 provides the summaries of the proposed models. After the initial assumptions were accepted, model 6 was likewise accepted. Note that the model has a coefficient of determination of 77%, which can be considered a good fit; that is, the ratios of the variables explain 77% of the permits granted to Peruvian migrants. The remaining percentage cannot be explained by the model. On the other hand, the Durbin-Watson statistic value (1.67) is not too far from 2, which indicates that problems of autocorrelations are not relevant. The three explanatory variables have good significance. With regard to the negative interpretation of the GDP coefficient, it can be said that the greater the difference between the GDP of Chile and Peru in favor of Chile, the lower the relative weight of the permits granted to Peruvians, as if Peruvians desisted in migrating to Chile.

When it comes to interpreting the coefficients, it could be seen that with an increase by one percentage point in the per capita GDP ratio, Peruvian migration declines by 0.61 percentage points. Could this be because when GDP increases in Chile, the influx of people from other countries increases, thus diminishing the relative weight of Peruvian migration? The positive sign of the HID ratio means that an increase in this variable in favor of Chile increases migratory flow. In the case of the coefficients, with an increase of one percentage point in the HDI ratio, the migratory flow increases by 0.68 percentage points. On the other hand, an increase in the education budget in Chile by one percentage point decreases the migratory flow by 1.05 percentage points. It is possible that the effect of migrants from other countries diminishes the relative weight of permits granted to Peruvian citizens.

Table 6
Multiple regression model with the introduction of variables "by stages," 2005-2014

Model	Non-standardized coefficients	Standardized coefficients	Significance
Model 1			
Constant	-1,486,091.794		0.488
GDP ratio (Chile-Peru)	-13,165.962	-0.486	0.768
HDI ratio (Chile-Peru)	112,924.089	0.325	0.471
UR Ratio (Chile-Peru)	-9,695.721	-1.006	0.325
Gini ratio (Chile-Peru)	-15,201.490	0.441	0.277
IR ratio (Chile-Peru)	1,837.791	0.588	0.314
Ed. spending ratio (Chile-Peru)	-7,132.026	-0.410	0.566
Model 2			
Constant	-2,050,112.442		0.022***
GDP ratio (Chile-Peru)	14,237.774	0.415	0.146
HDI ratio (Chile-Peru)	-10,787.156	-1.120	0.154
Gini ratio (Chile-Peru)	-15,171.362	-0.440	0.176
IR ratio (Chile-Peru)	1,862.047	0.596	0.206
Ed. spending ratio (Chile-Peru)	-4,740.838	-0.273	0.516
Model 3			
Constant	-1,847,155.304		0.007**
HDI ratio (Chile-Peru)	135,434.089	0.389	0.120
UR Ratio (Chile-Peru)	-7,678.419	-0.797	0.097***

Gini ratio (Chile-Peru)	-13,351.474	-0.387	0.161
IR ratio (Chile-Peru)	1,444.412	0.462	0.202
Model 4			
Constant	-1,508,003.221		0.005*
HDI ratio (Chile-Peru)	79,711.256	0.229	0.277
UR Ratio (Chile-Peru)	-3,090.500	-0.321	0.210
Gini ratio (Chile-Peru)	-7,568.727	-0.220	0.366
Model 5			
Constant	-1,362,424.614		0.003**
HDI ratio (Chile-Peru)	59,961.906	0.172	0.372
UR Ratio (Chile-Peru)	-1,873.631	-0.194	0.328
Model 6			
Constant	-1,534.445		0.006*
Ratio HDI_ Chile_Peru	1,568.225	0.868	0.004*
Ratio GDP_Chile_Peru	-85.048	-0.613	0.040**
Ratio ed. Spending_Chile_ Peru	-35.891	-1.05	0.003**
R squared	0.850		
R squared adjusted	0.77		
Standard estimation error	5.3874		
Durbin-Watson	1.67		

Note
Statistical significance: *p<1%, p**<5%, p***<10%.
Source: compiled by authors using SPSS.

Formally, the model estimated is as follows:

$$\pi_t = -1534{,}445 - 35{,}891\, EDURatio_t + 1568{,}225\, IDHRatio_t - 85{,}048\, PIBRatio_t \quad (3)$$

4. Conclusions

To put this study on Peruvian migration to Chile in context, it is worth noting that global migration during 2018 totaled 258 million migrants. Of this total, the International Organization for Migration (IOM) calculated that 150.3 million were migrant workers, 4.8 million were students, 25.4 million were registered refugees, 36.1 million were children, and 124.8 million were women (IOM, 2018, p. 9). The international evidence indicates that migratory flows are greater from countries whose economies have not been able solve problems of disparities in salaries and poverty, and that migratory flows are to countries whose economic and political stability

facilitate individual welfare. Peruvian migration to Chile coincided with a return to democracy in Chile, starting in the 1990s. Improvements to economic stability during the following decades increased incentives for Peruvians to migrate to Chile. The increase in the number of permanent residence permits granted, with Chile being the first migration destination, is evidence of this. The question that still needs to be asked is: what macroeconomic factors are prompting Peruvians to migrate?

The goal of this study was to determine the variables associated with the weight of Peruvian migration out of total immigration to Chile in the period 2005–2014. The endogenous variable was the percentage of permanent resident permits granted to Peruvians out of the total permits granted. The exogenous variables included the major macroeconomic variables as indicators of development and welfare; namely the Human Development Index, per capita GDP, education spending as a percentage of GDP, the Gini index, the unemployment rate, and the inflation rate.

An initial descriptive analysis of both countries provided the principal macroeconomic trends. The latest UNDP report (PNUD, 2018, p. 10) classifies Chile among countries with "very high human development" and Peru among countries with "high human development." This report also notes the increase in per capita income in Chile.

The Pearson correlation indicates that the greater the difference in HDI in favor of Chile, the greater the migratory flow of Peruvians. That is, everything seems to indicate that the decision to migrate is related to the search for a better life by individuals. In accordance with international evidence, the greater the difference in per capita GDP between Chile in Peru, the greater the migratory flow. It should be remembered that here we use per capita GDP as a proxy variable for the salary of an individual. In contrast to expectations, there is an inverse proportional association between the education ratio and the endogenous variable; that is, the greater the education budget in Chile, the less the migration flow. Although this result seems illogical, we believe that it could be influenced by the relative weight of migrants from other countries. Note that a correlation analysis of variables is a first approximation of the phenomena analyzed.

In the second part of the study, the results underscored the importance of the prosperity of the receiving country in the decision of individuals to migrate, measured by the Human Development Index. Consistent with international evidence, the positive sign of the coefficient demonstrated that an increase in this variable in favor of Chile served to increase migratory flow. Unexpectedly, an increase in Chile's per capita GDP and an increase in education spending do not seem to be decisive variables in relation to

requests for permanent residence permits. An economic reason for this may be related to the fact that per capita GDP is not reflected in the average income of the Chilean population, which could be a disincentive to migration flow. The same is true of the cost of education for families.

Limitations of the study

The limitations of this study have to do with restricted access to microdata that would allow for a more in-depth understanding of the reasons for migratory flows. Another limitation is that the DEM database has not been updated and thus it was not possible to extend the period of analysis. On the other hand, it is surprising that some relationships turned out to have a sign that was opposite what was expected. This distortion may be due to the small amount of information available.

References

Algado M., & Ruiz, R. (2009). El desarrollo humano y los movimientos migratorios en las culturas mediterráneas. *Revista de Sociología*, *1*(94), 155-169.

Arango, J. (2000). Enfoques conceptuales y teóricos para explicar la migración. *Revista Internacional de Ciencias Sociales*, *165*, 33-47.

Ayvar, F., & Armas, E. (2013). Determinantes macroeconómicos de la migración internacional en el Estado de Michoacán, México. *Revista Cimexus*, *8*(2), 31-53.

Baier, S., Dwyer, G., & Tamura, R. (2006). How important are capital and total factor productivity for economic growth? *Economic Inquiry*, *44*(1), 23-49.

Banco Mundial. (2018). TheGlobalEconomy.com. http://theglobaleconomy.com

Bansak, C., Simpson N., & Zavodny, M. (2015). *The economics of immigration*. Oxford: Routledge.

Borjas, G. (1999). Immigration and the welfare magnets. *Journal of Labor Economics*, *17*(4), 607-637.

Casado M., Molina L., & Oyarzun, J. (2003). *El análisis económico de los movimientos migratorios internacionales: determinantes empíricos y nuevas propuestas de regulación*. Documentos de Trabajo de la Facultad de Ciencias Económicas y Empresariales 7.

Castles, S. (2000). Migración internacional a comienzos del siglo XXI: tendencias y problemas mundiales. *Revista Internacional de Ciencias Sociales*, *165*, 17-32.

Castro, A. (2010). Pobreza y migraciones. *Revista Derecho del Estado*, *1*(24), 65-80.

DEM (Departamento de Extranjería y Migración). (2014). *Migración en Chile, 2005-2014*. Departamento de Extranjería y Migración del Ministerio del Interior y Seguridad Pública.

Docquier, F., & Marfouk, A. (2004). *Measuring the international migration of skilled workers, 1990-2000*. World Bank Policy Research Paper 3381.

Figueroa, E., Ramírez, O., González, J., Pérez, F., & Enrique, L. (2012). Análisis del desempleo, la migración y la pobreza en México. *Revista Mexicana de Agronegocios*, *30*, 835-847.

Groizard, J. (2008). La emigración hacia los países desarrollados. Nueva evidencia. *Revista de Economía Aplicada*, *46*(XVI), 5-35.

Hayek, F. (1997). *La fatal arrogancia: los errores del socialismo*. 2.ª ed. Unión Editorial S. A. INEI (Instituto Nacional de Estadística e Informática). (2016). *Estadísticas de la emigración internacional de peruanos e inmigración de extranjeros, 1990-2015*. Perú: Instituto Nacional de Estadística e Informática (INEI), Superintendencia Nacional de Migraciones.

International Organization for Migration. (2018). *Global migration indicators*. Berlin: Editorial Global Migration Data Analysis Centre (GMDAC)–International Organization for Migration.

Karemera, D., Oguledo, V. I., & Davis, B. (2000). A gravity model analysis of international migration to North America. *Applied Economics*, *32*, 1745-1755.

López, E. (2011). La pobreza y su relación con la migración como problema social. *Revista de Derecho*, *32*(1), 85-117.

Malthus, T. (1951). *Ensayo sobre el principio de la población*. Mexico: Fondo de Cultura Económica.

Mill, J.S. (1978). *Principios de economía política con algunas de sus aplicaciones a la filosofía social*. Mexico: Fondo de Cultura Económica.

Moreno, I., & López, G. (2004). *Evidencia empírica de los determinantes de la inmigración internacional en España y Cataluña*. Working Papers.

Pardo, R. (2006). *Acumulación de capital humano y gasto público en educación: un modelo OLG para Colombia*. Archivos de Economía. Dirección de Estudios Económicos, Departamento Nacional de Planeación.

Piore, M. J. (1979). *Birds of passage: Migrant labor in industrial societies*. Cambrige: Cambridge University Press.

PNUD (Programa de las Naciones Unidas para el Desarrollo). (2018). *Human development indices and indicators. Statistical update*.

Ravenstein, E. G. (1885). The laws of migration. *Journal of the Statistical Society*, *48*(2), 167-235.

Ríos, J., & Rueda, C. (2005). *Un estudio sobre los determinantes económicos y no económicos de los flujos de migración internacional de peruanos entre 1994 y 2003*. Consorcio de Investigación Económica y Social.

Rosenzweig, M. (1990). Population growth and human capital investments: Theory and Evidence. Part 2: The problem of development: A conference of the Institute for the Study of Free Enterprises Systems. *The Journal of Political Economy*, *98*(5), S38-S70.

Santander, C. (2006). La migración peruana en el contexto del patrón de las corrientes migratorias en Chile: pasado, presente y futuro. *Remhu. Revista Interdisciplinar da Mobilidade Humana, 14*(26-27), 191-208.

Smith, A. (1958). *La investigación sobre la naturaleza y causas de la riqueza de las naciones*.
Mexico : Fondo de Cultura Económica.

Vásquez, R., Castillo, C., & Lera, L. (2015). Migraciones en países de América Latina. Características de la población pediátrica. *Rev. Chil. Pediatr.*, *86*(5), 326-330.