

**The Determinants of Migration from Europe to the Americas:  
A Panel Data Analysis for Argentina, Brazil  
and the United States from 1870 to 1910**

By

J. Ulyses Balderas  
Economics and International Buisness  
Sam Houston State University  
[eco\\_jub@shsu.edu](mailto:eco_jub@shsu.edu)

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**Abstract:**

This paper investigates the determinants of immigration to Argentina and Brazil from 10 European source countries for the period 1870-1910. By using panel data I am able to exploit the time-series and cross-section variation in immigration to these two countries. The model is estimated using the Hausman-Taylor Instrumental Variable technique. Results show economic opportunities measured through per capita GDP (or real wage), previous migration, and migration to the U.S. as an alternative opportunity played an important role in determining European migration to South America. Furthermore, the costs of migration measured through distance and language seemed to have little impact on the decision to migrate.

## **I. Introduction**

Several attempts have been made to study the determinants of European emigration during the nineteenth and the early twentieth centuries. It is common to see studies that focus on the pull and push factors of transatlantic migration. Some examples include Misuriello (1993), Cohen (1995), Gould (1979), and Faini and Venturini (1994).

Erickson (1976) emphasizes the importance of the recruitment of migrants made by the governments of the recipient countries as a pull factor. Greenwood (2005) goes one step beyond by studying the sex composition of U.S immigration from 12 European source countries for the period 1820-1929.

The literature becomes more extensive when contemporary migration is considered. Mayda (2005) studies the economic (income and inequality) and non-economic (cultural, political, geographic and demographic factors) determinants of migration inflows for 14 OECD countries from 1980 to 1995. Clark, Hatton and Williamson (2002) investigate the economic and demographic factors that determined immigration rates to the United States from 1971 to 1998. A model of age composition was successfully applied to the US immigration by Greenwood, McDowell and Wierman (2003) for the period 1972–1991.

The majority of studies have in common that they have used North America (in particular the US) as the destination country. However, less attention has been given to South America, even when in the late nineteenth century Brazil and Argentina emerged as alternative destinations in the New World. According to Cohen (1995), during the last two decades of the nineteenth century 1.6 million European migrants arrived in Brazil, a number exceeded only by Argentina. He argues that between 1880 and 1930, Argentina attracted 5 million Europeans, resulting in a more popular destination than the United States in per capita terms. The majority of immigrants who arrived in that country came

from Southern Europe, in particular, Italy and Spain. Germany, France and the United Kingdom also contributed although at a lesser extent (Velez, 1990).

It is well documented that European emigration to the Americas during the nineteenth century was dominated by the United States (Wilcox and Firenzi, 1929). However, after 1850 Argentina and Brazil emerged as alternative destinations.<sup>1</sup> By the end of the nineteenth century, Argentina ranked second in the number of immigrants (Whitaker 2004). This result was in part due to the incentives offered by the governments of the recipient countries. In 1889, Minister Hanna wrote in his Consular Report:

“All this immigration is assisted by the [Argentinean] Government by payment of the passage of the immigrants...In addition to the vast sum paid out by the Government in encouragement of immigration, there is another great outlay. The Government lands the immigrant, keeps him and his family some days at the immigrants’ hotel, pays his passage in river steamers and on railroad trains to reach the colonies or join the farms or estancias where employment has been secured for him...” (p. 327, U.S. Consular Reports, 1890).

For the case of Brazil, there was a particular need for labor after 1870, the year in which slavery was abolished. According to Texidó, Baer, Vichich, Santestevan and Gomes (2003), in the second half of the 19th century, the coffee plantations became one of the most important sectors for the Brazilian economy. A new wave of migration was needed. As Cohen suggested “...the lucrative coffee bean crop could not be planted, cared for and harvested without massive injections of new immigrants...” (Cohen 1995, p.203). After 1880 a new immigrant labor regime known as the *colono* system was implemented. Under this regime the cost of the trip to the New World was fully subsidized by state and federal governments (Klein, 1995). In his 1887 report, Consul Letcher informed some of the inducements to emigrants offered by the Brazilian Government:

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<sup>1</sup> Table 1 shows Argentina, Brazil, and US immigration by country of origin and by decade.

“As an incentive to immigration, the Brazilian Government holds out or offers to emigrants the following inducements: 1) Payment in full of their passage from Europe to Brazil to all those proceeding to agricultural settlements as laborers...2)Reduced rates of passage to all those who may wish to settle on their own account on lands belonging to the state...3) The construction of roads, schools, and churches, as well as any other aid or assistance that may be judged necessary for the prosperity and development of colonial settlements. In addition to the forgoing, the Government furnishes emigrants board and lodging for eight days, and free transportation from the port of their disembarkation to the locality to which they are going...” (p. 73, U.S. Consular reports, 1887).

Texidó et al. (2003) also argue that another important aspect of the migratory process was that part of the immigrants that came to Brazil after 1880 did not stay. Some of them emigrated to other Latin American countries and some others returned home. According to their estimates approximately 10.6% of the Italian migrants did not stay in Brazil, followed by Spaniards (5.5%), and Germans (4.3%). As a result, from 1888 to 1900 Brazilian planters subsidized European families as long as they stayed in Brazil (Klein 1995). Regarding the source of immigration, the majority of the immigrants to Brazil up to 1870 were Portuguese. After 1870, new immigration policies implemented by the Brazilian government attracted immigrants from Italy, Spain, and Germany.

The objective of this research is to determine the factors that influenced migration to South America. Even though some other attempts have been made to study European migration to South America (see Timmer and Williamson (1998), Williamson (1998) and Timmer and Williamson (1996)), this paper is unique in the sense that no previous study has related European migration to Brazil and Argentina to migration to the US during the late nineteenth and early twentieth centuries.

The organization of the paper is as follows. The next section describes the theoretical framework. Section 3 describes the data, while section 4 presents the empirical model and the results of the estimation. Finally, section 5 provides a summary and conclusions.

## II. Theoretical Model

In this paper I use a human capital model developed by Sjaastad (1962). Under this framework a migrant moves from country  $i$  to country  $j$  if the present value of the benefit of moving is larger than the present value of the cost associated with a move from  $i$  to  $j$ . Let  $PVM_{ij}$  be the present value of the benefit from migration for moving from country  $i$  to country  $j$ , where  $B$  is the benefit associated with the move,  $C$  represents the cost of moving,  $T$  is the number of post migration periods, and  $r$  is the discount rate:

$$(1) \quad PVM_{ij} = \sum_{t=1}^T \frac{(B_j - B_i)}{(1+r)^t} - \sum_{t=1}^T \frac{(C_j - C_i)}{(1+r)^t}$$

This equation implies that the potential migrant moves if the  $PVM$  is positive and selects the destination that yields the highest  $PVM$ . However, the actual returns and costs of migration are not usually observed. Consequently, it is common to use an empirical specification which considers migration (measured as the number of migrants or migrants relative to population) as a function of proxies for its returns and costs. The returns or benefits are mainly economic (higher wage, lower unemployment rates). The private costs, as defined by Sjaastad (1962), "...can be broken down into money and non-money costs. The former include the out-of-pocket expenses of movement, while the latter include the foregone earnings and the 'psychic' costs of changing one's environment..." (Sjaastad 1962, p.83). Therefore, the empirically specification becomes

$$(2) \quad m_{it} = \alpha + X'_{it}\beta + u_{it}$$

with  $i$  denoting source countries, and  $t$  denoting time. If we utilize a one-way error component model for the disturbances, then  $u_{it} = \mu_i + v_{it}$ , where  $\mu_i$  denotes the unobservable individual specific effect and  $v_{it}$  denotes the disturbance.

The  $X$  term in equation (2) includes three different vectors of explanatory variables. The first one entails economic opportunities, the second considers migration costs, and the third includes different “control” variables. The vector of economic opportunities includes relative per capita GDP or relative real wage index, percentage of economically active population working in the manufacturing and agricultural sector, relative change in per capita GDP, relative average growth of GDP during the past three years, and natural increase lagged 20 years. The vector of migration costs includes distance, language, total migration in previous periods, migration from country  $i$  to the U.S., and the migrant stock from country  $i$  residing in country  $j$ . Finally, the third vector contains population of country  $i$ . In what follows I will provide a brief discussion of the expected hypotheses about the vectors of economic opportunities, migration costs, and different control variables.

### *Economic Opportunities*

The relative real per capita GDP (or the relative real wage index) is a proxy for real income. The bigger per capita GDP (or wage) at home, the less attractive migration becomes for an individual, and vice versa. Therefore, it is hypothesized that earning a higher income abroad will be considered a pull factor for European emigrants. The same reasoning applies to the change in per capita GDP and the average growth rate of per capita GDP. That is, if the ratio of the change in per capita GDP is bigger than one, that implies that the source country is growing faster than the destination country, having more economic opportunities at home and discouraging migration.

During the late nineteenth century the primary sector (agriculture) dominated the economic activity in Brazil and Argentina. Therefore, I hypothesize that an individual

from a country with a higher percentage of economically active population in the agricultural sector was more likely to migrate to Brazil and Argentina because it was easier for the migrant to transfer his/her skills.<sup>2</sup>

The natural increase is defined as the difference between the crude birth and the crude death rates in the country of origin. By lagging this variable twenty periods I get a proxy of the wage pressure on the entry level cohort. Where the natural increase is higher, more individuals are entering the labor force. This increase in labor supply places some downward pressures on wages, encouraging individuals of the source country to emigrate. Therefore, a positive relationship between the natural increase and immigration is expected. In addition, people in their early 20s also have high propensities to migrate.

#### Migration Costs

The potential migrant adjusts to differences in the cost of migration. Higher migration costs discourage the migrant to move from country  $i$  to country  $j$ . Table 2 shows the price of passages from selected European countries to Argentina reported by Consul Baker in 1887. Prices varied according to the place the immigrant embarked and in some cases, according to the number of steamers at the same time offering passage (Reports of the Consular Officers of the United States, 1887). Although this information was available for some countries in 1887, it is more difficult to get the prices for every year and every country. It is a common practice in migration studies, to take distance as a proxy for the monetary and non-monetary costs. The bigger the distance between the source and the destination countries, the less likely are people to migrate from country  $i$  to country  $j$ .

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<sup>2</sup> Another possibility is that land in Europe went to the oldest son, leaving younger siblings to seek opportunities elsewhere.

Language is also considered a proxy of the non-monetary costs of moving. This is associated with assimilation and transferability of skills. I assume that an immigrant that arrives to Argentina (Brazil) and does not speak Spanish (Portuguese) will spend more time assimilating to the new customs due to the language. In addition, it is assumed that skills are less transferable when the immigrant has to learn a new language. Therefore, it is hypothesized that individuals from countries where Spanish or Portuguese is not the primary language are less likely to migrate to Argentina or Brazil.

Another variable that is commonly used as a proxy of the cost of migration is migration in previous periods. This variable provides a source of information about Argentina (or Brazil). Furthermore, it provides recent migrants with cultural and religious similarity with their home country. Thus, I hypothesized a positive relationship between current migration and past migration.

Finally, a dummy variable called “*Med*” that assigns 1 to immigrants coming from the Mediterranean countries (France, Italy, Spain and Portugal) and 0 otherwise, is included in the model. Migrants from Southern Europe all spoke Romance languages (French, Italian, Spanish and Portuguese) so it was easy for them to shift from one to another of these languages. Indeed, Consul Baker called Argentina a “Paradise for the Immigrants from the Mediterranean”. In the last paragraph of his 1885 report on “*The Conditions and Prices of Labor in the Argentine Republic*” he writes:

“...to the French, the Spanish, the Portuguese, and especially the Italians, I believe the Argentine Republic offers peculiar inducements and advantages. With them almost any change is for the better; but the aside from this, the laboring classes of the overcrowded centers of population of the Mediterranean shores are so similar in origin and customs and language, that they easily adjust themselves to the change of home and almost at once assimilate with the people of the river Plate. To the surplus populations of those countries I consider that the Argentine Republic offers a wide field and prosperous future. The best proof of this is the fact that they are already here in large numbers, and are fully in possession of all the avenues of labor and enterprise, ready and eager to occupy every available opening. It is hardly like leaving home for them to come here, for they

immediately find themselves in the midst of their own friends and countrymen, and without delay or difficulty take their chances with them in a battle of life.” (p. 16, U.S. Consular reports, 1886).

### Different Control Variables

Migration from country  $i$  to the United States is considered a substitute for the country of destination since it provided an alternative opportunity. If more individuals migrate from Europe to the United States, less people go to South America. Therefore, I hypothesize a negative relationship between the two variables.

Population in the source country is another variable that affects migration. An increase in the number of inhabitants, other things equal, decreases economic opportunities for natives at home. Therefore, it is hypothesized a positive relationship between immigration and population growth.

Finally, migration stock is also included as a control variable in my model. It is defined as the number of citizens of country  $i$  that lived in country  $j$  in year  $t$ . This variable gives a source of information about country  $j$  to those back in country  $i$ . The more foreigners from country  $i$  settled in Argentina (or Brazil), the easier the assimilation of new immigrants from country  $i$  due to the social, cultural, and religious ties back to  $i$  (Greenwood 2005). Thus, other things equal, I expect a direct relationship between the migration stock and immigration to South America.

### **III. Data**

There is a degrees of freedom restriction on the estimated model that is imposed based on the number of countries in the sample. The model requires that the number of explanatory variables to be equal or less than  $n-1$ , where  $n$  is the number of source

countries.<sup>3</sup> Given this constraint, countries of origin were chosen according to the availability of data on the dependent variable, which is migration from source country  $i$  to Argentina and Brazil. All countries for which data on dependent and independent variables were available were used.

The data set uses 10 source countries including Belgium, Denmark, France, Germany, Italy, Netherlands, Spain, Sweden, United Kingdom, and Portugal.<sup>4</sup> Migration from European countries to Argentina comes from three different sources: *Ministerio de Agricultura de la República Argentina* (1925), Ferenczi and Willcox (1929), and the *Organización de Estados Americanos* (1990). Migration from the same European countries to Brazil comes from Ferenczi and Willcox (1929), and the *Organización de Estados Americanos* (1990). Per capita GDP can be found in Maddison (2001), whereas the real wage index comes from Williamson (1995). Distance comes from the website *www.indo.com* and is calculated as the distance in miles between the main port city (capital city if the country does not have a port) of the source country  $i$  and Buenos Aires for Argentina, and Sao Paulo for Brazil. Finally, crude birth rates, crude death rates, total population and economically active population by industrial sector were collected from Mitchell (1981).<sup>5</sup> Greenwood (2005) provides more details on the construction of the variables.

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<sup>3</sup> The regression model estimates three different estimators, the within estimator, the between estimator, and the HT estimator. In order to estimate the between, we need the within estimator. Likewise, in order to estimate HT we need the between estimator. Since the within estimator is based on deviations from the group means, and the equation in terms of group means involves only  $n$  observations, we have to use  $n-1$  explanatory variables; otherwise it cannot be estimated (see Greene, 2000, for additional information).

<sup>4</sup> Ireland is not broken out of the UK data.

<sup>5</sup> Table 3 shows the descriptive statistics of the different variables used in the different specifications.

#### IV. Empirical Specification and Results

In order to simplify the notation, I partition the vector of independent variables  $X$  in equation (2) into two different vectors, a vector of variables that measure characteristics of country  $i$  during time  $t$  ( $X_{it}$ ); and another vector of time invariant variables ( $Z_i$ ).

Therefore, the model of migration for each destination country can be represented as:

$$(3) \quad m_{it} = \alpha_i + \delta_t + \beta X_{it} + \gamma Z_i + \varepsilon_{it}, \quad i = 1, \dots, 10; t = 1, \dots, 41;$$

where  $m_{it}$  represents total migration from country  $i$  in year  $t$ ;  $\alpha_i$  measures unobserved country specific effects;  $\delta_t$  considers unobserved time specific effects;  $X_{it}$  is a vector of variables that measure characteristics of country  $i$  during year  $t$ ;  $Z_i$  is a vector of time invariant variables; and  $\varepsilon_{it}$  represents random disturbances.

By using panel data, I am able to exploit the time-series and cross-section variation in immigration to Argentina and Brazil. Equation (3) is estimated for Brazil and Argentina using the Hausman-Taylor Instrumental Variable technique with annual panel data from 1870 to 1910 for ten source countries. Another way to deal with panel data is to use either the fixed or the random effects model. However, there are some limitations associated with each possible approach. The fixed effects model is inappropriate when applied to migration models because the coefficients on time invariant variables are lost (i.e. distance or language). In the migration literature it has been proved, both theoretical and empirically, that distance plays an important role in determining migration. Thus, alternative techniques are necessary for the estimation. The second option is the random effects model. Even when this technique yields consistent estimates, it requires zero

correlation between the random effects and the explanatory variables, a condition usually violated with migration data.<sup>6</sup>

Therefore, I use the Hausman-Taylor Instrumental Variables as an alternative approach. The advantage of using this technique is that it takes into account the unobserved country and unobserved time-specific effects. Furthermore, it accounts for the correlation between certain variables of the model and unobserved country and time-specific effects (Hausman and Taylor 1981). In order to calculate the instrumental variables estimates of  $\beta$  and  $\gamma$  for equation (2) the vectors  $X$  and  $Z$  are required to be partitioned so that  $X = (X_1 | X_2)$  and  $Z = (Z_1 | Z_2)$ , where the elements of  $X_1$  and  $Z_1$  are assumed to be exogenous or uncorrelated with the country effects ( $\alpha_i$ ), while  $X_2$  and  $Z_2$  are correlated with the country effects.<sup>7</sup>

The next step is to decide which variables could be correlated with unobserved country-specific effects and which ones are uncorrelated with them. Therefore, it should be considered which are and which are not “choice” variables for potential migrants in the source country  $i$  contemplating a move to Argentina or Brazil (Greenwood, 2005). For instance, we may think that education and skills in Spanish (Portuguese) are more internationally transferable to Argentina (Brazil) than those developed in another language. The knowledge of Spanish (Portuguese) could lead to better information about Argentina (Brazil), resulting in a correlation with the country-specific effect. Along the same lines, the number of previous migrants from country  $i$  to Argentina (Brazil) may develop a taste for Argentina (Brazil) lifestyle or for others aspects of living in Argentina

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<sup>6</sup> A chi-squared test with  $k$  degrees of freedom, where  $k$  is the number of time invariant variables, is implemented. Under the null hypothesis that individual effects are uncorrelated with regressors, we reject random effects (in favor of HT estimates) for large values of the test statistic.

<sup>7</sup> For additional discussion of the methodology see Greenwood, McDowell and Waldman (1996).

(Brazil) that is transmitted to current migrants and could thus be correlated with the unobservables” (Greenwood 2005, p.23).

As a final step, I classify the variables into four different groups. They are identified as belonging to  $X$  (temporally variant) or  $Z$  (temporally invariant) and as exogenous ( $X_1$ ,  $Z_1$ ) or endogenous ( $X_2$ ,  $Z_2$ ). In addition, a test for the exogeneity of the instruments is implemented for each regression to verify the validity of the instruments.

### Results

Due to the degrees of freedom constraint, I am forced to use different specifications, (each one with nine explanatory variables). In particular, I use three specifications. The first one includes the percentage of the economically active population in manufacturing, while specification II considers the percentage of the economically active population in agriculture. Specification III includes the stock of migrants and omits the percentage of the economically active population both in the manufacturing and the agriculture sector.

In addition, each specification has been implemented twice for each country. First, using relative one-year lag per capita GDP. Second, using relative one-year lag real wage index. Finally, the three specifications are expressed in double logarithm form, therefore the estimated coefficients are elasticities.

The Hausman Taylor estimates for Argentina and Brazil using specification I are shown in Table 4. Argentina shows a negative relationship between the one-year lag relative per capita GDP and the number of immigrants. This is consistent with our initial prediction. The bigger the gap between per capita GDP in the source country relative to per capita GDP in the destination country, the less the people that migrate. The coefficient of population in the source country resulted positive and significant, showing

a higher emigration in countries with large populations, due to the lack of opportunities. Immigration to the US from country  $i$  was included in the model as an alternative option for the potential migrant. The estimated coefficient is negative and significant. In other words, South American immigration decreased as US immigration increased.

Total immigration in the previous two years is also highly significant. The positive sign of this elasticity confirmed that prior migration increased current migration. The coefficient of the natural increase lagged 20 years is positive and significant, which is consistent with the initial hypothesis of the wage pressure on the entry-level cohort. The estimated elasticity of the percentage of the economically active population working in the manufacturing sector was not statistically significant. Likewise, the model did not capture any significance between the cost of migration variables (language and distance) and total immigration from country  $i$ . As mentioned before in the US Consular Reports, the incentives offered by the Governments of Argentina and Brazil probably offset the potential costs associated with learning a new language or simply incurred in a longer journey.<sup>8</sup> This result is also consistent with figures 1 and 2. The graphs show how a non Spanish/Portuguese speaker country (Italy), dominated South American immigration during the late nineteenth century.

Similar results were found when using the relative real wage index as a proxy for income. These elasticities are reported in the second column of table 4. The estimated coefficients showed a minimum difference in magnitude and no difference at all in direction.

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<sup>8</sup> Another factor that reduced the cost of migration and improved efficiency of labor markets in the recipient countries was the advent of steamship transportation in the 19<sup>th</sup> century.

The last two columns of table 4 illustrate the case of Brazil. Estimations show the same qualitative results obtained for Argentina. Significance was found in variables such as the one-year lag per capita GDP, population of the source country, natural increase lagged 20 years, immigration to the US, and lagged migration. However, the natural increase lagged 20 years showed a negative impact on immigration. It is worth remembering that according to Ferenzci and Willcox (1929), Brazil was the third recipient of migrants in America, after the US and Argentina. The negative sign may reflect the fact that European migrants were going to alternative destinations in America.

Regarding the rest of the economic variables, the signs of the estimated coefficients resulted as I initially hypothesized. Relative per capita GDP is negative, population of the source country is positive, immigration to the US is negative, and previous migration is positive.

The costs of migration measured through distance and language resulted statistically insignificant, as well as the percentage of the economically active population in the manufacturing sector. This result is similar to what I got for Argentina, suggesting that distance and learning a new language was not essential for individuals moving from Europe (except Portugal) to Brazil. As noted earlier in the Consular Reports, subsidies and other ways of support offered by the Brazilian government as well as the reduction in migration costs due to the advent of steamship transportation influenced the behavior of these migrants and can help to explain the insignificance of the previous coefficients.

Table 5 shows the estimations for specification II. The estimated elasticities for economic opportunities and the costs of migration for Brazil and Argentina mimic the results obtained in the first specification. I found a negative relationship between relative

income and migration; a positive coefficient of the population of country  $i$ ; a negative elasticity between US migration and migration to Argentina (Brazil); a positive impact of previous migration; and a positive coefficient for the natural increase lagged 20 years (although negative for Brazil). All these variables resulted statistically significant.

On the other hand, the variables associated with the costs of migration (distance and language), as well as the percentage of economically active population in agriculture were not statistically significant.

Finally table 6 presents the results using specification III. This model includes the stock of migrants and drops out both the percentage of economically active population in manufacturing and agriculture. Results for Argentina show a positive and highly significant impact of the migration stock. However, it also makes the coefficient on population of country  $i$  statistically insignificant. Relative one-year lag per capita GDP, natural increase, immigration to the US, and previous migration resulted statistically significant and with the expected signs. A new finding is the significance of the coefficient of language (though negative). This means that on average, people coming from Spain and Portugal migrate less to Argentina. This is true if we take into account that Italy was one of the main source of migrants for Argentina during the late 19<sup>th</sup> century.

For Brazil, results were a little different. The migration stock was positive and statistically significant, as well as the relative per capita GDP, population of the source country, the natural increase lagged 20 years, and previous migration. However, the variables that measure the costs of migration resulted statistically significant (as in the

previous two estimations). Although the direction of the coefficients is the same that the ones estimated for Argentina, the magnitude is usually larger for Brazil.<sup>9</sup>

## V. Summary and Conclusions

European migration during the late nineteenth and the early twentieth centuries to North America, in particular the US, has been widely studied. However, little attention has been given to transatlantic migration to South America. In this study, I examine the economic and non economic factors that influenced European migration to South America, focusing on the cases of Argentina and Brazil (after the US, the second and third largest recipients of European migrants).

I use a panel data that includes 10 European source countries over a period of 41 years from 1870 to 1910. In general, the random effects model is rejected in favor of the Hausman Taylor instrumental variable approach which accounts for the unobserved country-specific and unobserved time-specific effects.

Empirical results show similar findings for Argentina and Brazil. In particular, estimations showed that migration from country  $i$  in period  $t-2$  had a positive impact on migration in period  $t$ . This variable was highly significant for both Argentina and Brazil. The estimated elasticity tells us that a 10 percent increase on migration in  $t-2$  increases migration in  $t$  by approximately 6 percent. As expected, relative per capita GDP in  $t-1$  was also a key determinant of European emigration, showing that individuals tend to go to places where earnings or potential income is higher. The estimated elasticities ranged from -0.82 to -1.38 for Brazil and Argentina, respectively. Some other variables that were key factors in determining migration to South America were the natural increase,

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<sup>9</sup> It is worth noting that the random effects model could not be rejected for Brazil when using the relative real wage index. This is why I decided not to mention the corresponding estimation for Argentina.

population of the source country, immigration to the US as an alternative destination, and the stock of migrants.

On the other hand, migration costs measured through distance and language resulted statistically insignificant. The percentage of the economically active population in the manufacturing/agricultural sector was also statistically insignificant. The fact that individuals in Europe did not consider some of the migration costs is likely to be due to the incentives offered by both the Argentinean and Brazilian governments to attract immigrants from the Old World to the New World, as suggested by some of the US Consular Reports. In addition, the advent of the steamship transportation reduced the costs of migration during the 19<sup>th</sup> century.

Even though Argentina and Brazil were experiencing different political and economic conditions, the two countries were in need of labor, and at some point their governments offered subsidies to attract migration. This may help to explain the similarity in results between the two South American countries. A further research involves the inclusion of the US to see how the determinants of migration differ between the three countries.

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## VII. Appendix

**Table 1**  
**Argentina, Brazil, and US Immigration,**  
**by country of origin and by decade\***

	Period	Argentina	Brazil	United States
Belgium	1870-1879	628	671	6,991
	1880-1889	15,096	1,919	18,738
	1890-1899	2,654	951	19,642
	1900-1910	2,391	417	42,831
Denmark	1870-1879	303	401	29,278
	1880-1889	1,128	589	85,342
	1890-1899	1,282	500	56,671
	1900-1910	3,437	482	68,211
France	1870-1879	32,938	4,879	71,901
	1880-1889	79,422	7,621	61,548
	1890-1899	41,048	7,575	35,616
	1900-1910	37,340	5,028	75,118
Germany	1870-1879	3,522	14,627	751,769
	1880-1889	12,958	18,901	1,445,181
	1890-1899	9,204	17,084	578,163
	1900-1910	20,064	17,750	360,005
Ireland	1870-1879	-	-	442,198
	1880-1889	-	-	674,061
	1890-1899	-	-	405,710
	1900-1910	-	-	374,785
Italy	1870-1879	156,716	50,668	46,296
	1880-1889	472,179	277,124	267,660
	1890-1899	411,764	690,365	603,797
	1900-1910	848,533	235,557	2,145,712
Netherlands	1870-1879	111	709	14,267
	1880-1889	4,315	800	52,715
	1890-1899	675	811	29,349
	1900-1910	1,622	3,254	49,997
Norway	1870-1879	-	-	88,644
	1880-1889	-	4	185,111
	1890-1899	-	196	98,810
	1900-1910	-	64	200,090
Spain	1870-1879	44,802	4,922	5,540
	1880-1889	148,394	30,066	3,995
	1890-1899	114,731	164,293	9,189
	1900-1910	672,941	133,985	28,290
Sweden	1870-1879	186	462	90,179
	1880-1889	632	214	401,330
	1890-1899	490	2,751	239,248
	1900-1910	592	541	268,184
Great Britain	1870-1879	9,265	3,459	558,512
	1880-1889	15,692	1,216	805,111
	1890-1899	4,691	2,796	328,759
	1900-1910	13,186	3,984	528,890
Portugal	1870-1879	656	67,609	13,971
	1880-1889	1,852	104,690	15,186
	1890-1899	1,612	219,353	25,874
	1900-1910	10,481	226,443	73,367

Source: Own calculations based on OEA (1990) and Ferenczi and Willcox (1929).

\* Caveat: these numbers might not be comparable since they come from different official sources. However, they give us an idea of the destination of European emigration.

**Table 2**  
**Price of Passages from Europe to Buenos Aires, Argentina**

Steamer	Place of Embark	Price
North German Lloyd	Bremen, Germany	\$35.00
North German Lloyd	Antwerp, Belgium	\$32.50
Lamport and Holt	Liverpool/ London, UK	\$40.00
French Line	Havre/Bordeaux, France	\$40.00
Transport Maritimes	Barcelona, Spain	\$20.00 to \$35.00
Transport Maritimes	Marseilles, France	\$35.00 to \$45.00
Italian Line	Genoa, Italy	\$45.00 to \$50.00
Piaggio Line	Genoa, Italy	\$50.00 to \$60.00
Savarillo Line	Genoa, Italy	\$32.50 to \$47.50

Source: United States Consular Reports, No. 24, 1887.

**Table 3**  
**Descriptive Statistics**

Variable	Mean	Std Dev	Variance	Minimum	Maximum
Immigration to Argentina	7803.739	20296.19	4.12E+08	1	131466
Immigration to Brazil	5660.248	14691.99	2.16E+08	0.8709	132326
Distance to Brazil (miles)	5947.5	485.4456	235657.4	4926	6778
Distance to Argentina (miles)	6961.4	486.2296	236419.3	5939	7778
Population Brazil	14971.29	3701.277	13699451	9797	22216
Population Argentina	3740.598	1416.698	2007034	1796	6836
Percentage of immigrants to Argentina relative to Americas (US, ARG & BRZ)	0.1739	0.2526	0.0638	0.0002	0.9574
Percentage of immigrants to Brazil relative to Americas (US, ARG & BRZ)	0.1461	0.2549	0.065	0	0.9567
Percentage of immigrants to US relative to Americas (US, ARG & BRZ)	0.68	0.356	0.1268	0.0044	0.9995
Language (Spanish and Portuguese)	0.2	0.4005	0.1604	0	1
Per capita GDP, country <i>i</i>	2484.212	900.2731	810491.6	932	4679
Per capita GDP, US	3526.537	797.8788	636610.5	2445	5079
Per capita GDP, Brazil	737.4132	38.5981	1489.816	621.1956	793.5066
Per capita GDP, Argentina	2358.061	681.3824	464281.9	1310.69	3821.679
Real Wage Index, country <i>i</i>	59.4854	24.6549	607.8641	17	107
Real Wage Index, US	141.3171	18.9768	360.1193	111	172
Real Wage Index, Brazil	67.2683	14.0206	196.5782	39	95
Real Wage Index, Argentina	76.8537	19.8916	395.6754	41	114
GDP, Brazil	11028.71	2760.469	7620188	6985	17078
GDP, Argentina	9778.488	6500.551	42257166	2354	26125
GDP, country <i>i</i>	51802.31	54221.28	2.94E+09	3782	210513
GDP, US	238136	109597.6	1.2E+10	98374	460471
Rate of natural increase, <i>t-20</i>	9.9167	4.7027	22.1157	-12.2	26.7491
Percentage Economic active population in agriculture	0.4431	0.1778	0.0316	0.0975	0.7102
Percentage Economic active population in manufacturing	0.2453	0.0923	0.0085	0.0791	0.4722
Population, country <i>i</i>	19284.77	16842.32	2.84E+08	1785	64926
Migration stock, Argentina	80126.15	166858.6	2.78E+10	288.73	847562.1
Migration stock, Brazil	37849.84	90411.44	8.17E+09	72	444596.5
Mediterranean (Italy, Spain, Portugal and France)	0.4	0.4905	0.2406	0	1

**Table 4**

**Immigration from Europe: 1870-1910**  
**Hausman-Taylor Instrumental Variables Estimates**

**Specification I : including percentage of  
the economic active population in  
the manufacturing sector**

Dep Variable: # of immigrants from country <i>i</i>	Argentina		Brazil	
	Relative Per Capita GDP, t-1 (X1)	-1.217* (-5.431)	—	-0.829 (-1.481)
Relative real wage, t-1 (X1)	—	-0.432* (-2.667)	—	-1.036* (-3.18)
Population of source country (X1)	0.664* (3.593)	1.658* (4.934)	2.584* (3.491)	0.998* (2.549)
Natural Increase, t-20 (X1)	0.212* (2.899)	0.213* (2.941)	-0.45* (-3.706)	-0.387* (-3.2)
Immigration to US from country <i>i</i> relative to Argentina and Brazil (X1)	-0.394* (-4.689)	-0.346* (-4.179)	-0.41* (-2.921)	-0.358* (-2.562)
Total Migration prior 2 yrs (X2)	0.604* (13.755)	0.636* (14.981)	0.635* (12.58)	0.640* (12.846)
Percentage of the EAP working for the manufacturing sector (X1)	-0.327 (-1.343)	-0.291 (-1.134)	0.395 (0.873)	0.560 (1.293)
Percentage of the EAP working for the agriculture sector (X1)	—	—	—	—
Distance (Z1)	-0.367 (-0.079)	11.313 (0.857)	20.513 (0.762)	4.877 (0.400)
Constant (Z1)	-0.784 (-0.043)	-50.058 (-0.977)	-86.64 (-0.844)	-21.33 (-0.458)
Language (Z2)	-0.471 (-1.127)	0.617 (0.579)	2.006 (0.798)	0.430 (0.368)
Test for the exogeneity of the HT instruments	0.4550	1.0897	1.2525	1.447
Reject Random effects (chi-squared Test)	Yes (100.59)	Yes (83.528)	Yes (50.24)	Yes (55.155)

\*Significant at 95%.

T-ratios are in parentheses.

**Table 5**

**Immigration from Europe: 1870-1910**  
**Hausman-Taylor Instrumental Variables Estimates**

**Specification II : including percentage of  
the economic active population in  
the agriculture sector**

Dep Variable: # of immigrants from country <i>i</i>	Argentina		Brazil	
	Relative Per Capita GDP, t-1 (X1)	-1.38* (-5.094)	—	-0.952* (-1.676)
Relative real wage, t-1 (X1)	—	-0.397* (-2.453)	—	-0.948* (-2.94)
Population of source country (X1)	0.80* (2.262)	2.347* (4.614)	3.369* (3.322)	1.119* (1.949)
Natural Increase, t-20 (X1)	0.216 (3.014)	0.203* (2.813)	-0.432* (-3.579)	-0.383* (-3.177)
Immigration to US from country <i>i</i> relative to Argentina and Brazil (X1)	-0.392* (-4.81)	-0.36* (-4.346)	-0.434* (-3.087)	-0.374* (-2.667)
Total Migration prior 2 yrs (X2)	0.589* (13.684)	0.619* (14.319)	0.617* (12.02)	0.632* (12.619)
Percentage of the EAP working for the manufacturing sector (X1)	—	—	—	—
Percentage of the EAP working for the agriculture sector (X1)	0.363 (1.159)	0.549 (1.443)	0.432 (0.649)	-0.294 (-0.529)
Distance (Z1)	0.13 (0.014)	16.85 (0.83)	23.146 (0.653)	5.443 (0.343)
Constant (Z1)	-2.84 (0.077)	-73.75 (-0.938)	-99.784 (-0.739)	-24.434 (-0.403)
Language (Z2)	-0.498 (-0.623)	0.983 (0.606)	2.070 (0.625)	0.513 (0.341)
Test for the exogeneity of the HT instruments	0.8392	1.2017	1.351	1.4896
Reject Random effects (chi-squared Test)	Yes (93.79)	Yes (85.99)	Yes (76.83)	Yes (100.47)

\*Significant at 95%.

T-ratios are in parentheses.

**Table 6**

**Immigration from Europe: 1870-1910**  
**Hausman-Taylor Instrumental Variables Estimates**

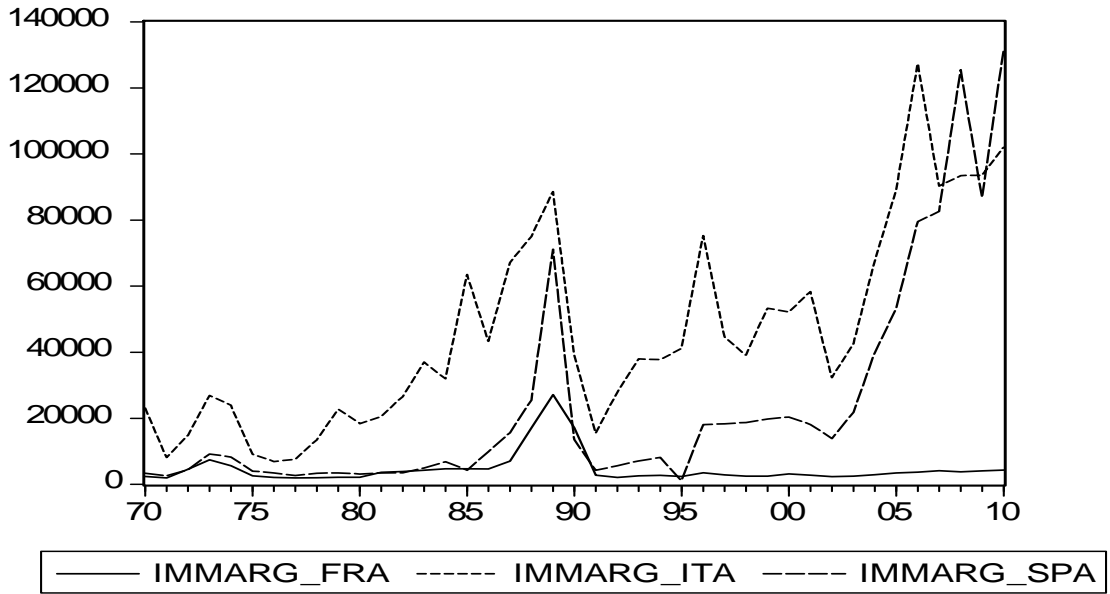
**Specification III : includes migration stock and leaves out  
the percentage of the economic active population in the  
manufacturing and the agriculture sector**

Dep Variable: # of immigrants from country <i>i</i>	Argentina		Brazil	
Relative Per Capita GDP, t-1 (X1)	-0.56* (-2.54)		-1.18* (-2.21)	—
Relative real wage, t-1 (X1)		-0.322* (-2.094)	—	0.84* (3.08)
Population of source country (X1)	0.045 (0.302)	-0.021 (-0.121)	1.83* (2.57)	-0.14 (-0.83)
Migration Stock (X1)	0.463* (5.197)	0.538* (6.191)	0.37* (4.44)	-0.27* (-2.46)
Natural Increase, t-20 (X1)	0.204* (3.064)	0.220* (3.275)	-0.35* (3.02)	0.28* (3.63)
Immigration to US from country <i>i</i> relative to Argentina and Brazil (X1)	-0.383* (-4.83)	-0.343* (-4.328)	-0.42* (-3.09)	-0.40* (-2.98)
Total Migration prior 2 yrs (X2)	0.52* (11.309)	0.533* (11.577)	0.53* (9.86)	0.58* (11.08)
Percentage of the EAP working for the manufacturing sector (X1)	—	—	—	—
Percentage of the EAP working for the agriculture sector (X1)	—	—	—	—
Distance (Z1)	-0.591 (-0.239)	0.333 (0.105)	13.89 (0.59)	-3.55 (-1.00)
Constant (Z1)	1.191 (0.123)	-2.506 (-0.202)	-59.57 (-0.66)	12.52 (0.92)
Language (Z2)	-0.51* (-2.306)	-0.424 (-1.59)	0.82 (0.38)	-0.35 (-0.96)
Test for the exogeneity of the HT instruments	0.1661	0.6895	1.43	0.69
Reject Random effects (chi-squared Test)	Yes (42.10)	Yes (40.774)	Yes (33.07)	No (8.3 x 10 <sup>-5</sup> )

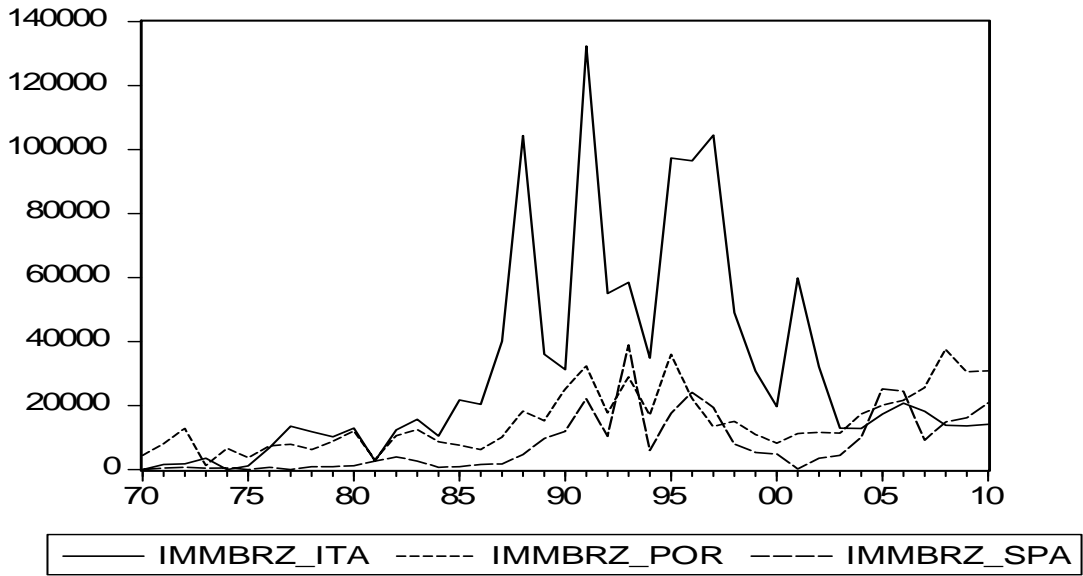
\*Significant at 95%.

T-ratios are in parentheses.

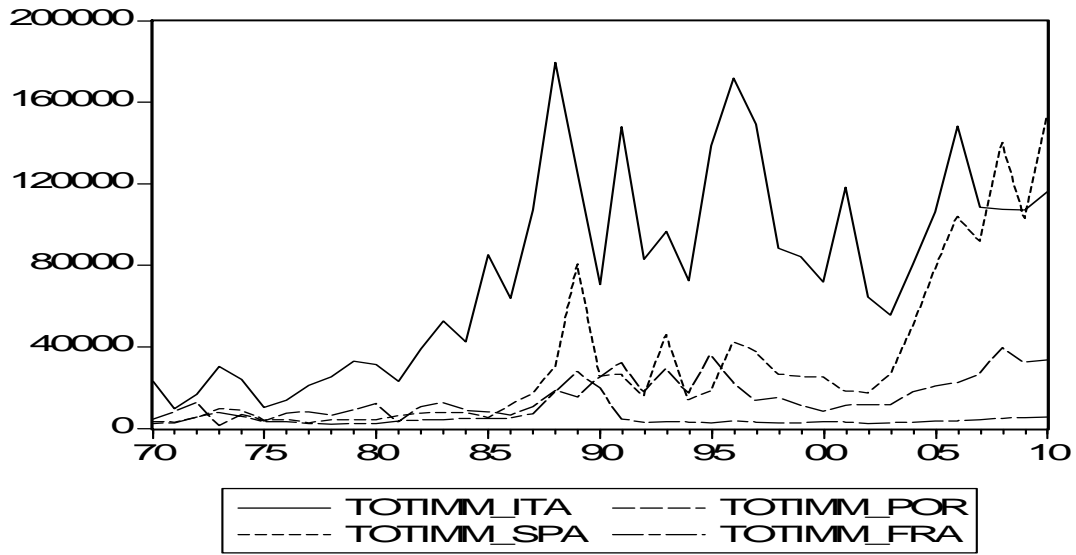
**Figure 1**  
**Immigration to Argentina**



**Figure 2**  
**Immigration to Brazil**



**Figure 3**  
**Total Immigration to Argentina and Brazil**



**Figure 4**  
**Italian Immigration to Brazil and Argentina**  
**Portuguese Immigration to Brazil, Spanish Immigration to Argentina**

