From Europe to the Americas: A Comparative Panel-Data Analysis of Migration to Argentina, Brazil, and the United States, 1870-1910

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Abstract

In this paper we use annual panel data, 1870-1910, to estimate and compare the determinants of European emigration to Argentina, Brazil, and the United States. We employ the Hausman-Taylor Instrumental Variable technique, which provides for cross-sectional (country) and temporal (annual) controls, accounts for variables that are potentially correlated with the unobservables, and allows the recovery of temporally invariant variables. Although the models are estimated separately, they are linked through the inclusion of migration to the other two countries as a measure of the opportunity cost of migrating to any given country. Migration to the South American countries was dominated by Portugal, Spain, and Italy. Especially after 1900, Italy also became an important source of U.S. immigrants. Nevertheless, the determinants of migration to Argentina and Brazil were similar to those for the U.S. in many, but not in all respects. In general, migration was from low-wage source countries, from countries with large stocks of immigrants in the destination who were born in the origin, and from countries with relatively much recent migration to the destination. Certain determinants differ considerably for the three countries. For example, greater rates of employment growth in the source countries compared to the U.S. seriously deterred migration to the U.S., but the same was not true of respective relative growth for Argentina or Brazil.

JEL: F22, N10, O50
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1. Introduction

The determinants of European emigration to the Americas during the 19^{th} and early 20^{th} centuries have been studied extensively (Baines, 1991; Gould, 1979; Hatton and Williamson, 1998). However, as noted long ago by Gould, a strong bias characterizes this literature due to "an orientation overly centred on the United States of America" (1979, p. 624). The bias is due partly to the availability of more and better immigration data for the U.S. than for other countries in the Americas.[1] It also is due partly to the fact that the majority of European transatlantic emigrants went to the U.S. Nevertheless, European migration to South America was substantial, amounting to over 6 million migrants to Argentina and Brazil between 1870 and 1910. The strong research orientation toward the U.S. has resulted in a neglect of well-known differences in the source-country composition of immigration to Argentina and Brazil compared to the United States and also to the neglect of changes in this composition over time. Moreover, the underlying determinants of migration to the various countries may have differed in kind and/or in magnitude, but we have little knowledge of exactly how and why. Gould notes this omission as "a relative neglect of the countries of the 'New' as opposed to the 'Old' immigration" (1979, p. 624). The goal of this paper is to study European migration to Argentina, Brazil, and the United States as separate destinations. To allow more comparability than has been possible in past work, we study each country of destination with essentially the same model, using annual panel data for the same period (1870-1910). We also link migration to each of the three countries by treating migration to the other two as alternative destinations.

Since Gould's critique of the literature, a few noteworthy efforts have been made to study historical migration to Latin America and especially to Argentina (Taylor, 1994) or from Latin Europe (Hatton and Williamson, 1994b, 1998; Faini and Venturini, 1994). For example, in a time-series context, Taylor (1994) models annual migration from Italy and Spain to Argentina, 1870-1939. Less modeling has been conducted on migration to Brazil.[2] In path-breaking work, Hatton and Williamson (1994b) study annual emigration from Italy (1877-1913), Portugal (1871-1913), and Spain (1883-1913) during the late 19^{th} and early 20^{th} centuries. In a panel data context, they also analyze decade average emigration rates for 12 European countries, 1850-1913. The annual models are estimated with time-series data, but not panel data. Although Faini and Venturini (1994) use annual panel data for emigration from Italy, 1876-1913, their destinations do not include South America, but rather only France, Germany, and the U.S. In our models, we study annual gross migration to the Americas from as many European source countries as possible. Although we too analyze emigration rates, our primary focus is on destinations rather than origins; that is, we examine where migrants came from and why they went where they did, and not why they departed independent of exactly where they went. In doing so, more than previous studies that analyze annual or short-term changes, we focus on cross-sectional differences between the countries of emigration and those of immigration. In the work reported below, we account for both unobserved country- and time-specific effects, and we also account for the potential correlation between certain variables of the model and such effects.

2. Immigration to the Americas

Although the U.S. was the leading country of immigration in the Americas, Argentina and Brazil also were important destinations for European emigrants. Between 1870 and 1910, the U.S. accepted 20.4 million immigrants from around the world; comparable figures are 3.5 million for Argentina, 3.1 million for Canada, and 2.6 million for Brazil. Thus, a total of over 29.6 million immigrants arrived in these four countries over the 41-year period. The U.S. accounted for 68.9% of them, whereas Argentina and Brazil together accounted for 20.7%.

During some periods certain European countries had more emigrants choose Argentina or Brazil than the U.S. For example, during the 1880s and 1890s more emigrants from France selected Argentina than the U.S. (Table 1). The same is true of emigrants from Italy during the 1870s and 1880s, and during the 1890s more of them went to Brazil than either Argentina or the U.S. During each decade between 1870 and 1910 more emigrants from Spain selected Argentina than the U.S., and during the last three of the four decades studied here, more went to Brazil than to the U.S. Between 1870 and 1910 about 5.1 million emigrants from Italy, Spain, and Portugal migrated to Argentina and Brazil, whereas only 3.2 million went to the U.S., of whom 2.1 million went from Italy between 1900 and 1910. Thus, in general, emigrants from Southern Europe had a strong preference for Argentina and Brazil over the U.S.

Table 2 reports migration rates for selected countries of European emigration to the Americas. These rates are expressed as annual average migrants per million source-country residents and are specifically distinguished for four periods. The patterns noted above are evident in that rates of migration from Germany and the U.K. to the U.S. were relatively high, averaging between 538.9 (1900-10) and 3,084.5 (1880-1889) for the former and 1,859.0 (1900-10) and 4,124.6 (1880-89) for the latter. (The U.K. includes Ireland.) Rates of migration from Portugal to Brazil were equally high and even higher for some periods (4,219.2 for 1890-99), and those for Spain to Argentina were especially high for 1900-10 (3,135.0). Italy's emigration rates to each of the three countries were high during the 1880s and 1890s, as well as very high to the U.S. during the first decade of the twentieth century (5,835.9). Italy's overall rates for the last two periods considerably exceed those of every other country for any period reported in Table 2. In general, emigration rates for the Southern European countries were sufficiently high to warrant more attention than they have received.

A major institutional difference between the two South American countries and the U.S. is that both Argentina and Brazil provided subsidies to immigrants, whereas the U.S. Government did not and usually barred any migrant whose passage was known to have been paid by a business interest. One reason that Argentina by the end of the 19th century ranked second in the number of immigrants accepted is the incentives it offered. In 1889, Minister Hanna in his U.S. Consular Report wrote:

> All this immigration is assisted by the (Argentinean) Government by the passage of the immigrants… In addition to the vast sums 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 estancies where employment has been secured for him (U.S. Consular Report. 1890, p. 327).

During the second half of the 19th century coffee cultivation became one of the most important sectors in the Brazilian economy (Texido, et al., 2003). However, labor was in short supply in Brazil. The Atlantic slave trade ended in 1850 and slavery was abolished in 1888. Cohen suggests that "the lucrative coffee bean crop could not be planted, cared for and harvested without massive injections of new immigrants" (1995, p. 203). Thus, a new source of labor was needed. After 1880 an immigrant labor regime known as the *colono* (i.e., laborer) system was implemented. Under this program the cost of the trip to the Brazil was fully subsidized by the state (especially São Paulo) and federal governments (Klein, 1995). In his 1887 report, U.S. Consul Letcher discussed some of the inducements offered by the Brazilian Government:

> 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 (U.S. Consular Report, 1887, p. 73).

Until 1870 most immigrants to Brazil were from Portugal, but after 1870 new immigration policies implemented by the Brazilian Government attracted migrants from Italy, Spain, and Germany. Many immigrants who came to Brazil after 1880 did not stay. Some emigrated to other Latin American countries and some returned home. This experience was not different than that for other countries in the Americas. For example, for the period 1870-1910 Argentina's emigration as a percentage of immigration was 53.5% for France, 44.0% for Germany, 55.4% for Italy, 39.9% for Spain, 57.4% for the U.K., and 64.2% for Portugal (Ferenczi and Willcox, 1929). As a consequence of labor shortages due to the ending of slavery and emigration, from 1888 to 1900 Brazilian planters subsidized European families as long as they stayed in Brazil (Klein, 1995). Of course, after about 1900 when migration from Italy to the U.S. became substantial, return migration from the U.S. was also common.

During the 1890s the Brazilian coffee boom ended, which resulted in a deterioration of already poor working conditions. Due to various problems for Italian laborers in Brazil around the turn of the century, the Italian Government passed a law in 1902 (the Pirinetti decree) that restricted migration to Brazil (Naylor, 1931; Gould, 1979). This law resulted in a sharp decline in the migration flow, from 59,869 in 1901 to 12,970 in 1903. Heavy net out-migration occurred. Whether the sharp increase in migration from Italy to Argentina and the U.S. was an indirect consequence is unclear.[3]

3. The Model

The theoretical perspective taken in most research regarding historical migration is that of a disequilibrium system. That is, migration is assumed to be driven by a set of non-market clearing national wages. Moreover, national differences in wages or per capita income are assumed to reflect opportunities for utility gains (Hatton and Williamson, 1998, p. 61). Underlying the disequilibrium perspective is the simple income-leisure model of labor economics wherein an optimizing agent maximizes a utility function subject to a full income constraint. One implication of this model is that the individual will supply labor such that the marginal rate of substitution of consumption for leisure equals the wage rate. If we abstract from mobility costs, the individual is expected to offer his labor services in the market with the highest wage, which may require migration (Greenwood, 1997). In general, economic opportunity differentials represent potential for household utility gains that can be arbitraged by migration. Such thinking almost certainly underlies Hicks's assertion that "differences in net economic advantages, chiefly differences in wages, are the main causes of migration" (1932, p. 76).

Essentially the same model is specified for Argentina, Brazil, and the United States, but the model for each country is estimated independently. The models emphasize the importance of both differential economic opportunities and the ease of transferring accumulated occupational skills from the various source countries to Argentina, Brazil, or the U.S. Potential migrants are assumed to be optimizers and to choose their utility maximizing location subject to their budget constraint. The potential migrant's utility in the home country is a function of his wage and the relative "attractiveness" of the home country. The individual decides to move to country j when expected maximum utility in j, which is based on the expected wage in j and other factors, exceeds home-country maximum utility by an amount greater than the costs of migration. The models focus on factors that are likely to have influenced 19th and early 20th century migrant flows and for which empirical measures are available. Each model contains three vectors of variables, one to reflect the relative economic advantage of country i compared to destination country j, one to reflect the costs of transferring accumulated occupational skills from i to j, and one that includes "control" variables. To simplify the notation, we treat the three as a single vector in the discussion that immediately follows. The model is of the following form:

$$m_{ijt} = \varphi v_{ijt} + \varepsilon_{ijt} , \qquad (1)$$

where m_{ijt} is country i's emigration rate to country j in year t, $\mathbf{v}_{\mathbf{ijt}}$ is a vector of annual explanatory variables specific to i and j, and $\boldsymbol{\varepsilon}_{\mathbf{ijt}}$ is random errors. Now partition $\boldsymbol{v}_{\mathbf{ijt}}$ such that $\boldsymbol{v}_{\mathbf{ijt}} = [\, \boldsymbol{x}_{\mathbf{ijt}} \mid \mathbf{z}_{\mathbf{ij}} \,]$, where $\boldsymbol{x}_{\mathbf{ijt}}$ is a kx1 vector of variables that measure characteristics of country i, year t, in the model for migration to country j, and $\mathbf{z}_{\mathbf{ij}}$ is a gx1 vector of time-invariant variables for country i in the model for country j. Now write (1) as

$$m_{ijt} = \alpha_{ij} + \delta_{jt} + \beta_j x_{ijt} + \gamma_j z_{ij} + \varepsilon_{ijt}\,, \qquad (2)$$

where $\boldsymbol{\alpha}_{\mathbf{ij}}$ is unobserved country-specific effects in the model for country j, $\boldsymbol{\delta}_{\mathbf{jt}}$ is unobserved time-specific effects in the model for country j, and $\boldsymbol{\beta}_{\mathbf{j}}$ and $\boldsymbol{\gamma}_{\mathbf{j}}$ are vectors of unknown parameters in the model for country j. The Hausman-Taylor (HT) Instrumental Variable (IV) approach (Hausman and Taylor, 1981) is used to estimate Equation (2). In this approach the $\boldsymbol{x}$'s for each country j are partitioned into ($\boldsymbol{x_1} \mid \boldsymbol{x_2}$) and the $\mathbf{z}$'s are partitioned into ($\boldsymbol{z_1} \mid \boldsymbol{z_2}$), where the k_1 elements of $\boldsymbol{x_1}$ and the g_1 elements of $\boldsymbol{z_1}$ are uncorrelated with the country effects, but the k_2 elements of $\boldsymbol{x_2}$ and the g_2 elements of $\boldsymbol{z_2}$ are correlated with the country effects. All variables are twice mean differenced (through time and across countries), so $\boldsymbol{\alpha}_{\mathbf{ij}}$ and $\boldsymbol{\delta}_{\mathbf{jt}}$ drop out of the estimation. However, mean differencing and using (cross-sectional and temporal) dummy variables are algebraically equivalent (but mean differencing allows the recovery of the coefficients of temporally invariant variables) (Hausman and Taylor, 1981).

A decision must be made regarding which variables may be correlated with unobserved country-specific effects and which are not (i.e., are exogenous). The distinction is based on the idea that any variable that could reflect a taste for country j may be correlated with the unobservables. For example, the number of recent migrants from i to country j may reflect a taste for j that is transmitted to potential migrants and therefore may be correlated with the unobservables. A similar argument holds for treating the language dummy (English in the U.S. model and South in those for the other countries) as endogenous. In the tables below that report the Hausman-Taylor IV estimates, variables are identified as belonging to $\boldsymbol{x}$ (temporally variable) or $\boldsymbol{z}$ (temporally invariant) and as exogenous ($\boldsymbol{x_1}, \boldsymbol{z_1}$) or endogenous ($\boldsymbol{x_2}, \boldsymbol{z_2}$). For each regression, a test is performed for the exogeneity of the HT instruments. In no case can exogeneity be rejected.

Let the vector $v_{\mathbf{ijt}} = [v_{\mathbf{1ijt}}, v_{\mathbf{2ijt}}, v_{\mathbf{3ijt}}]$, where the three $\mathbf{v}$'s represent each of three vectors noted above. Four variables are included in vector $\boldsymbol{v_1}$ to reflect differential economic opportunities of the various source countries compared to the U.S.: (1) relative real wage rate in year t-1, defined as source-country index relative to the country j index (Williamson, 1995); (2) relative growth of GDP over the prior three years, measured as average annual growth in country i relative to that in destination country j (Maddison, 2003); (3) percentage of the economically active population of i that was engaged in manufacturing in year t (Mitchell, 1992); and (4) percentage of the economically active population of i that was engaged in agriculture in year t (Mitchell).[4]

Given migration costs and other characteristics of country i, the higher the potential migrants' wage in country i, the higher must be the expected wage in j to induce a move to j. Thus, higher relative wages should discourage migration from i to j.[5] Similarly, more rapid growth of GDP in i relative to that in country j ought to reflect relatively better job opportunities at home and discourage migration. In alternative regressions, to assess whether Southern Europeans behaved differently, we interact the relative wage (and, alternatively, the relative growth) variable and the dummy for Southern Europe. The two industrial composition variables ought to take opposite signs with higher percentages in manufacturing reflecting better opportunities at home and higher percentages of agriculture reflecting fewer opportunities there (Hatton and Williamson, 1998).

Six variables (as well as certain variants of these) are included in $\boldsymbol{v_2}$, the vector for the cost of moving from country i to j: (1) total migration from i to j over the prior 2 years[6]; (2) the number of persons born in i and living in j in year t (hereafter referred to as "migrant stock"); (3) birthrate in i (and, alternatively, rate of natural increase lagged 20 years (Mitchell)); (4) a dummy variable for countries where English is the official language (equals one for Ireland and for the rest of the U.K. and otherwise zero) in the U.S. model and a second dummy variable for countries where Spanish, Portuguese, or Italian is the official language (equals one for Spain, Portugal, and Italy and otherwise zero); (5) distance from i to j (the distance between the principal embarkation point and Buenos Aires (for Argentina), São Paulo (for Brazil), and New York City (for the U.S.)); and (6) the opportunity cost of moving to country j, measured as the number of emigrants from i who moved to the other two alternatives in the Americas in year t.

Numerous historical and contemporary migration studies find that past migration is a critical determinant of current migration (Greenwood, 1969; Dunlevy and Gemery, 1977; Hatton and Williamson, 1998). Indeed, this idea is the major theme of Gould's 1980 survey. Past migrants from i to j not only provided potential current migrants in i with information about j, but also they frequently paid the transatlantic fares of their relatives and friends. For example, for 1910, 1911, 1912, and 1913, 25%, 33%, 36%, and 32%, respectively, of the U.S. immigrants reported that they were assisted with their fares, and these figures are almost certainly low.[7] Past migrants also provided current migrants with food and shelter, specific job-related information, and language, religious, and cultural familiarity that eased the transition to the new country.

The distinction between (two-year) lagged migration and migrant stock is important. Hatton and Williamson (1994b) use a (one-year) lag and migrant stock to distinguish between short- and long-run responses, and that is certainly one way to view this distinction. Both variables are statistically significant in their work. Dunlevy and Gemery (1977) argue that migrant stock may reflect both the influence of family and friends and capture the operation of a partial adjustment mechanism, so they too include both in their model. They find that each variable is statistically significant in the same regression and interpret this result as indicating that each force is at work. Especially where much return migration was occurring, migrant stock would reflect the pull of one's own countrymen, as opposed to a lagged migration response. Remittances were more likely if the migrants were established in the new country than if they planned to stay for only a season or two. The migrant stock variable also is likely to serve as a better proxy for ethnic marriage markets in the destination countries. Sex ratios for return migration were much lower than for primary migration, which would tend to enhance the importance of the migrant stock variable as such a proxy.[8] Marriage markets presumably would reflect a long-run response more than a short-run response.

Higher birthrates in i should have discouraged younger individuals from migrating, especially females with young children. Children also raised the cost of family-unit migration. Particularly later in the period studied here, migrant sex ratios varied considerably across source countries.[9] More so than migrants from elsewhere in Europe, those from Southern Europe tended to move temporarily, leaving their families behind with the intention of returning to their source countries or later reuniting with their families in country j. Easterlin (1961) stressed the importance of lagged natural increase. As noted by Hatton and Williamson (1998), this variable has two potential effects on emigration. First, it reflects the increase in the population in the age group with the highest propensities to migrate. Second, the increase in the supply of labor at the ages of labor force entry should have placed downward pressure on the wages of this cohort relative to older workers. In each instance, higher rates of natural increase 20 years earlier should have encouraged more contemporary emigration.

In place-to-place migration models, distance serves as a proxy for the money costs of travel and for the nonmonetary costs of moving farther away from relatives and friends. During the late 19th century, a one-way fare from Liverpool to New York was about \$17.50, whereas that from Naples, Italy, to New York was about \$25.[10] Such fares appear to reflect distance. Thus, distance ought to have discouraged migration to the Americas. Finally, knowledge of the language most commonly spoken in the destination should have facilitated the transfer of skills to country j, as well as social and cultural assimilation, and therefore have encouraged migration. Due to the similarities between Spanish, Portuguese, and Italian, we group them into a southern Europe dummy variable in the models for Argentina and Brazil. We place the language dummy in the $\mathbf{z_2}$ vector for each of the three countries, but the Southern Europe dummy in the $\mathbf{z_1}$ vector for the U.S. for which the language dummy is for Ireland and Great Britain.

Linkages between the models for the three countries may be formed in different ways, and theory provides little guidance regarding which is to be preferred. One option is to include a relevant explanatory variable or variables for an alternative opportunity in a third country in the model for any given country (Wadycki, 1974; Hatton and Williamson, 1994b, p. 68). Thus, for example, the relative wage for country i and the U.S. could be included in the model for Argentina. A second option is to include the total flow of migrants from i to k in the model for migration from i to j. This flow could be lagged (Devoretz and Maki, 1983) or contemporaneous (Kelley, 1965; Williamson, 1974). Devoretz and Maki, for example, find that prior migration from country i to the U.S. discouraged current migration from i to Canada. Especially in a model in which degrees of freedom is an issue, one of these latter options seems preferable because it picks up those who actually moved to the alternative destination for whatever reason. In our empirical work we used each option, but settled on the Williamson method as the most comprehensive. Alternative opportunities within Europe are not taken into account.

The vector of control variables ($\mathbf{v_3}$), in addition to the constant term, contains the population of country i. Although source-country population is included in the denominator of the migration rate that forms the dependent variable, its inclusion on the right-hand side of the regression allows the population term to take a freely estimated parameter (rather than implicitly constraining its coefficient to 1.0) that is frequently significant in comparable migration models. Moreover, in the presence of variables that have a scale component, such as prior migration, migrant stock, and migration to alternative destinations, population controls for the scale of the origin from which the migrants are drawn.[11]

4. Data

All countries for which information is available on both the dependent and independent variables are included in the data set. Thus, the 12 European countries commonly used in historical studies of migration to the U.S. were candidates and with the exception of Norway are used in the U.S. model: Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, and United Kingdom (less Ireland). The major differences in the data sets for the U.S. and for Argentina and Brazil are that (1) whereas Ireland is specifically broken out of the U.K. statistics for the U.S., it is not for the South American countries; (2) as discussed below, the various countries of destination may have measured different types of entrants as immigrants, thus making the measures less than perfectly comparable; and (3) for the South American countries observations are missing for certain source countries and certain years.

The first type of problem presents difficulties for the U.S. model because we do not have a measure of migration from Ireland to the South American countries to include as an opportunity cost of migrating to the U.S. To obtain separate estimates for Ireland and Great Britain, we applied their annual U.K. population shares to annual U.K. migration to Argentina and Brazil, which yields an 11-country sample for the U.S. that covers the same source-country area as the models for Argentina and Brazil.

U.S. immigration statistics are reported in many publications, including Ferenczi and Willcox (1929). Migration statistics for the source countries of migration to Argentina are reported in Ministerio de Agricultura de la República Argentina (1925) for 1870-1910. Migration to Brazil from the same European countries and for the same years is from Organización de Estados Americanos (1990). To fill in missing observations on migration to Argentina and Brazil, we interpolated where the time spans between observations were short, and we used average values for longer spans where averages are available for longer periods.[12]

The immigration statistics of the three countries are roughly but not perfectly comparable. For the U.S., between 1868 and 1891, in order to be counted as an immigrant, alien passengers were required to declare their intention of remaining. Between 1892 and 1907, in addition to being an alien and declaring this intention, the individual also must have been officially admitted and must have had a previous residence in a foreign country, but according to Willcox (1931) these additional requirements were phased in gradually. After 1907 they were required. Moreover, before 1904 only steerage passengers were included. Willcox feels that the inclusion of cabin passengers would have increased U.S. immigration by about 8% annually between 1892 and 1903. Finally, before 1904, residents of Canada and Mexico were not recorded as immigrants even if they declared the intention of becoming residents.

For Argentina, second- and third-class passengers from Europe who arrived by sea were classified as immigrants. River traffic between Montevideo and Buenos Aires was not well documented. Thus, like U.S. immigration that first passed through Canada, Argentinean immigration that passed through Uruguay was not regularly recorded. For Brazil, prior to 1907 third-class passengers who were foreigners and under 60 years of age were classified as immigrants. Beginning in 1907, second class passengers were included in the definition. Prevailing opinion was that second-class passengers did not exceed 5% of third class (Naylor, 1931). Thus, for long periods of time none of the countries counted all immigrants and all three may have counted travelers. Whereas the figures are not precise, they are sufficiently comparable to permit at least rough comparisons. The annual controls should account for year-to-year changes in each country's definition of an immigrant.

The number of source countries in the data set is critical because it establishes the degrees-of-freedom constraint at n-1, where n is the number of countries. For each country the number of observations is substantial (451 for the U.S. and 410 for Argentina and Brazil). Yet, the maximum number of right-hand-side variables in the U.S. model is 10 and in those for Argentina and Brazil is 9.[13]

Data on the independent variables are from a variety of sources, including Williamson (1995) for relative (international) real wages, Maddison (2003) for the measure of relative growth, and Mitchell (1992) for industrial composition, as well as birthrates, death rates, and population. The Williamson data refer to (unskilled) urban male wages. Where necessary, data from Mitchell and Maddison were interpolated (linearly) or extrapolated (where necessary). The details regarding construction of the data set are in Greenwood (2005). Means and standard deviations are reported in Table 3. The reader may note that whereas overall migration to Argentina was greater than that to Brazil, the mean emigration rate for migration to Brazil reported in Table 3 is higher. This difference is due to very high emigration rates to Brazil from Portugal, a country with a relatively small population.

5. Empirical Findings

Place-to-place migration models similar to that specified above frequently are estimated in double-log form, presumably because this form yields better fits, because its coefficients may be interpreted as elasticities, and perhaps because converting the data to logs provides an adjustment for potential heteroskadasticity. Of course, linear models also may be estimated. Hatton and Williamson (1998) estimate a hybrid (semi-log type) model that contains log terms for ratios of wages (to yield a measure of wage gaps) and certain other variables, but the migration measure is expressed as a standard rate. In our work, we have estimated the models in each of these ways, but in the results reported below we show only the double log estimates. We comment on other estimates in footnotes.

The empirical results are presented in Tables 4 (Argentina), 5 (Brazil), and 6 (United States). These tables report double-log coefficients estimated by the Hausman-Taylor IV approach, as described above. We stress that this econometric approach accounts for both time- and country-specific effects, but does not yield coefficients for years and countries in a manner similar to a standard two-way fixed effects model. Due to the limited degrees of freedom, a "core" model was estimated (Regression 1 in each table) and then alternative regressions for alternative specifications were estimated. The first two regressions in Tables 4 and 5 include only migration to the U.S. in the alternative opportunity variable, whereas the remaining regressions include migration to both alternatives in this variable. The results are generally quite strong, they are very stable to exclusion and inclusion of variables other than those considered core, and whereas they exhibit many similarities, they differ quantitatively and sometimes qualitatively from country to country. Let us consider each country in more detail.

For Argentina the relative real wage variable is always negative and statistically significant, which suggests that migrants to this country tended to emigrate from low-wage origins.[14] This result holds even in the presence of a dummy for Southern Europe. Wage elasticities range from -0.378 to -0.551. The interaction term between the dummy for Latin Europe and the wage variable is positive and marginally significant, which suggests mild evidence that migrants from Southern Europe were slightly less responsive to wage differentials relative to Argentina than their counterparts elsewhere in Europe, which may have been due to the fact that they came from low-wage countries and migrated to other countries with relatively low wages by the standards of the Americas. Job growth as proxied by relative average rates of growth of GDP over the prior 3 years takes an unexpected positive sign, but is not significant. As noted in the prior work of Hatton and Williamson (1998) regarding emigration from the U.K., both lagged migration and migrant stock are positive and significant. The elasticities are similar (about 0.5). Thus, migrants had a powerful tendency to follow their immediate predecessors and join others from their own country. Due to an increase in the population with relatively high propensities to migrate and/or a decrease in their wages relative to older cohorts, migration to Argentina was driven in part by increases in the size of the labor-force entry-aged cohort in countries of emigration. The U.S. does not appear to have served as an alternative destination for migrants to Argentina.[15] Rather, these two countries drew migrants from the same European source countries. Percent agriculture and percent manufacturing are never statistically significant. Neither is distance nor the birth rate.

The coefficients on the core variables for Brazil are similar to those for Argentina. Higher origin relative real wages discouraged migration to Brazil. The wage elasticities range from -0.607 to -0.974, slightly greater in absolute value than those for Argentina. Again weak evidence suggests that Latin Europe was slightly less responsive to wage differentials than Western and Northern Europe. Migrants had a strong tendency to follow immediately past migrants and join others from their country of origin. However, the elasticities for lagged migration are about twice as high as those for migrant stock (about 0.6 versus 0.3). Relative to Argentina, this difference may be due to greater labor turnover in Brazil. Migration to the U.S. and Argentina did not significantly affect migration to Brazil, but migration to Argentina alone did. However, the coefficient is positive, which suggests that migration to the South America neighbors was from the same and not different source countries.[16] Thus, for European countries taken as a whole, we reject the hypothesis that they were substitutes. Like Argentina, the southern Europe dummy variable is not significant for Brazil and neither is distance. The lagged natural increase variable has an unexpected negative sign and a high t-ratio. Percent agriculture and percent manufacturing are never significant for Brazil, which is the same finding as for Argentina.

As noted above, the U.S. model supports one additional explanatory variable relative to the results discussed above. The relative real wage is negative and marginally significant (at 10 percent) in most models of Table 6. However, in the U.S. model we used a contemporaneous and not a lagged value of the wage variable. The lagged relative real wage, while it took a negative sign, was typically not significant. The wage variable interacted with the Southern Europe dummy is not significant, so potential migrants in Southern Europe did not behave differently with respect to their responsiveness to relative wages than their counterparts elsewhere in Europe. In the linear and semi-log forms of the model this variable performed differently.[17]

The coefficient on the relative growth variable is negative, significant, and has a high elasticity. Clearly, relatively strong growth of employment opportunities in source countries discouraged migration to the U.S. (Though the regression is not reported in Table 6, in this respect Southern Europeans did not behave differently than potential migrants elsewhere in Europe.) This finding provides one of the most distinctive differences between the models for the U.S. compared to those for Argentina and Brazil, for which the job-growth variable is never significant. One possibility is that many migrants bound for South America knew that their fares were being reimbursed upon their arrival, and they also knew (according to the quotes noted above) that they had jobs at the end of their migration. This consideration would lessen the effect of differences in job opportunities between source and South American destination countries. A second possibility is that relative to the European source countries, the U.S. grew very fast, whereas its South American counterparts grew only slightly faster than the source countries. Recall that our measure of growth is the three-year moving average rate of GDP growth in the source country relative to that in the destination. On average, Brazil grew at about the same rate as its source countries (0.997), Argentina grew somewhat faster (0.958), and the U.S. grew at a rate between the two (0.987) (Table 3), so this hypothesis must be rejected.

As with Argentina and Brazil, for the U.S. both a significant short- and long-term response occurred. However, the difference between the two elasticities is greater for the U.S. than for its South American counterparts. In the regressions of Table 6, the elasticity on lagged migration is about 0.72, whereas that on migrant stock is about 0.24. In the U.S. model many variables take the expected sign but are not statistically significant. This statement is true for percent agriculture and percent manufacturing in source countries, as well as for natural increase 20 years earlier and English. Distance and the contemporaneous birthrate are never significant. Migration to Argentina and Brazil is positive and significant in all regressions, so as was the case in the model for Argentina, migration to the U.S. and its South American counterparts (at least Argentina) was from essentially the same source countries.

6. Summary and Conclusions

In this study we specify, estimate, and compare models of European emigration to Argentina, Brazil, and the United States. The models are estimated with annual panel data for the period 1870-1910. We use an econometric estimator for the fixed effects panel data model that allows the recovery of the otherwise unidentified coefficients of time-invariant variables. A comparison of estimators suggests that the use of the random effects model (generalized least squares) would be seriously misleading. However, the HT coefficients of the temporally invariant variables are typically not statistically significant, so the usefulness of our approach rests on the cross-sectional (country) and temporal (annual) controls and our ability to account for variables that are potentially correlated with unobservables.

Hatton and Williamson (1994, 1998) provide substantial evidence that “economic fundamentals” were of primary importance in explaining European immigration to the U.S., as well as emigration from various European source countries. Our findings reinforce those of Hatton and Williamson. We too find that such fundamentals helped shape migration to both Argentina and Brazil during the late 19th and early 20th centuries. Relative wages were of critical importance. Migrants moved to both Argentina and Brazil in response to wage gaps between their destinations and their European origins. In fact, wage differences appear to have been more important for the South American countries than for the U.S. These findings, in combination with those for the U.S. provided by Hatton and Williamson, underscore

Hicks's (1932) assertion that wages were the most important reason for migration.

Although the costs of migration to Argentina and Brazil were frequently subsidized by government sources, this factor does not appear to have caused substantial differences in most of the determinants of migration to South America compared to North America (such as causing the distance elasticity of migration to be lower for the former). With respect to the distance variable, the fact that U.S.-bound migrants often were subsidized by their families probably accounts for this similarity in the results for the U.S. and the South American countries. Moreover, as reflected in the ratio of the standard deviations to the corresponding means (Table 3), distance varies little between the various source countries and each specific destination. A better measure of the out-of-pocket costs of moving may be the average number of days required for the trip, which clearly fell between 1870 and 1910. However, no systematic data of this type exist.

The major difference between the three countries is that higher relative job growth is not significant for the South American destinations, but is negative and significant with a high elasticity for the U.S. This is one difference in the findings for the three countries that may have been shaped by subsidized fares and arranged jobs in South America. But relative wages and the prospect of jobs or better-paying jobs were not the only reasons for transatlantic migration. European emigrants had a powerful tendency to follow earlier migrants from their home countries. Earlier migrants not only reduced the cost of a long-distance, international move by providing information and subsidizing travel, but they also assisted with the social and cultural adjustment in the country of destination. Our findings suggest that both a short-term and a long-term response occurred in that lagged migration and migrant stock are both highly significant in our models. However, for Brazil and especially for the U.S. the elasticities of short-term response are considerably higher than those for long-term response. It is not clear what factors underlie these differences between countries, and we leave this issue for future research.

Some evidence suggests that potential migrants in Latin Europe were less responsive to wage differentials than their counterparts elsewhere in Europe. Labor-supply pressures in Europe (as reflected in the rate of natural increase lagged 20 years) appear to have influenced migration to Argentina, but not to either Brazil or the U.S. The reason for this difference is also not clear. Many other variables, such as distance between the origin and potential destination, percent agriculture and percent manufacturing in the European source countries, and language familiarity, do not appear to have played an important role in migration decisions. However, whereas many of these factors may not have greatly influenced how many migrants emigrated from Europe to the Americas, they could have played an important role in determining the characteristics (such as sex, age, and skills) of those who came.

Hatton and Williamson argue that "explaining Italian emigrant overseas destination with conventional economics is difficult at best" (1998, p.119). They go on to claim that "nonetheless, some variables mattered in clear and unambiguous ways" (p.119). The same observation applies to our work, but without the word "Italian." We must reject many hypotheses because the coefficients of certain variables are consistently insignificant for all three destination countries or for two of the three. Certain other variables, such as relative wages, migrant stock, and lagged migration, consistently take the expected sign and are highly significant. Different functional forms yield different results, though not wildly different. However, different estimation techniques can yield considerably different and apparently misleading results. Certainly this is true of random effects, which we test and reject in every case. Data are always an issue. We would like more variables and/or better measures. Williamson's international wage measures have added considerably to our ability to test various hypotheses concerning historical international migration. His work with Hatton that studies source regions in source countries is a potentially powerful approach, but again this approach appears to be limited by lack of data.

Footnotes

We are grateful to Jeffrey Williamson for providing the wage data used here. We also are grateful to John Greenwood and Fred Ziel, who assisted in the preparation of the data set.

1. The U.S. data, though not without many shortcomings, are characterized by several features. They start earlier (1820), probably because the U.S. was an independent country that began receiving sizable numbers of immigrants before the others. They also provide many details not available for other countries, such as sex, age, skills, and intended destination in the U.S., all by source country.

2. Hatton and Williamson (1998) employ emigration data for 69 Italian provinces for two years (1902 and 1912) to study the shares of emigrants destined to Argentina, to Brazil, and to the U.S.

3. The estimation technique discussed below controls for this decree, but does not yield any insights regarding its effects.

4. Following Hatton and Williamson (1998), we also considered including the percentage of the destination country's population that was economically active as a proxy for the probability of securing a job there. Hatton and Williamson (1998) suggest other measures, such as variance in job growth. The coefficient of variation would be another possible measure of the probability of getting a job. However, because Argentina's GDP must be interpolated from data provided in Maddison (2003), these alternative measures have zero variance for long periods. Although such measures could be generated for the U.S., the lack of comparability with Argentina and Brazil caused us to abandon this effort.

5. In Hatton and Williamson (1994b, 1998) this "wage gap" variable is measured as the log of the ratio of the destination to the origin variable. In those studies the variable is expected to take a positive sign, but in our study the expected sign is negative.

6. We also examined migration over the prior year, as well as the prior 3, 4 and 5 years. Lagged migration measured over longer periods can interfere with the migrant stock variable, so we did not wish to go back too far. Two years is a reasonable period to use to pick up the effects of recent past migration. (Hatton and Williamson (1998) go back two years, but introduce their one and two-year lags separately.) However, each of our measures yielded similar results.

7. U.S. Department of Labor (1914), p.18. According to this report, the reason these figures may be low is that assisted migrants could have been excluded, but rarely were if they showed assets on entry. However, those assisted by business interests and who admitted this frequently were excluded.

8. For 1908-1910, the annual average sex ratio of U.S. immigration was 201, whereas that for emigration was 420 (Ferenczi and Willcox, 1929, p.396 and p.474). (The sex ratio is 100 times the number of males divided by the number of females.)

9. For 1900-1910 the aggregate sex ratio for Italy, Portugal, and Spain was 358, whereas that for Germany, Ireland, and Great Britain was 132.

10. U.S. Treasury Department (1892), p.183 and p.220.

11. Hatton and Williamson (1998) define their migrant-stock variable relative to the source-country population.

12. The methods used to fill the data gaps are as follows: (1) for Argentina—(a) Netherlands, two missing values (1871, 1880) for which we used a decade total (1871-1880) to calculated the annual average, which we assigned to these years. (b) Denmark, 11 missing values (1870-1880) for which we assigned the annual average of the 1871-1880 period. (c) Sweden, 15 missing values (1870-1880, 1892, 1901-1903) for which we assigned the annual average of the 1871-1889 period to 1870-1880, the annual average of the 1891-1900 period to 1892, the annual average of the 1901-1910 period to 1901-1903. (2) for Brazil—(a) Italy, one missing value (1873) for which we interpolated from 1872 and 1874. (b) Spain, two missing values (1873, 1874) for which we interpolated linearly from 1872 and 1875. (c) France, three missing values (1873, 1874, 1901) for which interpolated linearly from 1872 and 1875 as well as 1900 and 1902, respectively. (d) U.K., two missing values (1873, 1877) for which we interpolated from 1872 and 1874 as well as 1876 and 1878, respectively. (e) Sweden, 11 missing values (1869, 1878, 1879, 1882, 1886-1889, 1893, 1904, 1905) for which we linearly interpolated from immediately preceding and following values. (f) Denmark, 16 missing values (1870-1885, as well as 1869, 1869) for which we did linear interpolation. (g) Netherlands, 14 missing values (1870-1883, as well as 1869, 1869) for which we did linear interpolation.

13. The econometric approach used in this paper requires a "between estimator," which is based on group means.

14. The relative real wage is negative and statistically significant in almost all models, whether estimated in linear form or in Williamson's semi-log form.

15. Hatton and Williamson (1998) argue that at least for Italian migration Argentina and Brazil were substitutes. More highly skilled and better educated Italians from the North of Italy tended to migrate to Argentina, whereas those from the South tended to select Brazil or the U.S. We tested this hypothesis (for Europe in general) by including only the South American counterparts in the alternative opportunity variable. The respective coefficients remain positive, but in the regressions for Argentina they are about half their magnitude (but still highly significant) compared to when the U.S. is included in the variable.

16. When immigration to Argentina alone is included in the regression for Brazil, the coefficient on this variable is always positive and significant. Moreover, the coefficient on the distance variable becomes negative and significant.

17. For both Argentina and Brazil, the interaction is negative and significant (t = -2.550 for the former and t = -3.472 for the latter) in the linear form, but the relative-wage variable, though negative, is not statistically significant. Thus, in this form, only potential migrants in Southern Europe were discouraged by higher relative wages.

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Table 1
Immigration to Argentina, Brazil, and the United States by Country of Origin and Decade, 1870-1910

	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
United Kingdom	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
Totals	1870-1879	249,127	148,407	2,119,546
	1880-1889	751,668	443,144	4,015,978
	1890-1899	588,151	1,106,675	2,430,828
	1900-1910	1,610,587	627,505	4,215,480

Sources: Ferenczi and Willcox (1929); Ministerio de Agricultura de la República (1925); Organización de los Estados Americanos (1990).

Table 2
Annual Average Migration to Argentina, Brazil, and the United States per Million Residents of Selected Source Countries, 1870-1910

Source country/ period	Destination countries			
	Argentina	Brazil	U.S.	Total
Germany				
1870-79	8.2	33.8	1789.3	1831.3
1880-89	28.1	40.9	3084.5	3153.5
1890-99	17.6	33.5	1127.0	1178.0
1900-10	29.5	25.7	538.9	594.0
Italy				
1870-79	573.5	169.4	169.0	911.9
1880-89	1608.5	936.5	913.3	3458.3
1890-99	1319.2	2217.2	1937.1	5473.5
1900-10	2300.0	646.8	5835.9	8782.6
Portugal				
1870-79	14.9	1535.0	315.9	1865.8
1880-89	37.2	2160.6	313.7	2511.5
1890-99	31.5	4219.2	497.5	4748.2
1900-10	164.6	3594.0	1173.5	4932.0
Spain				
1870-79	272.0	23.8	33.6	329.4
1880-89	844.5	166.9	23.0	1034.5
1890-99	685.0	906.9	50.9	1642.9
1900-10	3135.0	667.0	132.3	3934.4
United Kingdom				
1870-79	29.3	8.7	3108.2	3146.2
1880-89	43.2	3.4	4124.6	4171.2
1890-99	11.8	7.3	1878.9	1898.0
1900-10	26.4	8.0	1859.0	1893.5

Sources: Ferenczi and Willcox (1929) for migration data and Mitchell (1992) for population.

Table 3
Means and Standard Deviations

Vector/variable	Argentina		Brazil		United States[1]	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Dependent variables						
Immigration to j	7,803	20,296	5,660	14,692	27,041	43,233
Emigration rate from i to j (per million)	316.68	804.42	446.08	1,078.48	2,023.11	2,683.05
Differential econ. opportunity						
Real wage in j	59.485	24.655	same	same	60.726	23.995
Relative wage	0.804	0.341	0.899	0.363	0.428	0.152
Relative growth	0.958	0.025	0.997	0.027	0.987	0.029
Fraction agriculture in i	0.443	0.178	same	same	0.441	0.170
Fraction manufacturing i	0.245	0.092	same	same	0.237	0.092
Cost of migrating						
Total migration prior 2 yrs.	14,129	35,864	10,869	27,365	53,529	83,759
Migrant stock from i in j	80,126	166,859	37,850	90,411	543,649	785,846
Birthrate in i	31.507	4.389	same	same	30.834	4.720
Rate of nat. inc. in i, t-20	9.917	4.703	same	same	9.652	4.593
Southern Europe	0.300	0.459	same	same	0.273	0.446
Distance from i	6,961	486	5,947	485	3,686	325
English spoken in i	n.a.	n.a.	n.a.	n.a.	0.182	0.386
Control variables						
Population of i (thousands)	19,285	16,842	same	same	16,681	16,454

Notes: 1. Refers to 11-country sample.

Table 4
European Emigration to Argentina, 1870--1910:
Hausman-Taylor Instrumental Variable Double-Log Estimates and Absolute t-Ratios

	1	2	3	4	5	6
Differential econ. Opportunity						
Relative wage, t-1 (x_1) β:	-0.400	-0.423	-0.551	-0.378	-0.380	-0.364
t:	(2.449)	(2.554)	(2.753)	(2.318)	(2.348)	(2.202)
Relative growth, t-1 to t-3 (x_1)	1.983	1.701	1.724			
	(1.500)	(1.270)	(1.282)			
Percent agriculture in i (x_1)					0.007	
					(0.023)	
Percent manufacturing i (x_1)						-0.174
						(0.720)
Rel wage * South. Europe (x_1)			0.506			
			(1.470)			
Cost of migrating						
Total migration prior 2 yrs.(x_2)	0.494	0.514	0.496	0.525	0.524	0.525
	(10.206)	(10.328)	(10.114)	(10.717)	(10.867)	(10.767)
Migrant stock from i in j (x_2)	0.469	0.494	0.535	0.513	0.490	0.504
	(4.460)	(4.830)	(4.852)	(5.259)	(4.597)	(4.971)
Birthrate in i (x_1)				-0.400		
				(0.545)		
Rate of nat. inc. in i, t-20 (x_1)		0.152		0.204	0.199	0.205
		(1.956)		(2.466)	(2.509)	(2.568)
Southern Europe (z_2)	0.075	-0.064	0.126	-0.193	-0.209	-0.296
	(0.097)	(0.151)	(0.269)	(0.504)	(0.348)	(0.676)
Distance from i (z_1)	0.220					
	(0.048)					
Migr. from i to US, Brz (x_1)	0.112*	0.102*	0.100	0.099	0.111	0.105
	(2.521)	(2.357)	(2.299)	(2.335)	(2.495)	(2.421)
Control variables						
Population of i (x_1)	-0.844	-0.944	-0.987	-0.975	-0.917	-0.938
	(3.189)	(4.416)	(4.179)	(4.997)	(3.350)	(4.215)
Constant (z_1)	0.951	3.266	3.747	4.534	2.721	2.598
	(0.023)	(2.114)	(2.226)	(1.618)	(1.297)	(1.466)
Test for exogeneity of HT						
Instruments	1.103	0.691	0.756	0.598	0.707	0.715

Notes: *Refers to the U.S. only.

Table 5
European Emigration to Brazil, 1870--1910:
Hausman-Taylor Instrumental Variable Double-Log Estimates and Absolute t-Ratios

	1	2	3	4	5	6
Differential econ. Opportunity						
Relative wage, t-1 (x_1) β:	-0.728	-0.607	-0.974	-0.731	-0.693	-0.761
t:	(2.065)	(1.723)	(2.372)	(2.097)	(1.984)	(2.150)
Relative growth, t-1 to t-3 (x_1)	-2.291	-2.259	-2.569			
	(1.053)	(1.052)	(1.173)			
Percent agriculture in i (x_1)					-0.522	
					(1.129)	
Percent manufacturing i (x_1)						0.469
						(1.115)
Rel wage * South. Europe (x_1)			1.031			
			(1.302)			
Cost of migrating						
Total migration prior 2 yrs.(x_2)	0.601	0.583	0.597	0.584	0.584	0.586
	(11.146)	(10.909)	(10.985)	(10.964)	(10.921)	(10.916)
Migrant stock from i in j (x_2)	0.324	0.297	0.395	0.303	0.295	0.289
	(3.669)	(3.340)	(3.850)	(3.459)	(3.368)	(3.233)
Birthrate in i (x_1)				-1.850		
				(1.450)		
Rate of nat. inc. in i, t-20 (x_1)		-0.394		-0.322	-0.415	-0.419
		(3.039)		(2.338)	(3.172)	(3.187)
Southern Europe (z_2)	-0.443	0.145	0.303	0.154	0.443	0.206
	(0.535)	(0.159)	(0.424)	(0.182)	(0.469)	(0.232)
Distance from i (z_1)	-2.414					
	(0.618)					
Migr. from i to US, Arg (x_1)	0.027*	0.034*	0.008	0.006	0.026	0.028
	(0.349)	(0.447)	(0.101)	(0.079)	(0.319)	(0.337)
Control variables						
Population of i (x_1)	-0.958	-0.823	-1.032	-0.800	-1.025	-0.874
	(4.283)	(2.613)	(4.337)	(2.619)	(2.876)	(2.800)
Constant (z_1)	26.480	5.199	5.791	11.459	6.620	6.474
	(0.774)	(1.888)	(3.051)	(2.315)	(2.271)	(2.254)
Test for exogeneity of HT						
Instruments	0.900	1.446	0.863	1.333	0.930	1.442

Notes: *Refers to the U.S. only.

Table 6
European Emigration to the United States, 1870--1910:
Hausman-Taylor Instrumental Variable Double-Log Estimates and Absolute t-Ratios

	1	2	3	4	5	6
Differential econ. Opportunity						
Relative wage, t-1 (x_1) β:	-0.265	-0.230	-0.312	-0.264	-0.166	-0.198
t:	(1.315)	(1.404)	(1.503)	(1.555)	(0.906)	(1.137)
Relative growth, t-1 to t-3 (x_1)	-2.703	-2.761	-2.721	-2.686	-2.882	-2.803
	(2.488)	(2.788)	(2.805)	(2.782)	(2.700)	(2.872)
Percent agriculture in i (x_1)					0.073	
					(0.431)	
Percent manufacturing i (x_1)						-0.177
						(1.061)
Rel wage * South. Europe (x_1)			0.103			
			(0.519)			
Cost of migrating						
Total migration prior 2 yrs.(x_2)	0.718	0.721	0.718	0.719	0.725	0.722
	(16.181)	(17.834)	(17.803)	(18.169)	(16.712)	(18.323)
Migrant stock from i in j (x_2)	0.227	0.238	0.236	0.245	0.235	0.246
	(3.867)	(4.338)	(4.550)	(4.194)	(4.259)	(4.528)
Birthrate in i (x_1)				0.111		
				(0.327)		
Rate of nat. inc. in i, t-20 (x_1)		0.004	0.006	0.004	0.016	0.016
		(0.063)	(0.110)	(0.067)	(0.268)	(0.274)
Southern Europe (z_1)	-0.161					
	(0.502)					
Distance from i (z_1)	1.931	1.611				
	(1.109)	(0.888)				
English	0.436	0.345	0.134	0.154	0.142	-0.013
	(0.902)	(0.600)	(0.354)	(0.305)	(0.543)	(0.031)
Migr. From i to Arg, Brz	0.056	0.049	0.055	0.050	0.053	0.045
	(1.721)	(1.678)	(1.807)	(1.681)	(1.891)	(1.582)
Control variables						
Population of i (x_1)	-1.090	-1.093	-1.074	-1.089	-1.055	-1.058
	(9.564)	(10.173)	(9.667)	(8.347)	(11.568)	(9.127)
Constant (z_1)	-9.414	-6.874	6.190	0.245	6.108	5.752
	(0.669)	(0.472)	(6.413)	(3.213)	(7.675)	(5.400)
Test for exogeneity of HT						
instruments	0.640	0.644	0.689	0.718	0.912	0.893