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Globalization, Agricultural Markets and Mass Migration

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Abstract

The consequences of rising import competition for labor markets have been extensively explored in the recent literature. This paper uses a historical case of market opening, and shows how market globalization forces interacted with international migration choices between 1881 and the outbreak of the First World War. We present new data on historical Italian emigration at the province level and document that emigration rates varied substantially by locality, which has been largely unexplained in the literature. Indeed, provinces were differentially exposed to global forces according to their initial-year crop intensities. We explore the determinants of these outflows, focusing on globalization forces alongside more traditional explanatory factors such as migrant stocks and landholding structures. We find that migration was positively related to an index of exogenous global prices, which we interpret as an indication that most Italians were still in a poverty trap and lacked the funds to migrate unless agricultural incomes reached a sufficient level.

Key Words: Age of mass migration; determinants of migration; agricultural shocks

JEL Codes: N93; N13; F22; O15

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1. Introduction

Chinese and Japanese silk, Indian rice, Russian and American cereals: the first era of globalization generated an unprecedented flow of international commodities into European markets (O'Rourke, 1997). Between the 1870s and the outbreak of World War I (WWI), technological improvements in shipping, declining transportation costs, and international competition exerted downward pressure on commodity prices and, more generally, led to more pronounced price fluctuations. Peripheral, largely agrarian economies struggled to cope in this new environment due to low agricultural labor productivity, outdated production techniques, pre-industrial landholding systems and a lack of industrial employment.

Globalization did not only involve commodities. With declining fares and open borders, transoceanic migration exploded. From the 1850s to 1921 more than 30 million Europeans entered the US alone (Ferenczi and Willcox, 1929), birthing the "age of mass migration".

This paper sheds light on how market globalization forces interacted with the international migration choices of Italians between 1881 and 1912. We provide evidence that globalization did affect migration decisions. Specifically, we find that higher agricultural prices were associated with higher levels of out migration: the rise of incomes following the rise of prices released small landholders from the poverty trap so that they could afford passage abroad. The phenomenon reversed as incomes fell following sharp drops in international prices. We also investigate the role of price volatility and provide evidence of its role as a push factor: greater fluctuations in agricultural crop prices increased emigration rates out of Italian provinces. Finally, we explore the role of land tenure in explaining the differential effects of globalization on out-migration.

We focus on Italy for three reasons. First, migration flows were remarkable both in absolute terms and relative to other European countries. Italian emigration to the US rose from about 1 million individuals between 1880 and 1900 to 3.2 million in the following 20 years (Barkan, 2013), amounting to a fifth of the entire emigration flow to Ellis Island, with only Russian Jews being more likely to migrate (Spitzer, 2016). Second, Italian migration presents an extraordinary level of spatial and temporal heterogeneity across provinces, in terms of destinations and volumes, which has yet to be fully explained. Finally, the effects of globalization of agricultural commodities are more likely to materialize in developing, agrarian economies. On aggregate, competition-induced negative price shocks might drive uncompetitive

agents out of the market, creating an agricultural labor surplus; if not promptly assimilated by the industrial sector, such excess labor supply might induce migration. However, while increasing incentives to migrate, negative income shocks might also tighten liquidity constraints, ultimately preventing would-be migrants from relocating elsewhere. We investigate which of these two forces dominated during the first globalization era.

Open border policies dominated throughout our period,[1] which allow us to investigate the migration response to economic shocks in the absence of legal barriers. This provides an interesting comparison to the current global era, which is characterized by developing countries greatly affected by import competition but largely shut out of migration to the developed world.

Our paper contributes to two strands of the literature. First, we build a new dataset of transoceanic and European emigration rates at the Italian provincial level and examine the role of agricultural price shocks and uncertainty as a determinant of migration. This builds on the broader literature on the determinants of migration and of Italian emigration in particular, which has mostly used more aggregated data.[2] Hatton and Williamson (1998) shed light on the push and pull factors driving mass migrations from several European countries, proposing a unifying framework in which migration rates are responsive to business cycles in both home and destination countries. For Italy, they identify other key drivers of migration, including the size of existing migrant stocks, population pressures and landholding structures.

A handful of papers have considered the role of income shocks on migration decisions. Spitzer (2016) analyses the impact of temporary income shocks, proxied by changes in agricultural yields, on Jewish migration from Russia. He shows that the shocks explained the timing of migration but that migrant stocks and the wage differential with the US remained the key underlying determinants. Abramitzky et al. (2012, 2013) focus on Norwegian migration to the US and exploit variation in expected inheritance based on birth order to show that wealth was negatively correlated with migration, and self-selection being negative from urban areas. Persaud

[1] See Goldin (1994) for a comprehensive analysis of US migration-related policies. The end of the age of mass migrations coincides with restrictive US Immigration Acts implemented in 1917, 1921, and 1924, when stricter quotas effectively prevented further mass population movements from Europe. Immigration to Brazil was relatively unrestricted until the 1920s. Australia and Canada alternated between more open policies and more restrictive ones, while Argentina appears to be the only country that implemented more restrictive policies already by the end of the 19th century (Timmer and Williamson, 1998).

[2] The descriptive literature on the age of mass migration from Europe is quite broad: among other early key contributions, see Gould (1979) and Baines (1995). See Ardeni and Gentili (2014) for a comprehensive appraisal of aggregate studies that confirms the desirability of a more disaggregate approach.

(2017) looked at 19th century indentured servitude migration from India and found that price volatility in rice, the main crop, induced more migration, especially among lower castes. In the modern literature, Bazzi (2017) finds that rural Indonesians respond to positive agricultural income shocks with an increased propensity to migration, indicating that, for that group, the relaxation of the liquidity constraint dominates the effect of the falling wage differential.

Second, we contribute to the literature that analyzes the effect of import competition on labor markets, which has recently focused on China's accession to the WTO as an exogenous shock (Autor et al., 2013; Pierce and Schott, 2016; Acemoglu et al., 2016; Dix-Carneiro and Kovak, 2017; Majlesi and Narciso, 2015). In particular, Dix-Carneiro and Kovak (2015) study the effect of trade liberalization in Brazil and find almost no effect on migration, while Majlesi and Narciso (2015) provide evidence of a negative effect of international import competition on Mexican migration to the US and a reduction in migrants' self-selection. This paper adopts an historical perspective in analyzing the effect of an increase in market integration on migration during the early era of globalization.

The paper is organized as follows: Section 2 describes the historical context of Italian outmigration and integration with world commodity markets. Section 3 describes the econometric specification, while Section 4 describes the data. Section 5 presents the results and Section 6 concludes.

2. Historical background

Italy during the first wave of globalization

On the eve of its unification (1861), the Italian peninsula was fragmented into a constellation of heterogeneous state entities which, while comparable, maintained different customs, languages, and cultural heritages. Italy was a capital-and-land scarce, labor-abundant, developing country whose economy mainly rested on the primary sector. In 1901, more than 60 per cent of its labor force was employed in agriculture, only a slight decrease from 1881 (Felice, 2017). Italian wages were significantly lower the European average and roughly equivalent to a fifth of those in the United States (Williamson, 1995). The Italian government conducted a series of inquiries into the primary sector in the late nineteenth century (Franchetti and Sonnino, 1877; Jacini, 1886; Faina, 1907). Their depiction of agricultural laborers is a dismal one: exposed to

malaria, illiterate, living in near-subsistence conditions. In terms of height, a frequent proxy for living standards, the Italian population did not compare favorably to other Western European countries and the US (Hatton and Bray, 2010).

From the 1870s on, the increased international trade in goods drove price changes even in peripheral parts of Europe. Figure 1 displays the downward trajectory of international real prices (in 1912 *lire*) of the five major agricultural commodities farmed in Italy up to the mid-1890s. Prices of the dominant crop, wheat, reached a minimum in 1894, at about half their 1879 level.

[Figure 1 here]

Figure 2 depicts both imports and exports of wheat. From the late 1890s Italian wheat export dropped to naught while imports continued rising. Imported wheat mostly came from the Russian Empire, with the American market share increasing only after WWI.

[Figure 2 here]

The historical literature suggests that price fluctuations may have influenced economic actors significantly. According to Arcari (1936: 256), both rice production and rice acreage in the Northern regions of Piedmont and Lombardy decreased as a result of competition with Indian and Chinese rice, as early as the 1870s. Jacini (1884) made a similar argument for silk: competition from Japanese silk hampered the industrial development of the sector. Similarly, new plantations of citrus in the US (particularly in California) led to a sizable reduction of international prices that ultimately hindered Sicilian export revenues, thus contributing to international migration out of the island after 1900 (Dimico et al, 2017)[3].

Italian emigration during the Age of Mass Migration

According to ISTAT figures (2011), more than 11 million Italian migrants left Italy from 1870 to WWI. Figure 3 summarizes the long run trends and shows the destinations chosen. Between 1870 and 1900, the four main destinations for Italian migrants were other European countries, Argentina, North America and Brazil. After 1900, the main migration movements were directed to the United States and, to a lesser extent, other European countries.

[Figure 3 here]

[3] Such dynamics have also been highlighted in other contexts: according to Kamphoefner (2014), textile-producing, proto-industrial, German rural districts that were particularly affected by British competition experienced higher migration rates.

Around 1900, emigration centers shifted from the North to the South of Italy and preferences shifted towards the US (Figure 4). Return, cyclical, and seasonal migration had constantly been very significant (Bandiera et al. 2013 and Tortorici, 2017).

[Figure 4 here]

We further complement the ISTAT data with Ellis Island records, which allow us to get an alternative measure of out-migration to the US at the Italian province level. Figure 5 confirms the increasing role of Southern provinces as main emigrant sources.

The most detailed information about the individual characteristics of Italian emigrants is available for those destined for the US. According to Gomellini and Ó Grada (2013), Italian migrants were mainly male and young: about half were men aged between 15 and 29 years. In a recent paper, Spitzer and Zimran (2017) analyze the self-selection of Italian emigrants to the US. Using anthropometric measures, the authors provide evidence of positive self-selection at the local level, with this effect being greater for less developed areas.

3. Econometric specification

We investigate the impact of the first wave of globalization on international Italian migration, distinguishing between destinations, *i.e.* European countries, transoceanic countries (US, Canada, Latin America and Oceania), and, using a different data source, the US. To do this, we construct an index that captures regional exposure to global price movements across the relevant agricultural products produced in Italy during the sample period.[4] This Global Price Exposure (GPE) index is constructed as follows:

$$GPE_{it} = \sum_{j=1}^{J} \gamma_{ji,1881} P_{jt}$$

where γ_{ji} represents the share of crop j cultivated in province i at the beginning of the period (1881), while P_{jt} is the international price level of crop j at time t. Note again that the use of the pre-period crop share, $\gamma_{ji,1881}$, removes any concern about the endogenous response of local crop

[4] This index is in the spirit of Topalova (2007) and, more recently, Autor et al (2013) who construct measures of local labor market exposure to import competition.

mix to global price fluctuations. The measure GPE_{it} reflects the level of exposure of provinces over time to changes in the prices of agricultural products. Over this period, these prices were mostly trending downward, in large part due to increased integration of regional agricultural markets, as discussed in Section 2 above. As a result, from the perspective of Italian farmers, these price movements largely reflected an increase in import competition. However, the measure is quite broad and captures other changes in global supply and demand which drove agricultural price changes, so we interpret it as representing general globalization trends. Importantly, this index is measured at the province level, which is much finer than found in previous studies, which at best used regional data and often for fewer years.

We estimate the following specification:

$$\log(migration\_rate_{it}) = \beta \log(GPE_{it}) + \boldsymbol{X}'_{\boldsymbol{it}}\boldsymbol{\gamma} + \delta_i + \vartheta_t + \varepsilon_{it} \qquad (1)$$

where $migration\_rate_{it}$ is the out-migration rate out of province *i* at time *t*. We will disentangle the migration to the US from the migration rate to other European countries and the migration rate to transoceanic destinations at large (Canada, US, Latin America and Oceania).[5] The specification in equation (1) includes time-varying characteristics at province level ($\boldsymbol{X}_{\boldsymbol{it}}$), such as the level of industrialization and the size of migration networks, province fixed effects (δ_i) and time fixed effects (ϑ_t). Standard errors are clustered at the province level. The parameter β captures the effect of globalization at the province level on the out-migration rate.

In addition to our *GPE* measure, in some specifications we include a measure of the volatility of prices, to capture the pure effect of uncertainty in the local market as a push factor to migration, which was identified by Persaud (2017) as a significant determinant in the Indian indentured servitude context. More formally, both unfavorable and uncertain prices for agricultural goods will reduce the demand for farm labor by lowering the expected marginal value product of farm workers, thus reducing their wage. In addition, low and variable prices will reduce profit margins for small landholders who may be forced to sell or abandon farms. Both of these channels will increase the incentives for affected workers and landholders to migrate.[6]

[5] We conducted a similar analysis by focusing on domestic migration rather than international migration. We find no effect of globalization on movements across Italian provinces. Results are available upon request.

[6] Barkan (2013) describes small-holders being forced by poor harvests or other shocks to sell their land to larger landowners in order to fund their migration, thus escaping the liquidity constraint.

We define price volatility following Persaud (2017). For each crop *j* and time period *t*, price *p* volatility is computed over *h*-year windows; it corresponds to the standard deviation of logged inter-temporal price ratios.

$$Volatility_{i,t} = sd\left[\ln\left({}^{p_{j,t-h+1}}/_{p_{j,t-h}}\right)\right] \; with \; h = 1, \ldots, 5$$

After having computed volatilities, we then construct an index that uses the definition of *GPE* and can be interpreted as an aggregate measure of the price volatility induced by globalization.

Our extended specifications then control for other factors that have been found important in other studies, such as the existing migrant stock in the destination country, which may facilitate chain migration through information and remittance channels (see Moretti, 1999; McKenzie and Rapoport, 2010; and Gomellini and Ó Gráda, 2013). We also include a measure of industrialization which might be expected to decrease migration due to the availability of alternative employment outside the agricultural sector. Further, we interact *GPE* with the share of non-landowners in 1881, to test whether there are differential effects depending on the landholding structure of a province. The non-landowner class includes landless laborers as well as tenants, and sharecroppers. In addition, we estimate specifications that include interactions of *GPE* with a dummy for Southern provinces. This is motivated in part by findings in Hatton and Williamson (1998) that show differential patterns of migration from North and South Italy, driven partly by the relative abundance of non-agricultural labor in the North and the relative economic progress of the North. If there is a non-linear relationship between income and migration, then that might show up in this interaction term.

Identification

Our estimation strategy relies on the assumption that international price shocks are transmitted to local economies, and that these in turn affect migration. For this hypothesis to hold, local agricultural markets must exhibit at least some degree of integration with global markets. We use international prices for commodities in our measure of globalization below, which is exogenous to changes in economic activity at the Italian province level. We weight these price movements using information about the crop mix at the local level in the initial year

(1881). This avoids any contamination due to changing crop mix. Furthermore, to the extent that Italian tariffs changed during this time period, that was a national-level policy choice and any effects would be absorbed by the year fixed effects we employ in all specifications. To conclude, any threat to identification of our globalization measure would have to come at the local province level and would need to effect both globalization and local migration. We believe that our strategy avoids any endogeneity issues of this kind.

The existing economic history literature confirms that Italy was a fairly open country in terms of trade policy during this period, which suggests that it was becoming increasingly integrated in the global market. According to Toniolo (2013), Italian manufacturing tariffs were in line with those of more industrialized economies until the mid-1870s and only British tariffs were lower (James and O'Rourke, 2013). The structure of Italian tariffs was consistent with a standard Heckscher-Ohlin model. The land-holding class did not advocate trade restrictions because Italy was a labor-abundant country, exporting agricultural products. However, rapidly increasing international competition on grains turned the tables, as land-owners envisaged the prospect of falling market shares - arguing that land-intensive crops such as wheat would have suffered from international competition from the US and Russia. Protectionist measures remained mild until the early-1880s. Then, Italy levied two successive tariffs on wheat in 1885 and 1887, corresponding to about 25 per cent ad valorem. However, agricultural crises were common in this decade, such that many European countries increased their levels of protection.[7]

Wheat tariffs were again progressively increased in 1888 and 1894, reaching about 40 per cent ad valorem by 1913. While the effective rate of protection for wheat in 1911 was about 30 per cent, bilateral trade agreements partially softened these restrictions through the implementation of the most favored nation clause (Federico and Vasta, 2015). Indeed, recent re-estimations of actual Italian protection question the effectiveness of such measures. According to Federico and Vasta (2015), overall protection remained relatively low, with the exception of a short spell in the 1890s. The authors also argue that welfare losses due to protectionism were mainly driven by heavy duties on sugar.

[7] It is worth noting that recent key contributions have highlighted how, while not outstanding, Italian agricultural performance was not as poor as previously thought (Fenoaltea, 2011). Indeed, the hump in wheat production in the ISTAT series – usually taken as a reference – during the 1880s might just reflect measurement errors (Federico, 1982). The unreliability of production series is also the main reason why we do not control for it in our regressions.

It is hard to contrast wheat tariff systems across Europe due to data availability. However, comparing wheat price series across Europe provides suggestive evidence of significant market integration. Despite transportation costs and tariff-created wedges, European grain markets appeared to be fundamentally tied together. The pace of convergence, both domestic and international, was commodity-specific; for wheat the process traces back to the early 19th century, climaxing in the 1860s (Federico, 2010), a time in which trade policies and market efficiency are more likely to drive results than decreasing transportation costs. While present and fluctuating, Italian agricultural trade policies did not define it as an unusually protectionist country in the European context. Indeed, it did not generate any major compositional shift in agricultural mixes, while possibly having had a positive impact on wheat production (Federico and O'Rourke, 2000). Protectionism did not prevent prices from falling across Europe as technological change acted in the opposite direction. Had the tariff not been levied, prices might have possibly declined even further.

4. Data

The empirical analysis relies on an extensive data collection and digitization from published governmental sources at the province level, as outlined below. We collect key information on migration, population, agricultural prices, landholding, and the composition of farmed land, *i.e.* the share of land allocated to any crops. We complement this dataset with data on industrialization at the province level, taken from Ciccarelli and Fenoaltea (2013).

Emigration data

Absolute provincial out-migration figures from 1876 to WWI are based on an underexplored section of the "*Annuario statistico dell'emigrazione italiana dal 1876 al 1925"*. This publication contains the universe of statistics produced by the two main governmental migration agencies active during the reference period: The *Direzione Generale di Statistica* (henceforth, DGS) and the *Commissariato Generale dell'Emigrazione* (henceforth, CGE), active

since 1901[8]. While previous studies of migration determinants revolve around a regional approach, our analysis is significantly more disaggregated, using information on 69 provinces rather than 16 regions. We focus on DGS figures simply because the series begins in 1876.

According to Italian law, would-be migrants had to undergo a two-stage procedure before being able to leave the country. First, they had to apply for a *nulla osta*, a document certifying their eligibility for a passport issued by local authorities. Second, they had to collect the actual passport which was valid for 3 years. DGS series are based on the of *nulla osta* issued by each municipality, aggregated to the province level.

However, these steps were not systematically followed by every migrant. After obtaining a *nulla osta*, would-be migrants could decide not to leave and, although rare, local prefects could reject passport applications. On the other hand, nothing guarantees that those receiving passports actually left, as migrants could postpone or cancel their departure. Both of these would imply that the DGS data over-estimates emigration. Finally, by and large, several destination countries allowed the access of European migrants not holding a passport at all, decreasing the incentive to follow standard legal requirements in sending countries (Keeling, 2013).

Despite capturing provincial variation, the DGS series only allows us to differentiate between European and transoceanic out-migration, masking destination-specific patterns. Similarly, these data do not incorporate gender, age, and occupational dimensions[9]. Nevertheless, according to the available aggregate figures, about 70% of Italian passport applicants were employed in the agricultural sector at the time of application. Therefore, our analysis is likely to capture the main driving forces of local migration. Alongside these limitations, our series do not contain information on return and cyclical migration. Our interest does not lie in explaining destination heterogeneity but, rather, examining the economic environment that determined migration. Such constraints, possibly key in other contexts, do no invalidate our analysis despite inevitably introducing some measurement error in both migration rates and migration stocks at destination – a proxy for migration networks.

[8] The two bodies operated autonomously and developed different, often contradictory, definition of migrants. They also used different data collection techniques. Such inconsistencies help explaining why, despite overall trends being the same, there might be sharp discrepancies in absolute numbers. See Tortorici (2017) and Bevilacqua (2001) for an in-depth treatment of the matter.

[9] Sicily had a higher fraction of female emigrants, as the agricultural tradition there did not favor female employment. This is in direct contrast to much of the rest of the country where women often worked on the farm while male family members migrated temporarily to boost family incomes.

In order to overcome these limitations, we further extend our analysis by using Ellis Island administrative records, a far-reaching data set that comprises individual-level data on the universe of Italian passengers setting foot on Ellis Island, the main migration hub in the US.[10] We focus on Italian passengers between 1892 and 1914 – a total of about 3.5 million data points. Although these data have been utilized in recent studies,[11] we innovatively employ them to study the determinants of Italian emigration to the US at the provincial level. We use the place of last residence to identify a province of origin for individuals in the Ellis Island dataset. This was sometimes challenging, firstly because missing or misspelled place names were not uncommon. We retrieved a total of about 1.75 million observations following the matching procedure presented in Tortorici (2017). We therefore run our analysis using about 60 per cent of Italian migrants who reported their last residence at Ellis Island.[12] While quite high, the attrition rate is significantly better than in other, recently published, studies (Abramitzky et al. 2012; 2013). Second, provincial administrative boundaries have shifted over time. We use constant boundaries based on the 1881 map, using information provided by the *Sistema Informativo Storico delle Amministrazioni Territoriali* (SISTAT)[13].

Land allocation, production, and agricultural prices

The globalization index, *GPE*, is based on international prices and land allocation data purposely digitized from the *Annuario di Statistica Italiano*, a comprehensive publication detailing economic activity. In particular, the exposure to foreign agricultural competition is proxied by the share of overall farmed land allocated to a specific crop.

Our analysis includes all major agricultural commodities produced in Italy: wheat, wine, olive oil, corn, rice, oats, and barley. Given that the choice of allocating land to a specific crop is likely to be endogenous, we keep the provincial composition of agricultural production constant,

[10] In terms of data sources, Bandiera et al. (2013) considerably contribute to the literature by developing an aggregate analysis based on recently digitized Ellis Island administrative records, an encompassing collection of individual observations about the European migrants entering the US through that hub. The authors evaluate the significance of return migration flows during the age of mass migration, highlighting how they were significantly higher than previously thought.

[11] See Bandiera et al. (2013), Spitzer and Zimran (2017), and Ward (2017).

[12] For completeness note that information on last residences is particularly coarse before 1901. Our analysis might therefore underestimate emigration to Ellis Island throughout the 1890s.

[13] When cleaning Ellis Island records, each municipality had been linked to the current corresponding municipality and assigned both latitude and longitude coordinates. In order to map each municipality to the province they belonged to in 1881, we plotted the coordinated of each municipality over a map of Italian provinces in 1881 and simply designed an R script to check within what historical provincial boundaries each municipality falls within.

using the first available year, 1881.[14] This is in line with the approach in Autor et al (2013) and similar papers on import competition and its effects.

International price series trace import prices at customs net of tariffs and trade agreements. We opt to use these prices in order to preserve the exogeneity assumption. In other words, we assume that prices are exogenous with respect to local agricultural markets, so that provincial production is assumed to not influence international markets.

Table 1 presents the summary statistics of the variables used in the analysis. The time horizon of our study stretches over 30 years, from 1881 to 1912. The emigration data shows a significant degree of variability across provinces, regardless of destination choices. In terms of minima, emigration rates – defined as absolute emigration over population – approach 0 because emigration figures were very low from Southern provinces in the early 1880s. Maxima are driven by the provinces of Udine and Belluno, in the Northern region. These areas experienced intensive emigration towards other European countries, even compared with the emigration rates of Southern provinces towards the United States. As mentioned in Section 4, emigration rates obtained from Ellis Island administrative records are a lower bound due to attrition.

Migration networks, defined as the lagged sum of absolute migration, retrace the discussion about rates and destination choices already developed in Section 2. The share of non-landowners employed in the agricultural sector is defined as the sum of sharecroppers, day laborers, salaried laborers, and renters; it varies across provinces, with lower values to be found in North-Western Italy. However, the mean is quite high, with about 85 per cent of those employed in the primary sector not owning land.

Our *GPE* measures are weighted averages of international agricultural commodity prices and volatilities, scaled by the importance of each crop within a given province. Industrialization, expressed as an index (Ciccarelli and Fenoaltea, 2013), also changes significantly with the maximum being Milano, and the minimum in Sassari – a Northern province of Sardegna. Overall, aside from Naples, the South was comparatively less industrialized than Northern provinces.

[Table 1 here]

[14] Comprehensive provincial crop mix data are in any case only available for 4 years (1878, 1881, 1891, 1894).

5. Results

How did market globalization forces interact with the international out-migration choices between 1881 and 1912? Table 2 presents baseline estimates of the effect of our index of international commodity prices, *GPE*, on provincial emigration rates, looking separately across columns 1-4 at, respectively, the total emigration rate, the transoceanic emigration rate, the US emigration rate (measured by Ellis Island data) and the European emigration rate. This specification includes province and year fixed effects and clusters standard errors at the province level. All variables are logged.

[Table 2 here]

We find that increased market integration has a statistically significant, positive effect on emigration rates, with transoceanic rates being most responsive. Given that our globalization measure is a weighted average of international prices, with the weights reflecting province crop intensities, we can interpret this coefficient as indicating that emigration was greater when prices were higher. This makes sense if we are thinking about small holders whose incomes depend on the price of farm goods. Higher prices provide higher incomes for this group, so this result indicates that there may have been a liquidity constraint to migration operating during this period. This is in line with other research on the relationship between income and migration, such as in Bazzi (2017). Throughout the sample period Italy remained a poor country where this liquidity constraint effect dominated, as income had not yet reached a sufficient level relative to US incomes to act as a deterrent to migration. This fits the model of the relationship between income and migration presented by Faini and Venturini (1994). Table 3 expands on the baseline specification to include an interaction between *GPE* and a 5-year price volatility measure. If we believe that what individuals cared about was not just price levels and agricultural incomes but volatility and uncertainty in the prices (and incomes) they faced from year to year, then we would expect the interaction between *GPE* and volatility to be positive. Indeed, we do find this in columns 1 and 2, for the aggregate and transoceanic emigration rates, but the estimated coefficient is not statistically significant for the emigration rate to the US (Column 3) and to

other European countries (column 4).[15] We conclude that there is some evidence in support of the idea that volatility is a key driver, together with the overall trends toward globalization – at least when considering transoceanic movements. The historical literature has emphasized the seasonal nature of migration to Argentina and Brazil in particular, because of the complementary timing of harvest seasons with Italy, so that workers might harvest in two countries in the same year. Our finding may indicate that farm workers responded to uncertainty by using this seasonal migration option, as an insurance device. For India, Persaud (2017) presents evidence that volatility is important in driving emigration, but he does find the effect to be largest for lower status individuals. Since we cannot separate migrants by status here, it makes it difficult for us to reject that hypothesis for the Italian case.

[Table 3 here]

Table 4 presents the specification which includes the full set of controls, *i.e.* provincial industrialization and migration networks and landholding structures. Industrialization does not show up as significant except for Ellis Island migration, where it has the anticipated negative coefficient, implying that areas capable of absorbing the agricultural labor surplus produced fewer immigrants. We investigate further this result in the next section, when we disentangle the analysis between the North and the South of Italy. As expected, migration networks play a significant role in explaining emigration rates at the province level, as existing migrant stocks in the destination country may facilitate chain migration through information and remittance channels (see Moretti, 1999; McKenzie and Rapoport, 2010; and Gomellini and Ó Gráda, 2013). This result is consistent across the different destinations considered, with the estimated coefficients having similar magnitude for transoceanic and European emigration.

[Table 4 here]

The analysis provided above shows the role of globalization and uncertainty in affecting the migration decision. But what is the role of land tenure? We also explore this question in Table 4, which includes the interaction between the *GPE* index and the share of non-landowner

[15] We obtain similar results when including the GPE volatility measure by itself. Results are available upon request.

laborers at provincial level, as measured in 1881. The estimated coefficient on that term is negative, indicating that it is owners that were responding more positively to higher agricultural incomes and not landless laborers, who would in fact have benefited from food price reductions. Another possible mechanism here is that higher agricultural prices increased the incentive to invest in agriculture. Temporary and seasonal migration was considerable for Italy throughout this period and may have been motivated by a desire to gain extra capital to invest in land and expand agricultural operations. Unfortunately, we cannot measure whether migrations we observe are permanent or temporary.

Robustness checks

The inter-censual population figures that we use to construct emigration rates in the main specifications come from ISTAT and were in fact reconstructed. ISTAT did not publish these data regularly before the mid 1890s, which leads to some missing observations that limited our sample size. As a robustness check, we computed emigration rates using only provincial population data for 1881, an approach used also in Spitzer and Zimran (2017). Results are robust to this alternative specification and are presented in Table 5.

[Table 5 here]

As discussed in Section 2, Hatton and Williamson (1998) show differential patterns of migration from North and South Italy, partly due to the relative abundance of non-agricultural labor in the North and the relative economic progress of the North. Table 6 presents the results of a specification that includes interactions of GPE with a dummy for Southern provinces. If there is a non-linear relationship between income and migration, then that might show up in this interaction term. While we find no difference in the effect of globalization on European migration rates across Southern and Northern provinces, a significant difference emerges when we compare transoceanic emigration rates at large (column 2) with emigration rates to the US. Indeed, the effect of globalization on transoceanic emigration rates is lower in Southern provinces, but we find the opposite result when we look at emigration rates specifically to the US. Indeed, the effect of GPE on the emigration rates measured by the Ellis Island administrative recordings doubles in Southern provinces. This finding is indeed consistent with the overall

migration patterns discussed in Section 2: emigration centers gradually shifted from Northern to Southern provinces and preferences shifted towards the US.

[Table 6 here]

6. Conclusion

Analysis of emigration flows at the sub-national level has been fairly limited in the historical literature. Exploiting variation across localities, which are more homogenous than nations, can inform our knowledge of the true determinants of the decision to migrate. This paper exploited a clean shock to agricultural prices and incomes that occurred in Italy as a result of the first wave of globalization, spurred by steam shipping and declining internal transport costs. We used pre-period crop mixes to assign treatment intensity at the level of Italian provinces and explored the effect of price changes and price uncertainty on migration. We found a significant impact suggesting that higher prices drove higher agricultural incomes, which in turn encouraged migration out of rural Italy. In this period, Italy remained in a poverty trap which made income shocks important in financing migration.

Today, as transport and communications technology continues to advance and more countries enter into trade agreements, the consequences of globalization and import competition for developing nation migration will be increasingly salient. Understanding how these mechanisms operated in historically underdeveloped, agrarian economies can help inform the current debate and policy.

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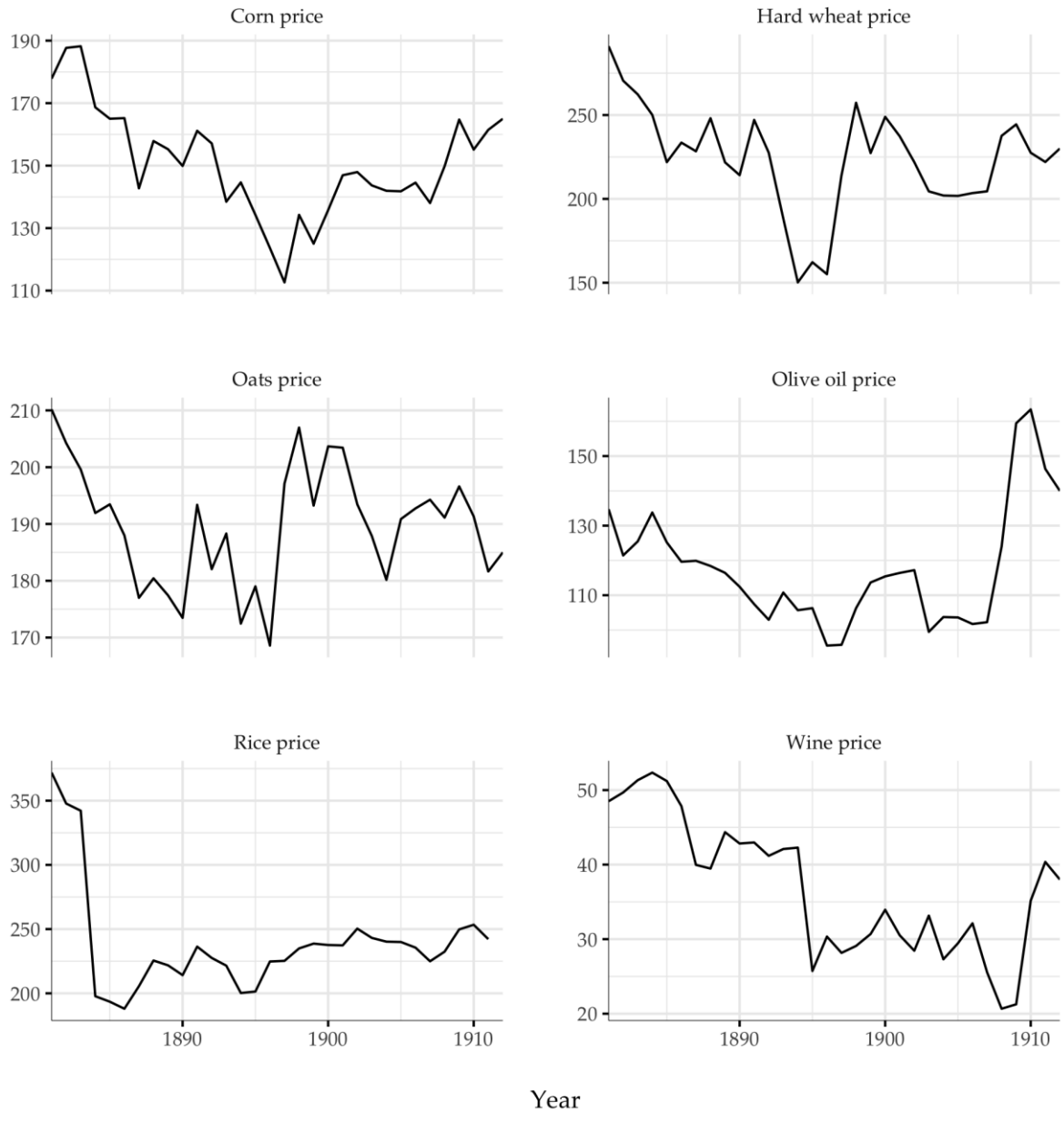
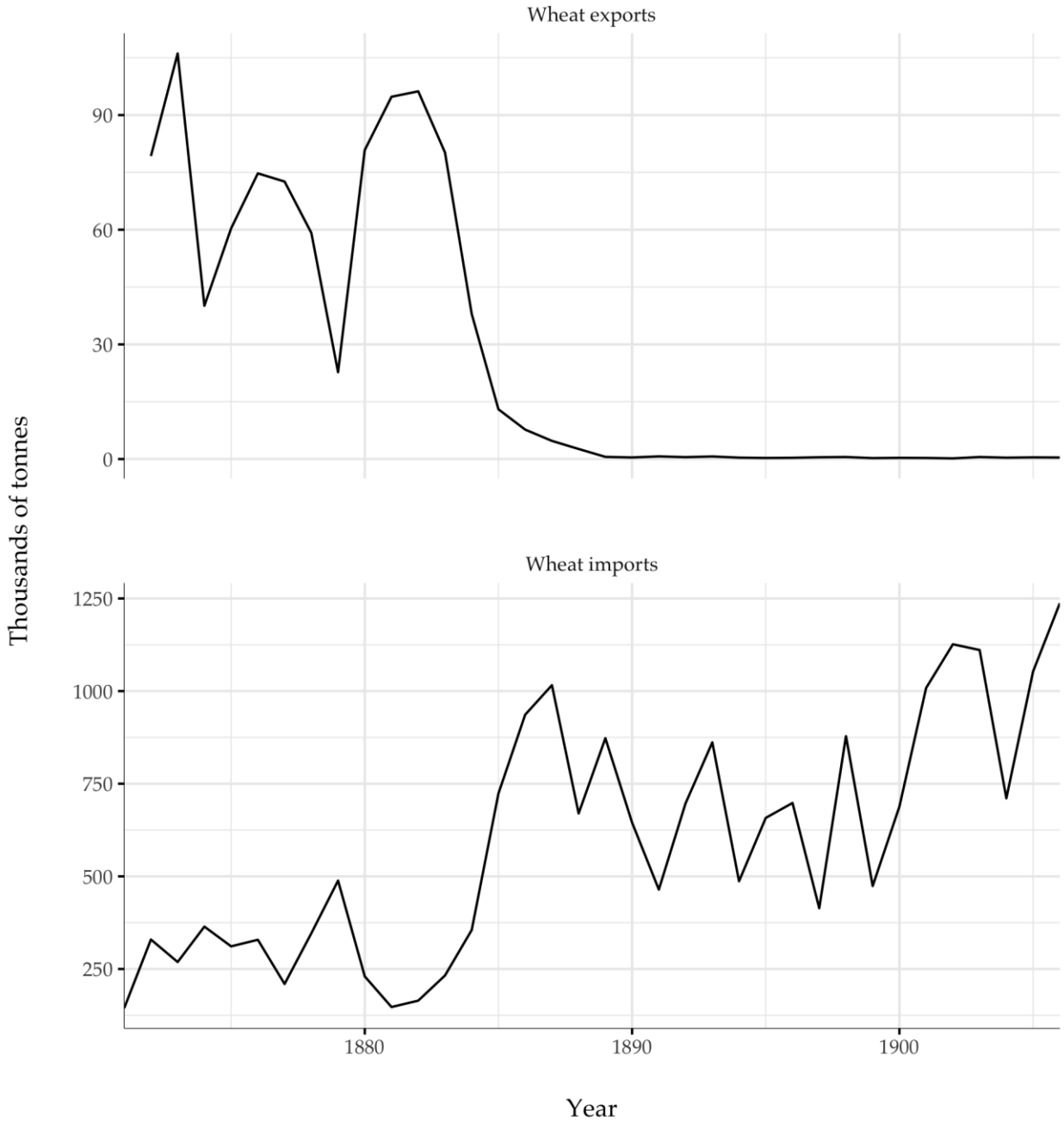
Figure 1: International crop prices



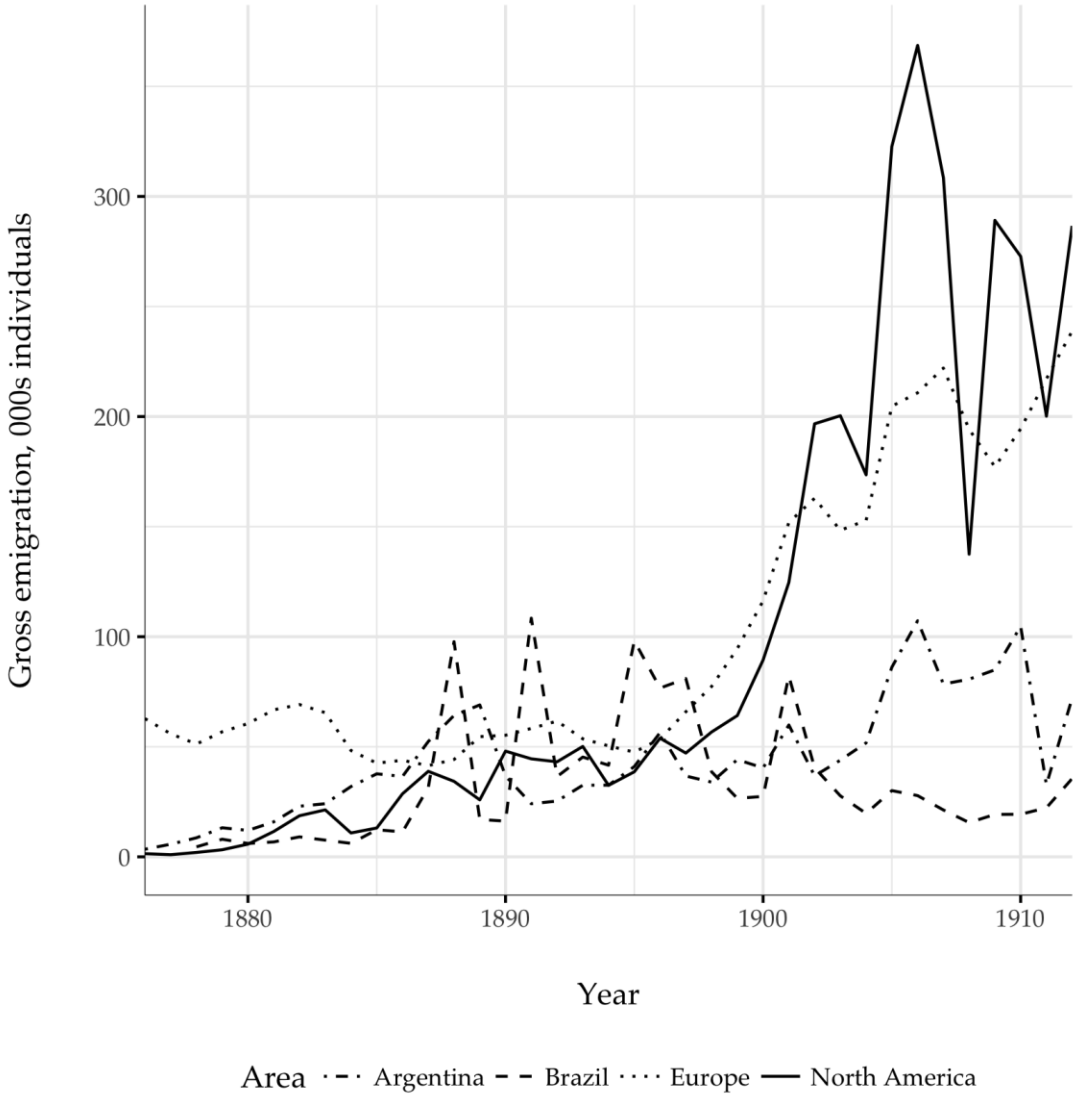
Source: Annuario Statistico Italiano

Figure 2: Wheat exports and imports



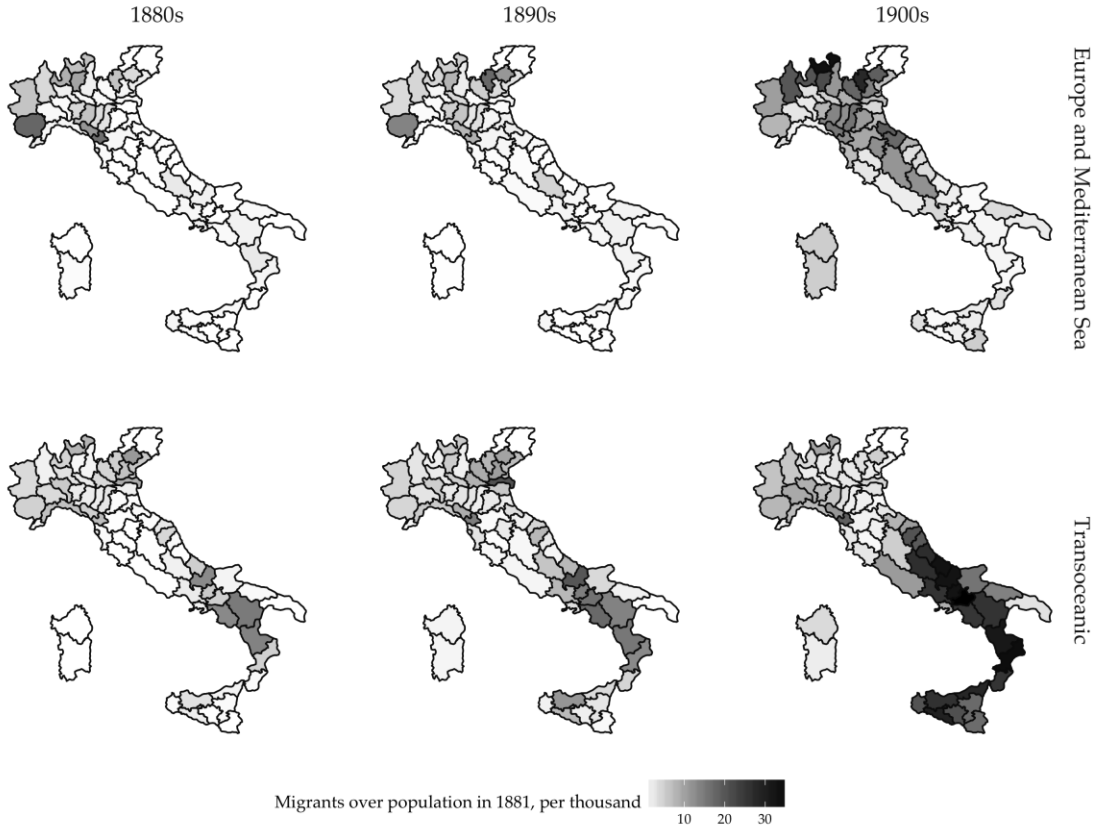
Source: Annuario Statistico Italiano

Figure 3: Italian migration by destination



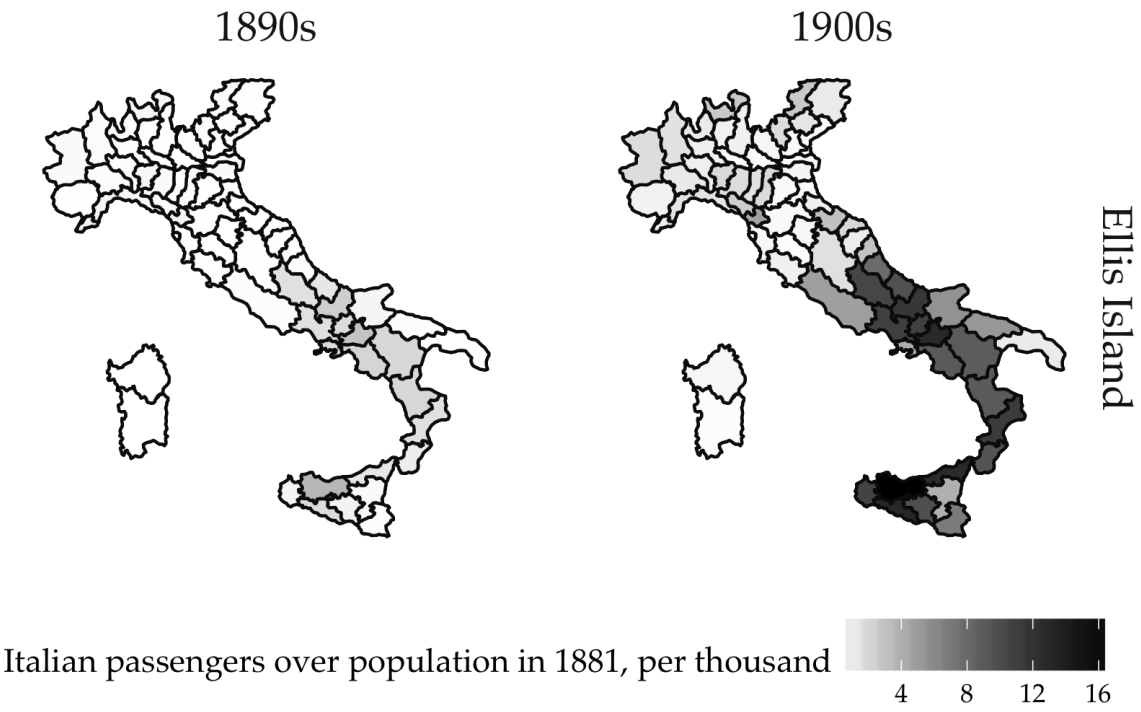
Source: ISTAT, Serie Storiche.

Figure 4: Out-Migration by province



Source: Annuario Statistico dell'emigrazione italiana dal 1976 al 1925.

Figure 5: Out-migration to Ellis Island by province



Source: Ellis Island administrative records, 1892 - 1912

Table 1: Summary statistics

Variable	*Minimum*	*Maximum*	*Mean*	*SD*
Share of non-landowner	41.11	97.32	84.43	10.25
European emigration rate per 1000	0.0016	137.38	6.95	13.63
Global emigration rate per 1000	0.0016	143.75	14.85	16.32
Transoceanic emigration rate per 1000	0.0017	58.68	7.99	10.02
Ellis Island (US) emigration rate	0.0012	26.12	2.74	4.27
GPE	7256.33	24246.32	15023.49	2783.37
GPE, 5-year volatility	180.82	2115.04	948.77	376.21
European migration network	0	1106798	29094.44	87759.11
Global migration network	0	1228871	62131.30	106544.89
Transoceanic migration network	0	324715	33373.53	50096.87
Ellis Island (US) migration network	0	155449	4768.44	13511.42
Population in 1881 (census)	114295	1114991	412458.67	222663.86
Yearly population	114295	1743723	466499.81	269462.58
Industrialization (Fenoaltea)	0.43	2.26	0.91	0.34

Table 2: Globalization and provincial emigration rates

	(1)	(2)	(3)	(4)
Variables	*Global emigration rate*	*Transoceanic emigration rate*	*Ellis Island (US) emigration rate*	*European emigration rate*
GPE	1.3324* [0.668]	1.7217** [0.854]	0.6433*** [0.238]	0.7187 [0.613]
Observations	1,442	1,432	1,115	1,423
Number of provinces	69	69	69	69
Adjusted R-squared	0.543	0.435	0.659	0.535

All regressions include province fixed effects and year fixed effects. Standard errors are clustered at the provincial level.
Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3: Globalization, 5-year volatility, and emigration rates

	(1)	(2)	(3)	(4)
Variables	*Global emigration rate*	*Transoceanic emigration rate*	*Ellis Island (US) emigration rate*	*European emigration rate*
GPE	1.6450**	1.9399**	0.6889***	0.8597
	[0.732]	[0.872]	[0.222]	[0.708]
GPE, 5-year volatility	0.6570**	0.6279*	-0.1508	-0.1353
	[0.258]	[0.326]	[0.235]	[0.318]
Observations	1,375	1,369	1,115	1,356
Number of provinces	69	69	69	69
Adjusted R-squared	0.538	0.374	0.660	0.544

All regressions include province fixed effects and year fixed effects. Standard errors are clustered at the provincial level.
Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4: Full specification

	(1)	(2)	(3)	(4)
Variables	*Global emigration rate*	*Transoceanic emigration rate*	*Ellis Island (US) emigration rate*	*European emigration rate*
GPE	3.6225**	2.2614*	1.1432	5.8793***
	[1.409]	[1.222]	[1.048]	[1.667]
GPE, 5-year volatility	0.4646***	0.4061**	-0.0707	-0.0129
	[0.171]	[0.183]	[0.166]	[0.246]
Provincial industrialization	-0.0208	-0.5223	-1.2911***	0.2606
	[0.456]	[0.531]	[0.228]	[0.505]
GPE x share of non-landowners	-0.0404**	-0.0237	-0.0085	-0.0665***
	[0.016]	[0.015]	[0.012]	[0.019]
Global migration network	0.9342***			
	[0.057]			
Transoceanic migration network		0.8653***		
		[0.044]		
Ellis Island (US) migration network			0.2377***	
			[0.048]	
European migration network				0.9898***
				[0.057]
Observations	1,374	1,368	1,051	1,355
Number of provinces	69	69	69	69
Adjusted R-squared	0.761	0.639	0.721	0.751

All regressions include province fixed effects and year fixed effects. Standard errors are clustered at the provincial level.
Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5: Robustness check. Rates are computed as migration/population in 1881

	(1)	(2)	(3)	(4)
Variables	*Global emigration rate*	*Transoceanic emigration rate*	*Ellis Island (US) emigration rate*	*European emigration rate*
GPE	3.4416***	2.5396*	0.1508	5.6878***
	[1.255]	[1.349]	[1.178]	[1.391]
GPE volatility, 5-year window	0.5251***	0.5214**	-0.0543	0.0898
	[0.178]	[0.211]	[0.192]	[0.249]
Provincial industrialization	0.2419	-0.3803	-1.0576***	0.4822
	[0.447]	[0.494]	[0.224]	[0.506]
GPE x share of non-landowners	-0.0386***	-0.0258	0.0047	-0.0630***
	[0.014]	[0.016]	[0.014]	[0.016]
Global migration network	0.9566***			
	[0.052]			
Transoceanic migration network		0.8591***		
		[0.052]		
Ellis Island (US) migration network			0.2441***	
			[0.043]	
European migration network				1.0239***
				[0.054]
Observations	1,984	1,973	1,282	1,949
Number of provinces	69	69	69	69
Adjusted R-squared	0.750	0.633	0.742	0.745

All regressions include province fixed effects and year fixed effects. Standard errors are clustered at the provincial level.
Significance: *** p < 0.01, ** p < 0.05, * p < 0.1

Table 6: North/South dynamics

	(1)	(2)	(3)	(4)
Variables	*Global emigration rate*	*Transoceanic emigration rate*	*Ellis Island (US) emigration rate*	*European emigration rate*
GPE	3.6578***	2.2740**	1.5377**	5.8641***
	[1.274]	[1.133]	[0.656]	[1.690]
GPE, volatility 5 years	0.4300**	0.3788**	-0.0660	0.0058
	[0.172]	[0.188]	[0.159]	[0.247]
Provincial industrialization	-0.0635	-0.5502	-0.9885***	0.2837
	[0.464]	[0.534]	[0.204]	[0.507]
GPE x share of non-landowners	-0.0368**	-0.0204	-0.0207**	-0.0683***
	[0.015]	[0.015]	[0.008]	[0.019]
GPE x South	-0.7971*	-0.6805*	1.5745***	0.4164
	[0.416]	[0.391]	[0.235]	[0.477]
Global migration network	0.9348***			
	[0.056]			
Transoceanic migration network		0.8691***		
		[0.043]		
Ellis Island (US) migration network			0.2385***	
			[0.044]	
European migration network				0.9911***
				[0.057]
Observations	1,374	1,368	1,051	1,355
Number of provinces	69	69	69	69
Adjusted R-squared	0.762	0.640	0.739	0.751

All regressions include province fixed effects and year fixed effects. Standard errors are clustered at the provincial level.
Significance: *** p < 0.01, ** p < 0.05, * p < 0.1