Contents lists available at ScienceDirect



International Journal of Educational Development

journal homepage: www.elsevier.com/locate/ijedudev

# Immigrant nationality and human capital formation in Brazil\*

## J. Dean Craig, Anna B. Faria\*

University of Colorado Colorado Springs, Department of Economics, United States

## ARTICLE INFO

JEL classification: 125 N36 Keywords: Brazil Immigration Human capital

## ABSTRACT

This paper investigates the impact of the mass migration episode of the late nineteenth and early twentieth century (1888–1920) on human capital creation in Brazil. We argue that the presence of immigrants at the turn of the twentieth century has had a positive impact on current measures of human capital and that the effect is heterogeneous. Demand for education depends on an immigrants' experiences with public education, on their religious background, and on their migration objectives and demographics. The supply of education is contingent on social capital and size of immigrant community. Further, we indicate that this effect persisted over time and remained localized due to high mobility costs and network effects. We find a positive relationship between German, Japanese and Italian presence in 1920 and current human capital, while Portuguese and Spanish presence are not associated with human capital increases.

## 1. Introduction

In his book about the experiences of immigrants in the United States, Thomas Sowell argues that:

"Each ethnic history is distinctive, and yet all were influenced by similar factors of age, location, time of arrival, and the skills and cultures they brought with them to American shores. The current economic position of American ethnic groups covers a wide range, and yet no group is unique, nor as unusual as comparison with a statistical 'national average' might suggest … The national average itself is nothing more than a lumping together of large differences." (Sowell, 1981, p. 14)

The Brazilian immigrant experiences of the turn of the twentieth century should warrant the same conclusion. The purpose of this paper is to explain the channels through which immigrant nationality may have influenced human capital formation in Brazil. To do so, we study the nationality traits likely to affect immigrants' demand and supply for education in the first few decades after their arrival and the mechanisms of persistence.

The literature on the long run economic effects of turn of the twentieth century immigration in Brazil has expanded significantly in the past decade [see, for example, De Carvalho Filho and Colistete (2010), De Carvalho Filho and Monasterio (2012), Musacchio et al. (2014), Rocha et al. (2017), Witzel de Souza (2017)].<sup>1</sup> Most of the research has focused on state-level outcomes or within-state local heterogeneity. Acemoglu et al. (2014) Little attention has been paid to heterogeneous effects due to nationality traits with no spacial restrictions, though the field is emerging [see, for example, Monastério (2017)]. Since human capital is a major determinant of economic development, the question of what determines it or builds it up is an especially relevant one (Glaeser et al., 2004; Dias, 2018).

The motivation of this paper is to understand the long run influence of demographic change by studying its particulars. National cultural traits, here narrowly defined, according to Guiso et al. (2006), "as those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation" are such particulars. While we do not imply our statistical analysis is proof of causality, we provide historical evidence of immigrant heterogeneity in the "market" for education and estimate the current effect of historical immigration on human capital. We use a simple OLS model and find that while the effect of immigration is positive, it is also contingent on the nationality of those groups. We discuss the potentially serious endogeneity problem in Section 5. We find that Italian, German and Japanese presence in 1920 is associated with higher qualitative and quantitative levels of local human capital today. The effect of

\* Corresponding author.

<sup>\*</sup> We are grateful to Devin Moeller for his assistance with GIS, comments from Daniel Lopes, and seminar audiences at the Brazilian Economic History Workshop at Insper, UCCS, SEA conference, ASREC conference and EEA conference.

E-mail addresses: jcraig2@uccs.edu (J.D. Craig), afaria@uccs.edu (A.B. Faria).

<sup>&</sup>lt;sup>1</sup> The literature on the economic effects of the Age of Mass Migration is extensive. Recent works and surveys on the topic include, for example, Hatton and Williamson (2005), Sánchez-Alonso (2019), Fulford et al., 2015, Sequeira et al. (2017), Droller (2018), Friedberg (2000) and Abramitzky and Boustan (2017).

https://doi.org/10.1016/j.ijedudev.2020.102260

Received 17 April 2020; Received in revised form 23 June 2020; Accepted 28 July 2020

Available online 06 November 2020

<sup>0738-0593/ © 2020</sup> Elsevier Ltd. All rights reserved.



Fig. 1. Immigrant Arrivals between 1851 and 1920. Source: Merrick and Graham (1979).

Portuguese and Spanish presence appears to be zero.

Starting in the mid-nineteenth century, immigrants from several European countries began arriving in Brazil. As shown in Fig. 1, approximately three and a half million immigrants entered Brazil between 1850 and 1920. The majority of them arrived immediately before or following slavery abolition in 1888. This immigration episode did not occur directly as an outcome of changes to the labor market in Brazil. It was largely a result of a concerted effort by the São Paulo state government to subsidize European immigration and maintain an elastic labor supply for exporting areas, and of private and public initiatives to create immigrant settlements in the South (Leff, 1991; Seyferth, 2011). As a consequence, immigrants concentrated more heavily in the southernmost parts of the country. Fig. 2 shows the distribution of foreign-born populations in 1920.

The effects of their presence on Brazil's human capital formation has received much deserved attention from scholars. Stolz et al. (2013) argue that the high level of immigrant initial human capital, measured by a higher numeracy score in 1900, had spillover effects to the entire economy. At the state-level, they find that states that received larger immigrant contingents between 1890 and 1920 had greater gains in numeracy than states with less immigration.<sup>2</sup> Stolz et al. (2013) argue that the mechanisms through which those effects come about were fourfold.

First, higher immigrant human capital had a level-effect on human capital accumulation, meaning the stock of human capital increased per capita as the the average immigrant "exhibited a formal and informal education and training that was better than that of native Brazilians." Second, immigrant self-selection increased the level of entrepreneurial capital in the country, meaning entrepreneurial immigrants were more inclined to educate themselves and their families in order to improve their economic conditions. Third, immigrant human capital had spillovers to the native population "as they initiated successful behavior." Stolz et al. (2013) connect this third mechanism with the creation of immigrant associations designed to assist the immigrant communities. Finally, they argue that female human capital can have "positive implications for intergenerational transfer." The immigrant experience

can change the relative importance of female education and create spillovers.

An alternative and, we think, complementary argument to explain human capital formation at the state-level is that commodity booms influenced the amount of revenues available for education investment. Musacchio et al. (2014) find that states undergoing export booms between 1889 and 1930 had greater access to export tax revenues for reinvestment and that the presence of immigrants in each state did not affect how those revenues were spent. In fact, Musacchio et al. (2014) find a negative correlation between immigrant presence and educational expenditures at the state-level.

While the state-level relationship between immigrant presence and human capital formation may appear weak, there are two reasons to believe that at the municipality-level the effects of immigrant presence are more pronounced. First, other factors may confound the state-level outcomes as the analysis becomes more complex as the scope of jurisdictions increase. As Musacchio et al. (2014) point out, after 1891, "improving education became a political prerogative, not only because voters could demand education, but because due to the literacy requirement to vote, increasing literacy could help local political bosses to mobilize more voters in state and national elections." Multiple political demands influenced state-level decision-making.

Second, competition for a scarce labor force between municipalities drove local politicians to invest more in educational services where immigrants were present. This effect cannot appear in any state-level analysis, because it was driven by local demands. According to Summerhill (2010), "[where] there were higher proportions of immigrant owners, local elites decided to spend more on education. Given that the immigrants were not enfranchised, this was most likely a 'supply-side' phenomenon. By offering higher levels of local public education, counties could recruit more immigrant workers, some of whom became farm owners."

Further evidence of the relevance of immigrant presence for the local provision of education comes from De Carvalho Filho and Colistete (2010), who argue that "the growing presence of immigrants seems to have increased the demand for primary education at the local level, reflecting on municipal and state level policies." They find a positive and persistent effect of immigrant presence in São Paulo state municipalities on public instruction.

Similar positive results come from Rocha et al. (2017) analysis of São Paulo state-sponsored settlements and De Carvalho Filho and

 $<sup>^{2}</sup>$  New data from Monasterio and Lopes (2018) suggest Stolz et al. (2013) underestimate the effects of immigration on current economic development. They find the increase in GDP per capita to be between 12% and 17%, while Stolz et al. (2013) estimate it at 1%.



Fig. 2. Foreign-share of Total Population in 1920. Source: DGE (1920).

Monasterio (2012) work on southern immigrant settlements. Rocha et al. (2017) argue that the effects of these settlements persisted due to higher supply of education over time and to a structural shift in occupations towards activities that required higher skills and thus more educational investments. De Carvalho Filho and Monasterio (2012) find that the closer a municipality is to a nineteenth century governmentsponsored immigrant settlement, the greater that municipality performs economically today.

There is little doubt that immigrant areas underwent deep economic transformations in the late nineteenth and early twentieth centuries. The driving mechanisms of such change are debatable and more research is needed to explore them. This paper addresses such research needs by highlighting differences in national traits as potential drivers of positive effects on human capital formation. The general hypothesis is that where immigrants were present during the early twentieth century, the market for education, both in its demand and supply sides, shifted to increase the equilibrium quantity of education in the long run. Furthermore, the scale of this positive shift depends on original traits that shape demand and supply for different national groups.

On the one hand, immigrants' experience with universal education in their home countries, their religious background and demographics help shape the demand for education during the mass migration episode of the late nineteenth and early twentieth century. On the other hand, the supply of education is contingent on social capital and size of immigrant community and strength of its network. Thus, immigrant nationality is likely to affect human capital formation at the local level and these heterogeneous effects would have persisted over time due to high inter-regional mobility costs in the short and medium run and to immigrant network effects.

The majority of immigrants to enter Brazil in the late nineteenth and

early twentieth century came from Italy, Portugal, Spain and Germany. Large numbers of Japanese immigrants arrived in Brazil starting in 1908 (Levy, 1974). The 1920 Census discriminates between 30 different nationalities present in Brazil at the time. We focus the analysis of heterogeneous effects of the five main immigrant nationalities, namely Italian, German, Japanese, Portuguese and Spanish.

#### 2. Nationality traits

We frame our main hypothesis, that the effect of immigrant-presence on human capital formation is heterogeneous between national groups, and the empirical analysis thereof on theoretical mechanisms that can explain these divergences in outcome. In this section we suggest five national traits that may explain this heterogeneity. At this point, we limit the empirical analysis to the main hypothesis without explicitly testing these mechanisms, though we are encouraged by the possibility of exploring these questions empirically at a smaller scale in the future.

The extent to which universal access to public education was available in one's home country, the religious affiliation of each group, the degree to which it differed from Brazilian Catholicism and the relative relevance of religious education, and the demographics of the immigrant populations affected demand. On the supply side, the level of social capital available within each immigrant community and the size of each community drove creation of ethnic schools.

There are two main mechanisms through which access to universal education in one's home country affects human capital formation in a recipient country. Both mechanisms affect one's expectations of access and thus increase demand for education. First, certain societies place great value on formal education and the extent to which formal education is available is endogenous to this valuation. Second, in the case of exogenous implementation of formal education, longer periods of exposition to public education and the greater extent of this provision, the more likely it will be that citizens will come to expect future provision. The two mechanisms are complementary (Kreutz, 2000).

Religious affiliation has received quite a bit of attention from social scientists seeking to understand its relationship with human and social capital formation.<sup>3</sup> The common argument is that religiosity has positive influence on both by operating as a community organizer and motivator (Furseth, 2008). The manner in which religious affiliation differs in the context of this paper from its standard treatment in social capital research is that the religious mechanism highlighted in this paper hinges on the different roles of religious education between immigrant communities. The desire for religious preservation is the driver of demand.

The element of religiosity is present in nearly all immigrant groups, with the exception of the Japanese, whose religious traditions are hard to disentangle from secular cultural elements. The relationship between religious affiliation and the social context within which these immigrant groups find themselves can explain more of the variations in human capital formation than the relationship between religiosity and social capital. The further one's religion is from Brazilian Catholicism, the more likely that community will be to engage in religious education. This is the German case, which we explore in the following section. Moreover, the closer the concept of group identity is tied to a religion and religious traditions, the more likely that community will be to organize ethnic schools. This is the case of Italians in Brazil.

Another driver of immigrant demand is the demographic composition of immigrant groups, which varied between national groups. The immigration of families creates a different demand for education than the immigration of single, young males. Adult members of immigrant families had greater incentives to invest in education and to pressure local politicians for schooling opportunities for their children than did single, young males, who were more likely to return to their home country and less likely to require any human capital investment at adulthood (Sampson, 1999). Moreover, the larger the share of single males, the smaller the share of women in each immigrant group. Fewer immigrant women could reduce the opportunities for intergenerational spillover effects highlighted by Stolz et al. (2013). On the supply side local authorities who needed to keep a labor force within its jurisdiction would be more likely to invest in public education if the immigrant group contained higher proportions of families.

The broadest mechanism through which immigrant national traits can the supply of education is social capital. To avoid confusion, social capital here is equivalent to civic capital as defined by Guiso et al. (2011). Civic capital comprises of "those persistent and shared beliefs and values that help a group overcome the free rider problem in the pursuit of socially valuable activities." (p. 419) Unlike broader definitions of social capital, civic capital encompasses only those informal institutions that facilitate coordination within groups to solve collective action problems and are long lasting or "durable."

There are two main ways in which social capital affects the provision of education and thus contributes to human capital formation. First, social capital increases the costs of free riding behavior within immigrant groups and thus increases the ability of those groups to organize into associations to provide education and other services to the community, by reducing externalities (Coleman, 1988; Putnam, 1993; Zhang et al., 2017). In fact, immigrant associations were fundamental to the early provision of education in Brazil, where public provision was scarce (Kreutz, 2000) (as shown in Fig. 3).

Second, social capital harnesses the ability of groups to generate

political pressure and obtain public goods through political processes. In a study of Chinese local elections, Padró-i-Miquel et al. (2015) find that "social capital enhances the introduction of elections in terms of government-provided public goods. More generally, they show that preexisting informal institutions can play an important role in determining the success of formal political institutions." This transferability from informal to formal institutions is fundamental to understand the persistence of the heterogeneous effects of national traits. In the Brazilian case, immigrant associations worked to sway politicians to increase education expenditures at the local level, transforming social capital into political capital over time. In areas where immigrant social capital was low, such transformation did not occur.

The effectiveness of each group's ability to organize hinges on the size of each community within a given municipality. Sufficiently small immigrant groups cannot organize due to high individual costs, whereas sufficiently large groups weaken social capital and immigrant networks and increase the costs of monitoring individuals within the group (Fukuyama, 2001; Oliver and Marwell, 1988; Poteete and Ostrom, 2004). Group size can influence the capacity of immigrant groups to organize in order to solve local collective action problems and provide public goods to its community.

In sum, we argue that there are five potential mechanisms through which human capital formation may have been influenced by immigration at the turn of the twentieth century. In the next section, we discuss the experience of the five largest national groups in Brazil by exploring how each of the mechanisms may have played out for these groups.

## 3. Immigrant nationality and demand and supply for education

## 3.1. Italians

The effect of the presence of Italian immigrants on human capital formation is likely positive and large. Many Italians, though not all, had had experience with universal access to public education. The strong ties between religiosity and education within Italian communities and the demographic composition of these immigrants, who arrived in family units, strengthened the demand for education. Moreover, the Italian immigrant communities in Brazil developed into strong networks of mutual aid associations, many of which were devoted to educational services. The size of the communities magnified the capacity of their constituents to organize to provide services and to pressure local politicians.

Universal access to education did not expand uniformly across Italian territories. Northern Italians had far more access to education than their southern counterparts (Pagani, 2014). The largest contingent of Italian arrivals in Brazil originated from the North and many had experienced public education and had come to expect it from Brazilian authorities (Silva Simões and Pimentel Franco, 2014). In addition, there developed in unified Italy a desire to build an Italian nation with a unified language and culture. As a result, the Italian government actively promoted the ethnic education of its emigrant population in an effort to promote a strong sense of *italianicità* (Salvetti, 2014).

While the concept of *italianicità* was connected to Catholicism, religious and government-funded education efforts did not coincide within Italian immigrant communities (Salvetti, 2014, p. 69). In fact, religiosity was the major force driving the educational efforts of the Italian populations in Brazil, who often saw themselves connected by religion rather than a newly-formed national identity (Kreutz, 2000, p. 360). Schools founded by Italian religious orders served not only the local immigrant community, but also native Brazilians and immigrants of other nationalities (Maschio, 2014). This meant that the Italian push for education influenced human capital formation not only within but also outside of their communities.

Italian communities had a particular feature that strongly influenced the demand for education in Brazil in the early twentieth century.

<sup>&</sup>lt;sup>3</sup> See, for example, Acemoglu et al. (2014), Arruñada (2009), Becker and Woessmann (2009, 2010), Cantoni (2015), Easterlin (1981), Guiso et al. (2003), Iyer (2016), Zhai and Woodberry (2011).



Fig. 3. Mutual aid associations and immigrant presence in early twentieth century Brazilian states. Source: INE (1936).

Family migration was an eligibility requirement for subsidized trips sponsored by the state of São Paulo. Single males were not eligible. This led to a large number of families, including many children, settling in the rural areas of the state. Combined with an expectation and appreciation of the value of education, the demographics of these Italian communities put education as a priority for these groups.

Given such relatively large demand for educational services within these Italian communities, the lack of actual educational provision in Brazil at the turn of the twentieth century meant that these communities would have to organize not only to provide education but also to pressure local politicians to create and maintain schools. Italians, much like the Germans and the Japanese, founded the largest numbers of mutual aid associations with an educational focus. Indeed, the Italian associations were fundamental in providing education to the children of its members, given the government's inability or unwillingness to step in (Pagani, 2014; Silva Simões and Pimentel Franco, 2014). Between 1907 and 1917, there were between 63 and 95 Italian schools in São Paulo. Enrollment in those schools varied from 2.5% to 7.1% of all students in the state for that period, as shown in Table 1.<sup>4</sup>

Underlying the development of these associations are the social networks of Italian immigrants and the social capital that created and stemmed from these networks. Kreutz (2000b, p. 349) explains that immigrants tended to organize into ethnically homogeneous groups in order to facilitate the strengthening of these networks.

A fundamental aspect of this strengthening of community ties and its subsequent effect on human capital formation was the sheer size of the Italian immigrant community within Brazil. The founding of settlements and the distribution of Italian immigrants in southern Brazil and in the coffee areas of São Paulo favored the development of sufficiently large Italian communities, whose voice local politicians needed to hear. The incentive to maintain immigrants on the coffee farms was often sufficient to push São Paulo leaders to provide some measure of public goods to their constituents.

In sum, we find that Italian presence may have contributed positively to human capital formation due to the strong role of religiosity, of the family unit and the size of the Italian communities in influencing demand and supply of education. Moreover, the Italians' experience

Table 1Italian schools in São Paulo between 1907 and 1917.

Year	Schools	Share of total enrollment
1907	63	6.6%
1908	85	6.7%
1909	95	7.1%
1910	67	4.8%
1911	70	3.3%
1912		4.5%
1913		4.3%
1914		2.5%
1917		3.0%

*Notes*: For 1910, schools from *Unione Magistrale* only. For 1911 and 1912, share of total enrollment data for capital city only. For 1913, share of total enrollment in Italian schools from 1912.

with universal access in their home country and level of social capital, evidenced by the number and relevance of mutual aid associations, also contributed, at least marginally, to the increase in education in areas where Italians lived at the turn of the twentieth century.

#### 3.2. Germans

The German experience with universal education was the most widespread of the nationalities here analyzed. Compulsory education was introduced in Prussia in 1763 and by 1870 primary enrollment was 49 percent (see Table 2). While the Italian experience with universal education was not uniform, German immigrants had come from regions where universal education was well-established (Kreutz, 2000p. 355) After arriving in Southern Brazil, these immigrants faced a severe shortage of public education opportunities for their children, and, to mitigate the issue, began opening ethnic schools.

The growth of German ethnic schools was slow until 1875 when the different religious groups within the immigrant communities took control of the schools' management. In 1875, there were 99 ethnic schools in Rio Grande do Sul and in 1900 there were 308. By 1931, 56,596 students attended 952 German ethnic schools across the country (Kreutz, 2000a, p. 355–57).

Lutheranism was fundamental to the process of education of the German population in Brazil. Out of the 952 German ethnic schools in

Year of introduction of compulsory education and primary enrollment ratios in 1870, 1900 and 1920.

Country	Introduction of compulsory	Pri	mary Enr	ollment R	atios
	education	1820	1870	1900	1920
Prussia	1763	21	49	58	97
Italy	1877	15	50	68	79
Japan	1871	7	41	86	98
Spain	1838	11	52	49	45
Portugal	1844	3	27	37	42
Brazil	1934	1	8	14	20

Sources: Soysal and Strang (1989), Lee and Lee (2016).

operation in 1931, 57% were evangelical schools (Kreutz, 2000ap. 357). Lutherans understood education as a necessary step in the development and maintenance of their religious tradition and that in the absence of public schools, the congregation had the duty to provide education to the future generation of Lutherans. As Santos and Cecchetti (2013) put it, "the founding of schools was the fruit of the faith" and the religious motive drove Lutheran Germans to devote themselves to the "secular task" of creating and maintaining the ethnic schools.

The demand for ethnic schooling was fomented by the large number of German families that migrated primarily to the countryside of southern Brazil. They sought to join or create immigrant settlements and to acquire and work in small agricultural farms (Seyferth, 2011). Germans who went to the coffee areas of São Paulo operated similarly to their Italian counterparts. In the South, however, the permanent nature of the German settlements created incentives for the development of community-based associations while at the same time lessening the local governments' incentives to provide public goods as a means to win over immigrants from other towns.

Without much government support, the German communities organized themselves in associations to meet their demand for education. In addition to the religious motive, ethnic schools contributed to the preservation of the German ethnic identity.<sup>5</sup> German associations served not only as the promoters of ethnic schooling, but also as the organizations around which the entire immigrant community centered. These organization built on and strengthened the existing social capital within the German immigrant communities in southern Brazil. According to Santos and Cecchetti (2013), these associations worked as a "social cement that produced solidarity and social cohesion based on the preservation of German attitudes and cultural traditions."

Another contributing factor to human capital formation in the German case was the size of the German community. In the South, there were many immigrant settlements of sufficient size to guarantee the operability of these organizations. In other areas, albeit smaller, German communities generally had a sufficiently high number of families to not only generate a large enough demand for these associations but also to supply them continuously.

Overall, we expect German presence to have the largest effect on current human capital formation. We suspect all five nationality traits played a role in increasing demand and supply of education in locations where Germans were present in the early twentieth century.

## 3.3. Japanese

The Japanese were the immigrant group who placed the highest value on education, surpassing the Germans. Setoguti (2008, p. 1171) describes the immigrants' demand for education deriving from "a historical experience promoted by the modern Japanese state, in support

of education." Not attending school, she argues, was a marginalizing attitude, and the expectation of return to Japan led immigrants to create, "by any means," ethnically Japanese schools. Demartini (2000)'s work on the oral account of early Japanese immigrants corroborates the importance of education to these groups. The Japanese created associations to "first and foremost, supply education to their children." The associations built schools before anything else. These schools operated not only to provide formal education but also to serve as the main medium through which Japanese culture, including the high regard for education, was passed on to future generations.

Despite the strong Japanese commitment to the education of their children, that effort was not connected to the promotion of any religion and religious group did not participate directly in the education of Japanese children in São Paulo. Still, the Japanese actively promoted and maintained ethnic organizations promoting Japanese culture and education. The desire to return home impelled the Japanese to bring up their children as if they were in Japan, with the same customs and educational background. The parents feared that bringing up their children in a foreign country would ostracize them upon return (Setoguti, 2008, p. 1166).

A strong desire to return home was usually more prominent in immigrant groups formed by young and single men, who migrated in search of quick financial success. The Japanese who migrated Brazil were unusual in this aspect. Most had the desire to return, but many had come in as family units. The fact that the Japanese migrated as families had a dual role in fomenting human capital formation. First, the arrival of families meant that children were a large part of the immigrant contingent. The arrival of thousands of new potential students increased demand for education. Second, familial ties created a strong sense of community between immigrants, who used those ties to help create and maintain the associations involved in educating the Japanese children.

The role of associations cannot be underestimated in the Japanese case. The Japanese organized to supply their children with education whether or not the government stepped in (Setoguti, 2008p. 1171). The objectives of Japanese education were broader than those of the general public and the immigrants had little interest in assimilating into Brazilian culture. Only community-run associations could promote these objectives and unlike other national groups, whose associations performed different roles, the primary goal of these Japanese groups was the provision of education. Moreover, these associations helped promote cooperation within the community and with other Japanese groups (Demartini, 2000, p. 3).

Not only did the Japanese organize into these ethnic associations, but they also tended to concentrate in tightly knit communities. Rather than develop several small nuclei, the Japanese concentrated into larger groups to facilitate the provision of education and the maintenance of their culture. In 1934, of the 11,000 thousand Japanese who lived in urban areas, about 5000 of them were in São Paulo city, which to this day is the home to the largest number of Japanese descendants. The ethnically Japanese population in Brazil centers around one and a half million, second only to Japan itself (IBGE, 2008).

We expect a large and positive effect of Japanese presence in current human capital levels. All nationality traits indicate that the Japanese increased supply and demand of education in their settlement locations. The only exception is that the religious element was not a strong driver of education in the Japanese community, being replaced by the desire to educate children in the customs of the home country.

## 3.4. Portuguese

The limited extent of education system in Portugal at the time of the mass migration suggests that those arriving in Brazil at the time did not have the same expectations as the Germans and Japanese with regard to the provision of education. Despite the introduction of compulsory education laws in 1844, the expansion of public and private education

<sup>&</sup>lt;sup>5</sup> Some communities in southern Brazil have kept close ties to their German or Austrian heritage and speak German to this day.

in Portugal did not mimic that of Germany or even Spain. The primary enrollment ratio in 1900 Portugal stood at 37%, while Germany's (Prussia) was 58% and Spain's 37%, as shown in Table 2.

Correia and da Silva (2004) describe the poor outcomes of the educational effort in Portugal as a failed result granted by the "passive resistance" of the populace to the education laws. They further argue that the Portuguese people, "in their majority ignorant," were "indifferent, if not refractory, to the benefits and campaign for education." An alternative explanation is that the Portuguese did not see it in their interest to invest in their children's education at that point, given the economic conditions in the country and the expected return to education. Ultimately, the concept of education as a means necessary for individual advancement did not seem to take root with the Portuguese in both Portugal and Brazil.

The demographic composition of the Portuguese immigrant contingent explains in part why those communities did not get involved in pushing for education. Most Portuguese immigrants were single males and concentrated in urban areas where they engaged in commercial activities. There were few women and many very young men (children, in fact) and older unmarried men, who were less likely to marry immigrant women from other nationalities and native Brazilians (Klein, 1993). Out of the five nationalities, the Portuguese had the lowest share of female presence in 1920. As shown in Table 3, only one in five Portuguese-born persons were women. This meant that the Portuguese community had less interest in promoting and demanding education and their associations' objectives illustrate that. These associations, which in the German, Italian and Japanese cases were fundamental in the creation and maintenance of ethnic schools, tended to focus on recreation, health care and the preservation of Portuguese culture, rather than on formal schooling.

The lack of Portuguese ethnic schools did not mean that the Portuguese forwent their cultural identity and divested themselves from their communities completely. The Portuguese were the first immigrant group to found and maintain mutual aid associations of various kinds. While the Portuguese associations did not focus on universal education, they were responsible for creating some of the most important literary clubs and libraries in the country, which served overwhelmingly the wealthier Portuguese immigrant class. For the poorer immigrants, these association provided hospital care and recreation opportunities (Klein, 1993, p. 255). The language commonality lowered the costs of integrating the Portuguese children into the Brazilian educational system and freed up resources within the Portuguese community to invest in associations whose foci were to provide assistance to the poorer members of the community and to the preservation of a Portuguese cultural identity (Fiss, 2001).

In sum, we expect that the effect of Portuguese presence at the turn of the century to be the lowest of the five nationalities. The Portuguese experience with universal access to education was limited, there were no incentives to promote religious education and the influx of Portuguese immigrants was largely comprised of young men. These three aspects contribute to a low impact of Portuguese presence in the demand for education. While the average size of the Portuguese communities and the existence of associations may indicate that the size of the community might have helped increase supply, the relatively low demand for education may have rendered those factors null.

 Table 3

 Share of women in foreign population in 1920.

Italian	34%
German	33%
Japanese	27%
Portuguese	20%
Spanish	32%

Source: DGE (1920).

#### 3.5. Spanish

There is much less information on the Spanish immigration experience in Brazil, but it appears to resemble the Portuguese in regard to education, in that these immigrant communities may not have contributed much at the margin to the demand and supply of education. Still, there were two ways in which the Spanish may have come to demand and supply more education than their Portuguese counterparts in Brazil. Religious drive and community size did not contribute significantly to the Spanish decision to invest in education. While universal access to education in their home country was relatively widespread, the Spanish who left for Brazil were poorer and less educated than those who migrated to the United States and Argentina. Many who chose Brazil over the other American alternatives did so because of the transportation subsidies offered by the São Paulo government. According to Klein (1994), the Spanish in Brazil tended to be the least educated of the immigrant groups. (p. 51) Their demographic composition, heavily based on family units, and social capital levels would have led to greater investment incentives than the Portuguese.

Spanish immigration to Brazil consisted heavily of family units and resembled the Japanese and Italian experiences. These three immigrant contingents located in rural communities and engaged in agricultural work, especially in coffee farming. (Martins, 1989, p. 12, 15). The family organization and rural distribution of the Spanish in Brazil may have contributed to an increase in demand for education in areas which they occupied, because families were more likely to pressure local politicians and those politicians had an interest in keeping these immigrants within their jurisdictions. Families were more likely to remain in a given location. To the extent that the Spanish migrated to Brazil as family units, they were less mobile and more likely to develop a political interest in the furthering of their children's education.

The evidence on the level of Spanish associationalism in Brazil is mixed. While several associations formed in São Paulo state to cultivate cultural ties to Spain, the Spanish were one of the groups whose integration into Brazilian society occurred more naturally and rapidly (Martins Dias, 2010; Klein, 1994). Moreover, the Spanish associations resembled the Portuguese ones by focusing on recreation and aid rather than education of Spanish children, though the extent to which they organized was smaller than their Portuguese counterparts.

Klein (1994, p. 89) suggests that the Spanish failed to mobilize to the same degree as the Portuguese due to their lack of social mobility and diffuse settlement in rural areas. The relative small size of Spanish communities may have prevented the scalability of community organizations. However, evidence from the 1920 Census suggests that the average Spanish community was not smaller than other groups. Table 4 indicates that the Spanish had the third largest average group size of the five main nationalities (Columns 1 and 2). Excluding the largest ten immigrant communities and communities with fewer than 5 nationality members, we find that the average Spanish community had 365 individuals, ranking second relative to the other nationalities (Column 3). The evidence is therefore inconclusive.

Overall, we expect the effect of Spanish presence to be low to medium. Historical evidence suggests access to education in the Spain and the role of religion to be weak, while demographics, social capital

#### Table 4

Average community size by nationality in 1920.

Nationality	Average size (1)	Median size (2)	Conditional average (3)
Italian	584	38	645
German	77	7	72
Japanese	166	21	137
Portuguese	267	21	275
Spanish	263	14	365

Source: DGE (1920).

and the size of communities to have an intermediate effect on the market for education where the Spanish were present. The next section explores the channels through which the effects of foreign-born presence persisted over time.

## 4. Persistence

There are two complementary mechanisms through which the heterogeneous effects of national traits have persisted. First, ethnic schools may have contributed to the sustained formation of human capital in the municipalities in which they were located by increasing the availability of education services to the population. While it is true that the presence of ethnic schools and associations varied with the distribution of particular national groups across the territory, it cannot fully explain the persistence of the heterogeneous effects on human capital formation, because the formal education of immigrant children and the ability of immigrants to formally mobilize suffered profound changes in 1938 with the enactment of the nationalist Decree 406, which closed ethnic schools across the country.<sup>6</sup>

The purpose of Decree 406 was to weaken immigrant identity and Brazilianize the population by severely limiting the rights to organize of the immigrant communities. With regards to formal education, the decree prohibited the publishing of any books, magazine or newspaper in any foreign language. Immigrants were no longer allowed to manage rural schools and the teaching of foreign languages to children younger than fourteen years old was forbidden. The curriculum had to focus on Brazilian themes, including not only the Portuguese language, in which all courses were to be taught, but also geography, history and politics (Brasil, 1938).

Decree 406 not only limited immigrant's ability to educate their children but also to found and manage associations. From 1938 on, no rural settlements or associations founded within them were to be "denominated in a foreign language." The decree prohibited rural settlements populated by a single national group and limited the share of each national group to no more than a quarter of the total population of each settlement. At least thirty percent of the population had to be Brazilian natives and in cases in which there was not a sufficient number of Brazilians, Portuguese immigrants were to substitute for them. The nationalist government had become increasingly preoccupied with the existence of immigrant enclaves, especially after the Vargas government declared support for the Allies in World War II. Brazil's participation led the government to treat German, Italian and Japanese nationals and descendants as enemies of the nation (Geraldo, 2009, p. 174).

These prohibitions on immigrant life meant that at least formally the immigrants were no longer able to supply any more formal education than what the federal government allowed. Decree 406 revealed how low the federal government's tolerance of immigrant culture was. Given all the formal limitations on immigrants, an informal element of culture must have persisted if the effects of the national traits have persisted. We argue here that this element is the strength of the immigrant networks, i.e. the ability of certain groups to retain their social capital and other national traits in the face of legal constraints.

Cultural assimilation has weakened immigrant networks and the social capital stock contained within them. There are few descendants of turn of the century immigrants who today do not speak Portuguese as their first language and who are not fully assimilated into Brazilian culture or consider themselves first and foremost Brazilian. However, the complete social assimilation of immigrant descendants does not mean that a complete cultural dissociation occurred. Many elements of German, Italian and Japanese cultures were incorporated in Brazilian customs or are passed on between generations by their descendants. Evidence of the strength of immigrant networks comes from the literature on the industrial development of São Paulo, in which immigrants played a significant role. According to Hanley (2004), the web of business connections within immigrant communities was stronger than in the general Brazilian business community. While "[investors] and directors concentrated their energies and their money, abandoning the practice of forming broad connections in general - and connections to a bank in particular - and turned to the stock market instead," she argues, "[the] English, Italians, and Germans continued to work in these more personal, process-based relationships. Their communities were smaller and more clearly defined than the amorphous Brazilian business community." (p. 211).

Given the persistence of the social networks around the immigrant cultural elements, e.g. food, festivities, recreational activities, business connections, there is no reason to believe that the education element of immigrant national traits has dissipated more quickly. As Guiso et al. (2011) argue, "civic capital is highly persistent, since all the methods for its transmission (interfamily transmission, formal education, and socialization) take long time. For this reason, communities/countries that, for an historic accident, are rich in civic capital enjoy a comparative advantage for very extended periods of time."

In addition, some evidence has emerged of the direct effect of ethnic schooling on human capital formation. Witzel de Souza (2017) finds that German ethnic schools in early twentieth century São Paulo have had a positive effect on current human capital due to their effect on public school enrollment. Furthermore, Witzel de Souza argues that the effect is not due to the exogenous human capital shock of introducing better educated immigrants, but to the spillovers on education demand and supply from the ethnic schools. While still in its early stages, more empirical research will be helpful in elucidating the effects of ethnic schools on human capital formation.

The second mechanism of persistence were high mobility costs which prevented large scale within-country migrations up until the mid-twentieth century. According to Graham and de Hollanda Filho (1984) the net internal migration rate between 1900 and 1920 was 3.8%, the lowest twenty-year estimates in their analysis. Data from the 1912 Statistical Yearbook indicate that fewer than one percent of the population engaged in interstate and intrastate migration through ports in 1910 and 1912. These numbers omit land movements, but reflect the approximate patterns of internal migration, since coastal transportation was generally cheaper than ground alternatives at that time. To the best of our knowledge, there are no studies that estimate the costs of interregional or interstate mobility for the early twentieth century. There are, however, studies focusing on transportation cost by tonnage and on mobility costs in later decades that suggest that distance and credit constraints contributed to the high costs of internal migration (Reis, 2014; Leff, 1972; Graham, 1969; Sahota, 1968).

This rigidity meant that immigrants tended to permanently settle in or near the areas to where they initially migrated and that few people migrated to immigrant areas from other regions of Brazil due to high costs.<sup>7</sup> These early immigrant areas were thus more likely to benefit from immigrant presence and most importantly, to see a shift in the structure of their local economies. In particular, immigrant areas that had higher human capital early on underwent a shift in their employment structure over time towards activities that require skilled labor (Rocha et al., 2017). With the shift in employment structure, the expected returns to education increased and further shifted demand for education in those areas.

Immigrant heterogeneous national traits can have long lasting effects on human capital formation and remain localized. As Stolz et al. (2013) put it, "human capital spillovers would have predominantly taken place in and around these areas with high immigrant concentration, which is particularly strong in the São Paulo region."<sup>8</sup> (p.

<sup>&</sup>lt;sup>6</sup> Decree 406 was one of many restrictions imposed on immigrant enclaves after the 1930 Revolution (Geraldo, 2009).

<sup>&</sup>lt;sup>7</sup> Large scale internal migration began in the 1940s.

Expected effect of national characteristic on human capital formation.

	Italian	German	Japanese	Portuguese	Spanish
Universal access	Medium	High	High	Low	Low
Religious Affiliation	High	High	Low	Low	Low
Demographics	High	High	High	Low	Medium
Social capital	Medium	High	High	Low	Medium
Size of community	High	High	High	Medium	Medium
Demographics	High	High	High	Low	Medium
Social capital	Medium	High	High	Low	Medium
Size of community	High	High	High	Medium	Medium

101) Easterlin (1981) summarizes the persistence argument well when he writes that "[a] major commitment to mass education is frequently symptomatic of a major shift in political power and associated ideology in a direction conducive to greater upward mobility for a wider segment of the population... it often represents a sizable break with conditions of the past." (p. 14) In this paper, we argued that nationality traits affected the incentive structure of the market for education in Brazil and thus may have affected the manner in which certain areas achieved economic growth (or failed to do so).

#### 5. Empirical analysis

In the previous sections, we have laid out the mechanisms through which immigrant groups may have influenced human capital formation in Brazil. Table 5 summarizes the expected effects of each national group on the current human capital stock of the municipalities where they were located in 1920. Overall, we hypothesize that greater positive effects on human capital formation will take place where, in 1920, Germans, Japanese, Italians, Spanish and Portuguese were prevalent, in this order.

## 5.1. Data

In order to empirically test our hypothesis, we use data on the distribution of national groups in Brazil from the 1920 Census as our main exogenous estimators. The 1920 Census contains municipality-level data on the number of foreign-born individuals from 31 nationalities, from which we calculate the share of each of our five main groups (Italian, German, Japanese, Spanish and Portuguese) from the total population in each municipality. This exercise gives us five main exogenous variables. Our main endogenous variable is the average Education subindex of the IFDM (Índice Firjan de Desenvolvimento Municipal) between 2005 and 2013. We use the subcomponent variables of the subindex as part of our robustness checks in Section 5.4.

The IFDM Education subindex has six components: kindergarten enrollment rates (20%); elementary education age-grade distortion (10%); share of elementary education teachers with a college degree (15%); average daily elementary education classroom hours (15%); elementary education drop-out rates (15%); elementary education results on the Basic Education Development Index or IDEB (25%) (Firjan, 2015). We use the average IFDM Education subindex for three reasons: first, the subindex encompasses qualitative and quantitative measures of education provision; second, the subindex is limited to lower levels of education, all of which are funded at the local-level. In Brazil, secondary (high school) and tertiary (higher) education are funded by state and federal governments, and would not reflect the variations in local-level human capital formation; and finally, we avoid concerns of researcher bias and data mining, as we do not choose the subindex variables and their respective weights.

Given that municipal boundaries have changed over time, current municipalities need to be combined into minimum comparable areas (MCAs) to allow for meaningful estimation. The 1920 Census variables contain a little over 1300 observations, while current data sets range between 5000 and 5700. In order to control for previously existing conditions, we use data from the 1872 Census, which contains 642 municipalities. For this reason, we create MCAs that approximate the 1872 municipalities, but do not exactly match them. This transformation exercise creates 635 geographical units, the MCAs, which do not translate into any real jurisdiction, but allow for intertemporal analysis. For this reason, we are unable to use fixed effects.

## 5.2. Empirical strategy

To estimate the effects of immigrant presence on human capital, we employ a simple OLS model:

$$\begin{split} IFDM_i &= \beta_0 + \beta_1 * FShare_i + \beta_2 * IShare_i + \beta_3 * GShare_i + \beta_4 * JShare_i \\ &+ \beta_5 * SShare_i + \beta_6 * PShare_i + \gamma_i * \mathbf{X}_i + \varepsilon_i, \end{split}$$

(1)

where IFDM<sub>i</sub> is the average Education IFDM subindex between 2005 and 2013 in MCA *i*, FShare<sub>i</sub> IShare<sub>i</sub>, GShare<sub>i</sub>, JShare<sub>i</sub>, SShare<sub>i</sub> and PShare<sub>i</sub> are the shares of foreign-born (total), Italians, Germans, Japanese, Spanish and Portuguese in MCA *i* in 1920 relative to the entire MCA population.  $X_i$  are MCA level controls, which include for the year 1920 total and foreign literacy rates, GDP per capita (logged), the number of school buildings per 100,000 inhabitants and total foreign share in each MCA, and literacy rates for 1872. We present the Summary Statistics in Table 6.

On the one hand, we are unable to test for the specific mechanisms described in Section 2 due to a lack of historical municipality-level data. On the other hand, we are able to test some corollary hypotheses. To test whether the presence of foreign-born is sufficient to affect current human capital levels, we control for the share of foreign-born in total population in 1920. We argue that the main channel through which immigrant heterogeneity affected human capital development is not via a one-time shock to the stock of human capital in each municipality, so we control for previously existing levels of human capital by using 1872 literacy rates and 1920 foreign and total literacy rates as well as the number of school buildings in existence in 1920. To control for historical levels of economic development we include a GDP per capita variable for 1920, the earliest year for which GDP data are available.

A potential identification problem with this analysis is the existence of endogeneity bias: immigrants chose to settle in areas with greater access to education. While this is a valid concern, we address this potential bias in two ways. First, we control for previously existing economic conditions (1920 GDP per capita) and levels of human capital (1872 and 1920 literacy rates and 1920 number of schoool buildings). Table 7 shows that there is no statistically significant correlation between literacy rates in 1872 and immigrant presence in 1920 (Column 2), which suggests immigrants did not take into account the existing levels of human capital in their decision to settle. Even the relationship

Table 6	
Summary	statistics.

	Mean	St. Dev.	Min	Max
IFDM	0.632	0.128	0.336	0.908
Foreign share	0.025	0.052	0.000	0.357
Italian share	0.010	0.027	0.000	0.155
German share	0.001	0.003	0.000	0.051
Japanese share	0.000	0.004	0.000	0.076
Spanish share	0.003	0.011	0.000	0.094
Portuguese share	0.004	0.013	0.000	0.205
Literacy rate	0.290	0.118	0.060	0.746
Schools per 100,000	12.397	13.908	0.000	96.909
Foreign literacy rate	0.681	0.220	0.000	1.000
GDP per capita	5.397	0.709	3.324	7.906
Literacy rate in 1872	0.179	0.109	0.023	0.831
Ν	635			

<sup>&</sup>lt;sup>8</sup> The authors here are referring to the "center and southern part of Brazil."

Correlation between 1920 immigrant presence by nationality, 1920 GDP per capita and 1872 literacy rates.

	1920 GDP per capita (1)	1872 literacy rate (2)
German presence	0.0811	0.0052
Spanish presence	0.1934*	0.0489
Italian presence	0.2121*	-0.0435
Portuguese presence	-0.1467*	0.0307
Japanese presence	0.0892*	-0.0463

Asterisks indicate significance at the 95% level of confidence.

between contemporaneous economic development and immigrant presence is weak at best. Column 1 of Table 7 indicates that immigrant presence is weakly positively correlated with GDP per capita in 1920, when not negative or statistically insignificant.

Second, we argue that the historical record indicates the size of the bias may be insignificant. The decision to settle had more to do with potential economic gains and push factors than with pre-existing superior economic performance. To European emigrès, Brazil figured as a tertiary resort compared to the United States and Argentina. The Japanese initially emigrated to North America and only began to arrive in Brazil in 1908, the year after the imposition of restrictive quotas in the United States. Discontent among immigrants with the disparity between advertised and actual conditions in Brazil were common (Takeuchi, 2007; Klein, 1994; Holloway, 1980). Moreover, the São Paulo state subsidization program limited the extent to which immigrants were given a location choice, at least upon arrival. The fact that a large share of immigrants arrived through a subsidization program illustrates the lack of natural economic attraction factors to even the fastest-growing areas of Brazil.

Another limitation of our empirical strategy is that we are unable to control for state-level effects. This is due to two reasons. First, using MCAs precludes us from determining exactly what state each municipality belongs to. While some MCAs contain only single-state municipalities, others includes municipalities from either a number of states or municipalities that became part of different states overtime. The second reason is that, even if we were to ignore the first issue and assume we can extract from MCAs their "state" component, we are left with a dataset that does not comport the level of analysis we conduct. In other words, we would have "states" with far too few observations to draw any conclusion.

A final concern is that we cannot control for certain geographical characteristics that may help explain the model. We avoid including latitude and longitude, rainfall, proximity to the coast, etc., because several of our MCAs are too large to allow for any meaningful analysis. We are confronted with questions which would require too far of a leap of faith or potentially biased choice on our part. For example, should we use latitude and longitude for the center of the MCA? How should we determine that center? Based on the center of the MCA polygon or the center of the municipalities? If the latter, what do we do when there are multiple municipalities within the MCA, as is most often the case? Rather than complicate and potentially hinder the analysis, we conduct it without these valuable controls.

## 5.3. Results

With these limitations in mind, our main results suggest that the relationship between immigrant presence and human capital is indeed heterogeneous and persistent. Table 8 shows the results of our main OLS regressions. In Column (1), we find that the relationship between foreign presence (Foreign Share) and current local human capital is positive, as predicted, and statistically significant. The size of the coefficient suggests that a one standard deviation increase in foreign presence (as share of total population) increases the IFDM subindex by

half of a standard deviation. This result is consistent with our expectation that foreign presence has a positive effect on current human capital, which has been shown in other studies as well [e.g. Rocha et al. (2017), De Carvalho Filho and Monasterio (2012), De Carvalho Filho and Colistete (2010)].

Column (2) reports the results of including the share of immigrants of the five main nationality groups. These results directly address our hypothesis. We find that the coefficient on Foreign Share decreases in size, but remains statistically significant, which is consistent with our expectation that nationality traits that drive the differences in educational outcome. For that reason, we expected that the coefficients for nationality shares would be positive. In fact, Italian, German and Japanese shares are positive and statistically significant at the 0.1%confidence level. Spanish and Portuguese share are not statistically significant. The values of Italian, German and Japanese shares are consistent with our expectations. The impact of German presence on the subindex ( $\beta = 3.835$ ) is greater than of Japanese ( $\beta = 2.079$ ), which in turn is greater than of Italian ( $\beta = 1.849$ ). The lack of statistical significance of Spanish Share and Portuguese Share is consistent with our hypothesis that the Spanish and Portuguese had little influence on the demand and supply of education at the turn of the century.

As we discussed earlier, a potential issue with this analysis is that the mechanism through which immigrant presence affected current human capital is that immigrants represented a shock to the stock of human capital at the turn of the century. While we do not have data on 1920 human capital for each national group, we include 1920 total literacy rates in Column (3), the number of schools in Column (4) and foreign literacy rates in Column (5). In order to control for other economic development characteristics in 1920, we also include GDP per capita (logged) in Column (5). The coefficients on the shares of national groups remain statistically positive, while decreasing in size for Italian and German shares by 13% and 36% respectively. The coefficient on Japanese presence increased in size by 14%. Results from these specifications suggest that differences in 1920 human capital stock cannot fully explain variations in current human capital. Moreover, foreign literacy rates, which proxy for foreign human capital stock, appear to be statistically significant but have the wrong sign.9

In an ideal setting, we would like to control for all pre-existing differences in economic development and in human capital attainment. This would lessen concerns over endogeneity, which we explained in Section 5. However, due to data limitations, we can only proxy for some of those conditions. Systematic income data is unavailable for periods prior to 1920, but there exist data on literacy rates from the 1872 Census. In column (6), we control for this variable and find that pre-existing human capital appears to have had a negative relationship on current human capital when foreign presence is included. The coefficient on 1872 literacy rate suggests that a 10% increase in pre-existing literacy decreases the IFDM subindex by approximately 2%.

Since we cannot control for state or regional effects due to our use of minimum comparable areas, we interpret the results of Column (6) as the main estimates in our analysis. We find that after controlling for pre-existing and foreign human capital and income per capita, the relationship between foreign presence and current human capital is, as predicted, heterogeneous. Italian, German and Japanese shares continue to show a positive and statistically significant relationship with current human capital. In fact, after including all controls, the size of the effects fall by approximately 19% for Italian Share and 32% for German Share, and remains essentially constant for Japanese Share [contrast Columns (2) and (6)].

The coefficients presented in Column (6) are not economically negligible. A one standard deviation increase in Italian Share (0.027) is associated with an increase in the IFDM subindex of one-third of a

<sup>&</sup>lt;sup>9</sup> There are some questions on the reliability of these particular data, so we refrain from drawing strong conclusions from these coefficients.

Simple OLS regressions with robust standard errors.

LHS: Average education IFDM index	LHS: Average education IFDM index 2005–2013.					
	(1)	(2)	(3)	(4)	(5)	(6)
Foreign share	1.351***	0.412**	0.244	0.274	-0.156	-0.132
	(0.091)	(0.132)	(0.164)	(0.174)	(0.200)	(0.193)
Italian share		1.849***	1.900***	1.863***	1.611***	1.503***
		(0.226)	(0.231)	(0.240)	(0.225)	(0.223)
German share		3.835***	2.746**	1.852*	2.452**	2.588***
		(0.786)	(0.848)	(0.871)	(0.764)	(0.748)
Japanese share		2.079***	2.409***	2.481***	2.379***	2.144***
		(0.561)	(0.605)	(0.626)	(0.454)	(0.477)
Spanish share		-0.101	0.220	0.317	0.605	0.650
		(0.635)	(0.632)	(0.632)	(0.502)	(0.500)
Portuguese share		0.256	0.0944	0.0210	0.400	0.501
		(0.393)	(0.383)	(0.380)	(0.296)	(0.298)
Literacy rate			0.115**	0.0667	-0.00528	0.0128
			(0.042)	(0.046)	(0.048)	(0.048)
Schools per 100,000				0.000958**	0.000722*	0.000723*
				(0.000)	(0.000)	(0.000)
Foreign literacy rate					-0.137***	-0.140***
					(0.026)	(0.026)
Logged GDP per capita					0.0382***	0.0409***
					(0.009)	(0.009)
Literacy rate in 1872						-0.123***
						(0.033)
Constant	0.598***	0.597***	0.568***	0.571***	0.755***	0.778***
	(0.005)	(0.005)	(0.011)	(0.012)	(0.027)	(0.027)
Ν	631	631	631	631	581	576
$R^2$	0.30	0.35	0.35	0.36	0.44	0.45
F	219.3	73.74	69.85	60.08	86.58	77.28

Standard errors in parentheses.

\* p < 0.05.

\*\*\* *p* < 0.001.

standard deviation from its mean. A one standard deviation increase in German and Japanese shares (0.003 and 0.004) is associated with a 6 to 7 percent of a standard deviation increase in the IFDM subindex. A 1 percent increase in German or Japanese shares increases the mean IFDM subindex by 4.1% and 3.4%. A 1% increase in Italian share increases the IFDM subindex by 2.4%.

The effects of German Share and Japanese Share are smaller in total magnitude, possibly due to the relative size of these groups in relation to Italians. The absence of statistical significance for the Spanish and Portuguese share coefficients are in line with our expectations that their presence did not impact human capital formation in Brazil, at least not to the extent that the other three groups might have.

#### 5.4. Robustness checks

It is possible to raise some endogeneity concerns with this analysis. We have addressed these issues in Section 5. In this Section, we conduct empirical robustness tests to further investigate these concerns as well as others that are not fully covered by our main specification. First, we estimate the model controlling for population size by eliminating municipalities for which the number of foreigners is small in absolute terms and relative to the total population. Second, we investigate in more detail the hypothesis that immigrants tended to migrate to areas previously occupied by other immigrants or that were economically more developed than non-immigrant recipient municipalities. In the same specification, we go further by trying to isolate differences in IFDM performance based on current levels of economic development. Finally, we break down the IFDM Education subindex into its components and regress our exogenous variables on each of these components.

Table 9 shows the results of OLS for AMCs that had more than 5 or 10 immigrants or more than 1% of its total population is comprised of

foreign-born individuals. Results are generally consistent with our main specification coefficients, with two exceptions. Japanese Share loses its statistical significant effect for AMCs with greater than 1% Foreign Share. This may be due to the fact that in 1920 64% of AMCs with Foreign Share greater than 0.01 (1%) did not have a Japanese presence. Only 72 AMCs had any Japanese inhabitants in 1920. The final difference between these results and our initial estimates is that Portuguese and Spanish presence appear to have had a positive and statistically significant effect in these restricted specifications. These results are not inconsistent with our hypothesis since we find that the relative size of the coefficients is in line with our expectations of positive, heterogeneous effects as we outline in Table 5.

One final consideration about the results of Table 9 is that in AMCs with greater than 1% Foreign Share none of the control variables appear to have a statistically significant effect, with the exception of 1920 Literacy Rate, which again appears with the incorrect sign. These results suggest that locations where immigrant presence was greater had their human capital formation path shaped mostly by these newcomers, which is consistent with the size of population mechanism we outline in Section 2.

In Table 10, we present the results of our investigation into the hypothesis that immigrants self-selected into areas with previously existing immigrant communities or that were relatively more economically developed. To do so, we estimate our main model and include additional control variables for foreign presence (as share of total population) and share of free persons in total population in 1872. We also include a variable for current GDP per capita (2010) to control for the fact that current income likely correlates positively with current human capital levels. We find that after adding these controls, results are largely consistent with our main specification. Even after control-ling for pre-existing and current economic conditions, we find that

<sup>\*\*</sup> p < 0.01.

OL	S	regressions	controlling	for	toreign	popu	lation	size.
----	---	-------------	-------------	-----	---------	------	--------	-------

LHS: average education	LHS: average education IFDM index 2005–2013				
	Drop fewer than	Drop fewer than	Drop less than 1%		
	(1)	(2)	(3)		
Foreign share	-0.444*	-0.586***	-0.304		
	(0.180)	(0.171)	(0.180)		
Italian share	1.380***	1.312***	1.481***		
	(0.209)	(0.202)	(0.211)		
German share	3.375***	4.139***	3.164***		
	(0.731)	(0.716)	(0.696)		
Japanese share	2.185***	2.077**	0.973		
	(0.598)	(0.751)	(0.609)		
Spanish share	0.843	0.924*	0.962*		
	(0.430)	(0.407)	(0.429)		
Portuguese share	0.865**	1.097***	0.639*		
-	(0.263)	(0.254)	(0.270)		
Literacy rate	-0.00453	-0.0241	-0.237***		
-	(0.048)	(0.050)	(0.069)		
Schools per 100,000	0.000659	0.000518	0.000135		
	(0.000)	(0.000)	(0.000)		
Foreign literacy rate	-0.278***	-0.353***	-0.0709		
	(0.032)	(0.036)	(0.076)		
Logged GDP per capita	0.0490***	0.0459***	0.00477		
	(0.011)	(0.011)	(0.016)		
Literacy rate in 1872	-0.134***	-0.158***	-0.0234		
	(0.036)	(0.039)	(0.054)		
Constant	0.896***	0.960***	0.832***		
	(0.030)	(0.029)	(0.046)		
Ν	495	441	202		
$R^2$	0.51	0.54	0.51		
F	92.63	91.86	31.84		

Standard errors in parentheses.

\* *p* < 0.05.

\*\* *p* < 0.01.

\*\*\* p < 0.001.

there exists a robust positive relationship between Italian, German and Japanese presence and human capital formation.

We also estimate our main model using each component of the IFDM Education subindex as our dependent variable. These components are: enrollment rates in daycare and pre-school (Mat); average daily classroom hours for elementary education (Had); dropout rates for elementary education (Tx); share of teachers with higher education degrees in elementary education (Dsu); results of elementary school national exam (IDEB); and age-grade distortion in elementary education (Tdi). In addition, we estimate the model controlling for foreign population presence. We present these results in Table 11.<sup>10</sup> We find that no particular component is driving the results of our main specification, which suggests the IFDM Education subindex is a good proxy for educational provision and quality at the municipality-level.

We explore the possibility that the main drivers of these results are the state of São Paulo, since it received the majority of the immigrant population around the turn of the century, or the South, which received immigrants earlier in the nineteenth century. Were this the case, then immigrant presence around other parts of the country would not have been shown to correlate with better human capital measures today. Our results excluding São Paulo (not shown) suggest that is not the case. While some coefficients do lose statistical significance, perhaps due to lack of variation in the data outside of São Paulo municipalities, they do not differ economically from the coefficients of our main analysis. Italian presence remains statistically significant and its coefficient is

International Journal of	Educational Develo	pment 80	(2021)	) 102260
--------------------------	--------------------	----------	--------	----------

#### Table 10

OLS regressions contro	lling foi	: 2010	GDP per	capita an	d 1872	variables.
------------------------	-----------	--------	---------	-----------	--------	------------

LHS: average education	ation IFDM inde	x 2005–2013.

	(1)	(0)
	(1)	(2)
Foreign share	-0.124	0.00108
0	(0.190)	(0.184)
Italian share	1.138***	0.971***
	(0.222)	(0.221)
German share	1.829*	3.467***
	(0.753)	(1.014)
Japanese share	1.551*	1.371*
	(0.600)	(0.599)
Spanish share	0.907*	0.812
	(0.434)	(0.444)
Portuguese share	0.326	0.204
	(0.299)	(0.277)
GDP per capita	0.0851***	0.0830***
in 2010 (logged)	(0.009)	(0.009)
Foreign share		-0.154*
in 1872		(0.074)
Free persons as		-0.148***
Population share in 1872		(0.037)
Constant	0.0170	0.152
	(0.086)	(0.090)
Original controls	Vec	Voc
	576	576
n <sup>2</sup>	0.57	0.58
K~	07.00	0.00
r	97.80	84.39

Standard errors in parentheses.

\* *p* < 0.05.

\*\*p < 0.01.

\*\*\* p < 0.001.

twice as large as for the unrestricted specification. The coefficients on German and Japanese presence are similar to our main population results, but lose statistical significance. Spanish and Portuguese shares remain insignificant. When we restrict the analysis to São Paulo "state" MCAs, the coefficients (not shown) are similar to those we described above, suggesting São Paulo municipalities are not the only driver of our main results. <sup>11</sup>

When we estimate our main specification for southern states only, we find that Italian and German presence is still correlated with higher IFDM outcomes, while Japanese presence loses its statistical significance (not shown). This is to be expected since there were very few Japanese immigrants in southern Brazil in 1920, 714 to be exact in our dataset. Spanish presence is now negatively associated with human capital development, while the impact of the Portuguese remains nil. When we drop São Paulo and the southern states from our sample, we find results similar to when we drop São Paulo from our sample. The main difference is that German presence loses its statistical significance. Again, this is likely due to the lack of variation in the data and the small number of Germans outside of São Paulo and the South. In the four excluded states there were over forty-three thousand Germans, while in the remaining states there were fewer than five thousand.

Finally, we conduct a robustness test to assess the possibility that our estimations are picking up the (negative) effects of slavery rather than immigration (not shown). To do so, we include the share of nonwhite persons or the share of black persons in 1872. We use these two variable separately because the 1872 distinguishes between black persons and "pardos," a racial category that refers to light skinned black persons or persons of mixed race. We are hesitant to take any meaningful conclusions from this analysis for two reasons. First, as we have just mentioned, the concept of race as outlined in the 1872 census

 $<sup>^{10}</sup>$  We were unable to collect these data for all of the years used for the IFDM index. We average the data we have over the years available.

 $<sup>^{11}\,\</sup>mathrm{see}$  Section 5 for an explanation of our reluctance to separate MCAs by MCA state code.

OLS regressions with IFDM subindex components as dependent variables.

Expected Sign	LHS	ForeignShare	Italian	German	Japanese	Spanish	Portuguese
Plus	IFDM	-0.132	1.503***	2.588***	2.144***	0.65	0.501
Plus	IFDM <sub>5</sub>	-0.444*	1.38***	3.375***	2.185***	0.843	0.865**
Plus	IFDM <sub>10</sub>	-0.586***	1.312***	4.139***	2.077***	0.924*	1.097***
Plus	IFDM <sub>1%</sub>	-0.304	1.481***	3.164***	0.973	0.962*	0.639*
Plus	Mat	-0.278	2.107***	3.906***	-0.0543	0.381	0.699
Plus	$Mat_5$	4	2.041***	4.356***	-0.0274	0.409	0.89*
Plus	Mat <sub>10</sub>	-0.481	1.995***	4.720***	-0.0308	0.447	1.027*
Plus	Mat <sub>1%</sub>	-0.36	1.956***	4.037***	-0.823	0.619	0.965*
Plus	Had	-1333	6.312***	-5.631	8.427**	4.224**	4.016***
Plus	Had <sub>5</sub>	-1.635*	6.135***	-4.642	8.264**	4.457*	4.444*
Plus	Had <sub>10</sub>	-1.657*	6.114***	-3.861	7.958**	4.406*	4.549***
Plus	Had <sub>1%</sub>	-0.957	6.634***	-4.035	6.016*	4.112*	3.586**
Minus	Tx	-0.0405	-0.0986**	-0.652***	-0.264***	0.0177	0.0139
Minus	Tx <sub>5</sub>	0.0256	-0.0788*	-0.792***	-0.284**	-0.0252	-0.0534
Minus	Tx10	0.0495	-0.0674	-0.923***	-0.265*	-0.0389	-0.0936*
Minus	$Tx_{1\%}$	0.0105	-0.0917**	0.605**	-0.0920	-0.0547	0.0004
Plus	Dsu	0.428*	0.355	0.132	1.226**	-0.325	-0.712
Plus	Dsu <sub>5</sub>	0.0462	0.208	0.808	1.351***	-0.0542	-0.301
Plus	Dsu <sub>10</sub>	-0.109	0.167	1.499	1.351**	0.022	-0.0898
Plus	Dsu <sub>1%</sub>	0.0269	0.462*	0.712	0.415	0.135	-0.52
Plus	IDEB	-1.041	6.978***	20.12***	9.499***	1.659	-0.592
Plus	IDEB <sub>5</sub>	-2.817**	6.345***	24.86***	9.558**	2.815	1.402
Plus	IDEB <sub>10</sub>	-3.46***	5.90****	29.16***	8.545*	3.255	2.691
Plus	IDEB <sub>1%</sub>	-2.769**	6.614***	24.08***	4.366	4.095	0.682
Minus	Tdi	-0.154	-0.709***	-3.939***	-2.079***	-0.791	0.414
Minus	Tdi₅	0.0535	-0.608**	-4.529***	-2.078***	-0.90*	0.147
Minus	Tdi <sub>10</sub>	0.142	-0.547**	-5.066***	-1.972***	-0.947*	-0.0208
Minus	Tdi <sub>1%</sub>	-0.0551	-0.705***	-4.210***	-1.273*	-0.970*	0.288

Main specification controls included.

Years of data: IFDM: 2005–2013; Mat: 2010-2016; Had: 2010–2016; Tx: 2007–2016; Dsu: 2011–2016; DSD: 2005–2015 (add many science) Tdi: 2006–2016

IDEB: 2005-2015 (odd years only); Tdi: 2006-2016.

Subscripts 5, 10 and 1% indicate sample with MCAs with more than 5, 10 and 1% immigrants.

\* p < 0.05.

\*\* *p* < 0.01.

\*\*\* p < 0.001.

generates confusion. When we run our main regression adding the share of nonwhite persons, we find that its coefficient is negative and statistically significant, which is consistent with the literature on the detrimental effects of slavery on human capital development, as summarized by Engerman and Sokoloff (2012). However, if we use the share of black persons in 1872, that coefficient is not statistically significant and has the wrong expected sign.

Furthermore, if we include the share of slaves in 1872 rather than race composition, we find that none of the immigrant share variables change and that the coefficient on slave share is positive and statistically significant (not shown). Taken at face value, this result suggests slavery had a positive legacy on human capital formation, which is neither plausible nor true. Instead, this is likely a result of the fact that the 1872 data reflect the forced migration of slaves from the Northeast to the Southeast in the nineteenth century and not the local legacy of slavery in areas that had, by 1872, already been emptied of slaves.

## 6. Conclusion

In this paper we investigated the role of immigration in influencing long-run human capital formation by assessing the role of nationality traits in shaping demand and supply for education and the persistence of these heterogeneous effects. While we are unable empirically separate the effects of each mechanism outlined in Section 2, we are encouraged by the results and suggest that further research will help elucidate the role these mechanisms have played. Despite this impediment, the empirical exercise we conducted contributes to the literature on the role of immigration and of social capital in human capital formation.

If it is true that the presence of immigrants of different nationalities had heterogeneous effects on human capital in the long run, then it suggests that other mass migration events may also show these heterogeneous effects. Ultimately, our results suggest that scholars and policy-makers should err on the side of caution when, in the case of scholars, generalizing the effects of immigration, and, in the case of policy-makers, promoting certain immigration policies.

#### Author statement

J. Dean Craig: Methodology, Formal analysis, Validation, Writing – Review & Editing. Anna B. Faria: Conceptualization, Methodology, Software, Formal analysis, Data Curation, Writing – Original Draft, Visualization

#### **Declaration of Competing Interest**

The authors report no declarations of interest.

#### J.D. Craig and A.B. Faria

#### References

- Abramitzky, R., Boustan, L., 2017. Immigration in American economic history. J. Econ. Lit. 55 (4), 1311–1345.
- Acemoglu, D., Gallego, F.A., Robinson, J.A., 2014. Institutions, human capital, and development. Annu. Rev. Econ.
- Arruñada, B., 2009. Protestants and catholics: similar work ethic, different social ethic. Econ. J. 120 (September), 890–918.
- Becker, S.O., Woessmann, L., 2010. The effect of protestantism on education before the industrialization: evidence from 1816 Prussia. Econ. Lett. 107 (2), 224–228.
- Becker, S.O., Woessmann, L., 2009. Was Weber wrong? A human capital theory of Protestant economic history. Q. J. Econ. 124 (May (2)), 531–596.
- Brasil, 1938. Decreto-Lei n0 406, de 4 de maio de 1938: dispõe sôbre a entrada de estrangeiros no território nacional. Coleção de Leis do Brasil 1938, Página 92 Vol. 2 (Publicação Original), Maio, http://www2.camara.leg.br/legin/fed/declei/1930-1939/decreto-lei-406-4-maio-1938-348724-publicacaooriginal-1-pe.html.
- Cantoni, D., 2015. The economic effects of the protestant reformation: testing the weber hypothesis in the German lands. J. Eur. Econ. Assoc. 13 (4), 561–598.
- Coleman, J.S., 1988. Social capital in the creation of human capital. Am. J. Sociol. 94, S95–S120 (Supplement: Organizations and Institutions: Sociological and Economic Approaches to the Analysis of Social Structure).
- Correia, A.C.L., da Silva, V.L.G., 2004. A lei da escola: sentidos da construção da escolaridade popular através de textos legislativos em Portugal e Santa Catarina – Brasil (1880–1920). Revista Brasileira de História da Educação.
- De Carvalho Filho, I., Colistete, R.P., 2010. Education Performance: Was It All Determined 100 Years Ago? Evidence From São Paulo, Brazil. MRPA Paper.
- De Carvalho Filho, I., Monasterio, L., 2012. Immigration and the Origins of Regional Inequality: Government-Sponsored European Migration to Southern Brazil Before World War I. Regional Science and Urban Economics.
- Demartini, Z.B.F., 2000. Relatos orais de famílias de imigrantes japoneses: elementos para a história da educação brasileira. Educação e Sociedade.

DGE, 1920. Recenseamento do Brazil. Edited by Diretoria Geral de Estatística.

Dias, J., 2018. Can human capital alone close the Brazil-US income gap? In: Lawrence, M., Murray, F. (Eds.), Human Capital.

- Droller, F., 2018. Migration, population composition and long run development evidence from settlements in the pampas. Econ. J.
- Easterlin, R.A., 1981. Why isn't the whole world developed? J. Econ. Hist. 41 (March (1)), 1–19 (March).
- Engerman, S.L., Sokoloff, K.L., 2012. Economic Development in the Americas Since 1500. Cambridge University Press.

Firjan, 2015. IFDM. http://www.firjan.org.br/ifdm/downloads.

- Fiss, R.L.R.B., 2001. A imigração portuguesa e as associações como forma de manutenção da identidade lusitana – sul do Brasil. Rev. Electrón. Geogr. Cienc. Soc. http://www. ub.edu/geocrit/sn9427.htm.
- Friedberg, R., 2000. You can't take it with you? Immigrant assimilation and the portability of human capital. J. Labor Econ. 18 (2).
- Fukuyama, F., 2001. Social capital, civil society and development. Third World Q. 22 (February (1)), 7–20.
- Fulford, Scott L., Schiantarelli, F., Petkov, I., 2015. Does it Matter Where You Came From? Ancestry Composition and Economic Performance of U.S. Counties, 1850–2010. IZA Discussion Papers, No. 9060.
- Furseth, I., 2008. Social capital and immigrant religion. Nord. J. Relig. Soc. 21 (2), 147–164.
- Geraldo, E., 2009. O combate contra os "quistos étnicos": identidade, assimilação e política imigratória no Estado Novo. Locus: revista de história.
- Glaeser, E.L., La Porta, R., Lopez-de Silanes, F., Shleifer, A., 2004. Do institutions cause growth? J. Econ. Growth.
- Graham, D.H., 1969. Padrões de convergência e divergência do crescimento econômico regional e das migrações no Brasil – 1940/1960. Rev. Bras. Econ. 23 (July (3)), 53–76.
- Graham, D.H., de Hollanda Filho, S.B., 1984. Migrações internas no Brasil: 1872–1970.
- Guiso, L., Sapienza, P., Zingales, L., 2003. People's opium? Religion and economic attitudes. J. Monet. Econ. 50, 225–282.
- Guiso, L., Sapienza, P., Zingales, L., 2006. Does culture affect economic outcomes? J. Econ. Perspect. 20 (Spring (2)), 23–48.
- Guiso, L., Sapienza, P., Zingales, L., 2011. In: In: Benhabib, J., Bisin, A., Jackson, M.
- (Eds.), Civic capital as the missing link. Chap. 10 1. North Holland, pp. 417–480. Hanley, A., 2004. Is it who you know? Entrepreneurs and bankers in São Paulo, Brazil, at the turn of the twentieth century. Enterprise Soc. 5 (2), 187–225.
- Hatton, T.J., Williamson, J.G., 2005. Global Migration and the World Economy. The MIT Press.
- Holloway, T., 1980. Immigrants on the Land: Coffee and Society in São Paulo 1886–1934. The University of North Carolina Press.
- IBGE, 2008. Resistência e integração: 100 anos de imigração japonesa no Brasil.

INE, 1936. Anuário estatístico do Brasil ano II. Edited by Instituto Nacional de Estatística. Departamento de Estatística e Publicidade.

Iyer, S., 2016. The new economics of religion. J. Econ. Lit. 54 (2), 395-441.

- Klein, H.S., 1993. A integração social e econômica dos imigrantes portugueses no Brasil nos finais do século XIX e no século XX. Anál. Soc.
- Klein, H.S., 1994. A imigração espanhola no Brasil.

Kreutz, L., 2000a. A educação de imigrantes no Brasil. pp. 347–370 500 Anos de Educação no Brasil.

- Kreutz, L., 2000. Escolas comunitárias de imigrantes no Brasil: instâncias de coordenação e estruturas de apoio. Rev. Bras. Educ.
- Lee, J.-W., Lee, H., 2016. Human capital in the long run. J. Dev. Econ.
- Leff, N., 1972. Economic development and regional inequality: origins of the Brazilian case. Q. J. Econ.
- Leff, N., 1991. Subdesenvolvimento e desenvolvimento no Brasil: Estrutura e mudança econômica. Vol. I. Expressão e Cultura.
- Levy, M.S.F., 1974. O papel da migração internacional na evolução da população brasileira (1872 a 1920). Rev. Saúde Pública.
- Martins, J.S., 1989. A imigração espanhola para o Brasil e a formação da força de trabalho na economia cafeeira: 1880–1930. Rev. Hist.
- Martins Dias, V., 2010. Inserção ás avessas: a imigração espanhola em Franca-SP (1900–1955). Anais do XX Encontro Regional de História: História e Liberdade (September).
- Maschio, E.C.F., 2014. Escolas da imigração italiana no Paraná: a constituição da escolarização primária nas colônias italianas. História da escola dos imigrantes em terras brasileiras.
- Merrick, T.W., Graham, D.H., 1979. Population and Economic Development in Brazil, 1800 to the Present. The Johns Hopkins University Press.
- Monasterio, L., Lopes, D., 2018. Brazil Without Immigrants: Microdata Long Run Estimates. Working Paper.
- Monastério, L., 2017. Surnames and ancestry in Brazil. PLOS ONE.
- Musacchio, A., Martinez-Fritscher, A., Viarengo, M., 2014. Colonial institutions, trade shocks, and the diffusion of elementary education in Brazil, 1889–1930. J. Econ. Hist.
- Oliver, P.E., Marwell, G., 1988. The paradox of group size in collective action: a theory of the critical mass. II. Am. Sociol. Rev. 53 (February (1)), 1–8.
- Padró-i-Miquel, G., Qian, N., Xu, Y., Yao, Y., 2015. Making Democracy Work: Culture, Social Capital and Elections in China. NBER Working Paper 18101.
- Pagani, C., 2014. A formação das escolas italianas no estado do Rio de Janeiro (1875–1920). História da escola dos imigrantes em terras brasileiras.
- Potete, A.R., Ostrom, E., 2004. Heterogeneity, group size and collective action: the role of institutions in forest management. Dev. Change 35 (3), 435–461.
- Putnam, R.D., 1993. Making Democracy Work: Civic Traditions in Modern Italy. Princeton University Press.
- Reis, E., 2014. Spatial income inequality in Brazil, 1872-2000. Economia.
- Rocha, R., Ferraz, C., Soares, R.R., 2017. Human capital persistence and development. Am. Econ. J.: Appl. Econ.
- Sahota, G.S., 1968. An economic analysis of internal migration in Brazil. J. Polit. Econ.
- Salvetti, P., 2014. Governo italiano, diplomacia e escolas italianas no exterior. In: Luchese, T. (Ed.), História da escola dos imigrantes italianos em terras brasileiras.
- EDUCS, pp. 57–77. Sampson, R.J., 1999. Beyond social capital: spatial dynamics of collective efficacy for children. Am. Sociol. Rev. 64 (October (5)), 633–660.
- Sánchez-Alonso, B., 2019. The age of mass migration in Latin America. Econ. Hist. Rev. 72 (1), 3–31.
- 72 (1), 3–31. Santos, A.V., Cecchetti, E., 2013. Imigração alemã, luteranismo e a criação de escolas no
- sul do Brasil. CBHE. São Paulo. n.d. Annuarios do ensino do estado de São Paulo, 1908–1917.
- Sequeira, S., Nunn, N., Qian, N., 2017. Migrants and the Making of America: the Shortand Long-Run Effects of Immigration During the Age of Mass Migration. NBER
- Working Paper No. 23289. Setoguti, R.I.U., 2008. A tradição educacional entre os imigrantes japoneses e os nipo-
- brasileiros. VIII congresso nacional de educação-EDUCERE-III. Seyferth, G., 2011. A dimensão cultural da imigração. Rev. Bras. Ciênc. Soc.
- Seyterin, G., 2011. A dimensio curitar da imigração. Rev. Bras. Cienc. Soc. Silva Simões, H., Pimentel Franco, S., 2014. Instrução pública e imigração italiana no estado do Espírito Santo, no século XIX e início do século XX. História da escola dos imigrantes em terras brasileiras. EDUCS.
- Sowell, T., 1981. Ethnic America. Basic Books.
- Soysal, Y.N., Strang, D., 1989. Construction of the first mass education systems in nineteenth-century Europe. Sociol. Educ.
- Stolz, Y., Baten, J., Botelho, T., 2013. Growth effects of nineteenth-century mass migration: "Fome Zero" for Brazil? Eur. Rev. Econ. Hist.
- Summerhill, W., 2010. Colonial Institutions, Slavery, Inequality, and Development: Evidence from São Paulo, Brazil. MPRA Paper, No. 22162.
- Takeuchi, M.Y., 2007. Japoneses a saga do povo do sol nascente.
- Witzel de Souza, B., 2017. Immigration and the path dependence of education: the case of German-speakers in São Paulo, Brazil (1840–1920). Econ. Hist. Rev.
- Zhai, J.E., Woodberry, R.D., 2011. Religion and educational ideals in contemporary Taiwan. J. Sci. Study Relig. 50 (June (2)), 307–327.
- Zhang, Y., Zhou, X., Lei, W., 2017. Social capital and its contingent value in poverty reduction: evidence from Western China. World Dev. 93, 350–361.