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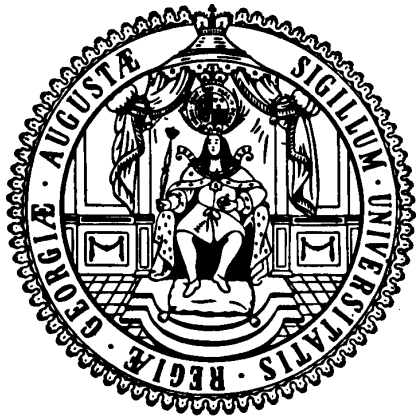

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Immigration and the Path-Dependence of Education: German-Speaking Immigrants, On-the-Job Skills, and Ethnic Schools in São Paulo, Brazil (1840-1920)

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Bruno Gabriel Witzel de Souza[1]

Abstract

This paper studies the impact of German-speaking immigrants on the path dependence of human capital accumulation in the State São Paulo, Brazil. Using a new dataset based on Almanacs from 1873 and 1888, we are able to test if (i) the cultural component, (ii) immigrants' on-the-job-skills, and (iii) their ethnic schools influenced the historical accumulation of human capital. No robust evidence was found for the first two explanations. On the other hand, for the 1910s, German schools had strong positive impacts on enrollment, not only for private, but also for state schools, a result which suggests the occurrence of spillover and contagion effects. Such impact tends, however, to dissipate over time and it does not survive for current educational performance. In addition, the paper shows that the path-dependence of education is conditional on the type of school: while there is a positive persistence in enrollment in private schools over the 20th century, enrollment in state schools depends negatively on its historical levels, reflecting convergence toward 100% enrollment rates in primary schooling. Furthermore, current stocks of human capital, measured by illiteracy and years of education, are shown to be strongly impacted by completion and enrollment in state schools back in the 1910s.

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Usual disclaimers apply and the author is solely responsible for the final content of this paper.

Immigration and the Path-Dependence of Education: German-Speaking Immigrants, On-the-Job Skills, and Ethnic Schools in São Paulo, Brazil (1840-1920)

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I. Introduction

This paper concentrates on the debate about the path-dependence of human capital and its relation with immigration, an emerging topic in the literature focused on the Brazilian long-run economic performance. We inquire whether German-speaking immigrants (1840-1920) impacted the historical accumulation of human capital in the Province/State of São Paulo, Brazil. The underlying hypothesis is that these immigrants represented an exogenous shock to the accumulation of human capital in the 19th and early 20th centuries, both in terms of schooling and on-the-job skills. In doing so, the paper uses a new dataset, constructed with Almanacs from 1873 and 1888, for the shares of German-speaking immigrants in the workforce at the municipal level, disaggregated by economic sectors. The paper also investigates how current educational performance, measured by current stocks of human capital and current flows in its accumulation, are influenced by their historical counterparts.

The analysis focuses on a historically specific and geographically delimited process, namely, the German-speaking immigration (1840-1920) to the Province/State of São Paulo. Three main advantages accrue from this approach. First, São Paulo is more culturally and institutionally homogenous than bigger aggregation units inside Brazil and, naturally, across-countries. Problems of omitted variables are pressing, but tend to be diminished at smaller aggregation levels (Gennaioli *et al.*, 2013b; Becker and Woessmann, 2010)[2]. Second, German-speaking immigration can be considered an exogenous shock to the demand for education in São Paulo. The initial allocation of these immigrants, mostly indentured laborers in the plantations or settlers in rural colonies, can be observed as exogenous to contemporaneous educational performance of the municipalities where these plantations or rural colonies were installed[3]. In addition, there is strong historical evidence that the motivations to accumulate human capital among such immigrants, especially in terms of

[2] Studies about path dependence at smaller units of aggregation also address Engerman and Sokoloff's (2008) concern about potential variations in causal mechanisms when different regions are considered separately.

[3] That is a core argument in the identification of Rocha, Ferraz, and Soares (2010) about settlement colonies in São Paulo. We extend it to the plantations which employed indentured labor of immigrants and argue that it is even clearer for the specific case of German-speaking immigrants.

formal schooling, were mostly exogenous to the prevailing economic conditions, thus ruling out a second possibility of endogeneity. And third, with disaggregated data for education, it is possible to explore the specific channels through which better initial educational conditions have persisted (or not) over time[4].

The choice of São Paulo as the unit of analysis has some broader implications, especially for the emerging literature focused on early human capital accumulation in Brazil. Although the State currently has the highest level of income, in absolute terms, among all Brazilian States, during most of its colonial history, São Paulo was considered just marginal in importance. Changes in its relative economic position occurred mainly during the second half of the 19th century[5]. In the same period, São Paulo transformed itself into the most attractive center for immigrants in the country. Nevertheless, immigration waves, especially of German-speakers, had different features there comparatively to other States: while in Southern Brazil immigrant communities were more isolated and ethnically homogenous, in São Paulo, the integration with the native population was significantly smoother (Tschudi [1860], 1980, p. 178; Buarque de Holanda, 1941, pp. 23, 24).

These differences can partly explain the diverse mechanisms found in the current literature on how immigration waves impacted long-run economic performance across Brazilian regions. In this, Carvalho Filho and Colistete (2010), as well as Rocha, Ferraz, and Soares (2010) find a positive and significant impact of European immigrants on the accumulation of human capital in São Paulo during the first decades of the 20th century. These results are, in general, similar to those in Stolz, Baten, and Botelho (2011), who make use of different *indicators* for human capital and assess the impact for the country as a whole. Carvalho Filho and Monastério (2011), on the other hand, argue that lower inequality associated with immigrants in Rio Grande do Sul had larger impacts on development than transfers of human capital. Both Rocha *et al.* (2010) and Stolz *et al.* (2011) touch upon the impact of the skills of immigrants on economic conditions as a further transmission channel. Although varying in the mechanisms, such studies are aligned in showing the positive impact of immigration to long-run development in Brazil. Martínez-Frítscher, Musacchio, and Viarengo (2010), on the other hand, argue that the political economy of financing education is the major explanation in the reversal of educational performance in Brazil, offsetting the impact of immigrants; they

[4] This is in line with the claims of Przeworski (2003) and Nunn (2009) for a better comprehension on how historical determinants influence current economic performance.
[5] Summerhill (2010, p. 13) asserts that the State undergone its own "reversal of fortune" at the period.

further notice that the main nationalities who emigrated to Brazil (Portuguese, Italians, and Spanish) had a potentially lower demand for education also in their countries of origin.

Focused on German-speaking immigrants, our main conclusions are that the presence of immigrants *per se* had no direct positive impact on the historical accumulation of human capital. On the other hand, if these immigrants managed to institutionalize their higher levels of human capital, especially through the creation of ethnic schools, they would have been able to influence historical levels of schooling. In this sense, we find that German schools had a strong positive effect not only in terms of enrollment in private schools, but also in state schools in the 1910s. This result holds after controlling for total municipal expenditures and state schools, which potentially proxy for outcomes of the political economy of financing education. In the sequence, we show that this direct impact of German schools on educational performance tends to dissipate over time. However, considering the importance of enrollment in state schools back in the 1910s for current stocks of human capital, one can still perceive the indirect impacts of this immigration wave on the long-run educational performance. The paper also shows that current enrollment levels are highly dependent on their historical counterparts, but the path dependence is conditional on the type of school: while convergence has been observed for the public system (municipal and state schools), a long persistence occurs for the private system.

The paper is organized as follows. In the next section, we provide an overview of the history of German-speaking immigration to São Paulo, deriving the working hypothesis from this. Sections III and IV present the data and the methodological approach. In short, the study is separated into three phases: (i) 1872; (ii) early 20th century; (iii) early 21st century. In every case, we study the impact of German-speaking immigrants on the corresponding educational performance. The focus of the last period, however, is more on how current educational performance is influenced by its counterparts in the early 20th century. Section V presents the empirical results and some concluding remarks are provided in section VI.

II. Historical Background

The immigration of German-speakers to the countryside of São Paulo can be broadly separated into two phases. From 1847 to the early 1870s, the main modality was the introduction of indentured laborers to the coffee plantations. Problems with the applicability of free labor contracts in a slave-based society, where the institutional framework did not

favor labor claims, led to a series of riots which undermined this type of immigration[6]. For the German-speakers, a new modality of immigration started in the 1870s, becoming especially relevant in the first decades of the 20th century: immigration to settlement colonies, established by the governments of the Province/State, by the Brazilian Empire/Federation, as well as by private land sellers (Heinke, 1905; Sommer, 1953).

The beginning of these immigration waves is associated with the end of the transatlantic slave trade, in 1850. Looking for new sources of abundant labor, in 1847 the firm Vergueiro & Cia. contracted, with public financial support, the first 367 immigrants from Holstein and Rhineland for its farm Ibicaba (Perret-Gentil, 1851; Heflinger, 2007). Due to financial constraints of the immigrants, the solution to attract labor was the proposal of sharecropping contracts, constituting the first experience, in larger scale, with free labor force of immigrants in the plantations of São Paulo (Dean, 1977; Viotti da Costa, 1998). The turning point in this immigration process occurred in 1856, with the breakthrough of the "Sharecroppers' Riot", a labor movement led by the Swiss Thomas Davatz, who triggered it by sending to Europe a report demanding an official inspection of the living and working conditions in the plantations (Davatz, [1858], 1941). In the aftermath of these events, especially in the 1860s, the sharecropping system declined, substituted by other forms of free labor relations. The Riot had major diplomatic consequences, especially with the enactment of the "Heydt's Rescript" by Prussia, in 1859, which prohibited propaganda favoring emigration to São Paulo (Heflinger, 2009).

As a consequence, the number of German-speaking immigrants declined sharply. Those who kept entering the Province were mostly part of a new modality of immigration, based on official settlement in rural colonies. The most prominent among German-speakers were Colonies Campos Salles (in Cosmópolis) and Nova Europa (in Ibitinga) (Sommer, 1953). In the Republican period, colonies established mostly with Germans were created on the western parcels of the State, reached by the agricultural frontier and railroad infrastructure during the first decades of the 20th century. These included rural settlements in the municipalities Presidente Venceslau, Assis, and Araçatuba, established both by official initiatives of the government to attract labor, as well as by private land sellers (Bezerra, 2007; Silva, 2010)[7].

[6] There is a vast literature focused on the transition from slavery to free labor relations in São Paulo. We cite, among others, Dean (1977), Stolcke and Hall (1983), Lamounier (1986), and Viotti da Costa (1998). For recent archivist research and comparisons among Brazilian, Swiss, and German documents, see Heflinger (2007, 2009).
[7] See the appendix for a map of São Paulo with clusters of German-speaking immigrants.

Although indentured laborers (1840-1870) and official settlers (1870-1920) had different socio-economic characteristics, their mechanisms of integration in São Paulo were similar. In general, the main niche for German-speaking immigrants was to establish specialized offices in dynamic urban centers around the booming rural areas. Our dataset shows that German-speakers were overrepresented in the shares of urban activities, especially in services and manufactures. By disaggregating data at the municipal level, these immigrants are shown as having almost a complete monopoly of some specialized jobs, despite being ethnic minorities. In 1873, German surnames represented at least 80% of beer manufacturers, 71% of cart manufacturers, 67% of tanners, 60% of guns' producers/sellers, and 47% of machinists and watchmakers. In 1888, these proportions diminished sensitively as a result of new immigration waves with different nationalities. Nevertheless, German surnames were still frequent in cart production (67%), mechanized manufactures (38%), beer production (34%), tanning (33%), and watchmaking (26%).

German-speaking immigrants also had major impacts in formal schooling. Although educational conditions were sometimes precarious and the opportunity costs of children in the rural areas were high, there is strong evidence that German-speaking immigrants had the most outstanding position in educational terms, especially when compared to the Brazilian average for the 19th and early 20th centuries[8]: they were the most literate amongst all immigrant waves in the period 1908-1932 and founded, in the whole country, the largest number of ethnic schools up to the first decades of the 20th century (Kreutz, 2005)[9]. In the countryside of São Paulo (excluding the capital), we identified 44 German ethnic schools, with at least 14 founded before 1900.

These two aspects combined motivate the main hypothesis of the paper: German-speaking immigrants had a relative advantage in terms of human capital, both in schooling and on-the-job skills, and might have represented an external positive shock on the historical accumulation process, which persisted over time. As an initial exploratory approach, difference-in-means tests (Table 2) show that municipalities with more German-speaking immigrants than the mean for the whole sample had an earlier advantage in literacy in 1872

[8] The literature on German schooling and education in São Paulo is vast. We cite here, among others: Grininger (1991); Karastojanov (1997); Bezerra (2001, 2007); Santos (2004); Kreutz (2005); Ribeiro (2005); Silva (2010); Gouvêa (2011).

[9] German-speakers were followed closely by Japanese immigrants in this respect. The last, however, immigrated at a later period (starting in the 1910s) and are thence less likely to have had an influence in the first two periods analyzed in our study. Nevertheless, considering the proximity of German-speakers and Japanese in terms of human capital advantages, comparative studies between these two nationalities certainly deserve further attention. I thank an anonymous referee for pointing this out.

and total enrollment in the 1910s. When the identifier for the two groups is the existence of a German school, this relation is even stronger.

In particular for formal education, two different effects from the creation of ethnic schools can be expected, one direct and one indirect. The direct effect of a German school on the number of enrolled students in the immigrant community is trivial: the more schools there are, the higher will be enrollment. However, indirect effects can also be expected if these schools fostered an increase in the demand for education beyond the immigrant community. First, it could be the case that native Brazilians (excluding descendants of German-speakers born in Brazil) studied in those schools. Second, given the smoother integration and more frequent interactions of German-speaking immigrants with the local population in São Paulo comparatively to Southern Brazil, these schools could have enhanced the local demand for education or the supply of teaching capacity. These potential indirect effects can be grasped by observing the impact of German schools on different types of schools. Given that German institutions were categorized as private schools, their impacts on the public system are interpreted in favor of this spillover hypothesis. This is indeed what occurred for the analysis in the 1910s, as discussed in the results.

III. Data

The construction of the dataset follows the three-period regressions explained in the methodology. In short, this means that data were collected the periods (i) 1872; (ii) 1903-1914; and (iii) 1999-2011. For each period, we focused on three types of information: education, economic conditions, and characteristics of a municipality.

The variables for education and municipal characteristics for 1872 come mostly from the Brazilian Census of 1872. For the economic variables, especially the sector composition of each municipality, the main sources were the Almanacs edited by Luné and Fonseca (1873), and Seckler (1888). The empirical novelty of the current study is to transform them into quantitatively valid indicators. These Almanacs bring nominal lists of professions at the municipal level. However, the sources for 1873 and 1888 are not directly comparable, since each editor made use of different categories to classify the economic production and might have considered different types of activities. To overcome this limitation and create consistent variables over time, we classified all different economic activities into one of the following

categories[10]: (i) rental activities; (ii) manufacturing; (iii) services; (iv) public administration; (v) higher technology[11]; (vi) trade and commerce. After defining such groups, we further aggregated trade and commerce into the services' category and excluded the higher technology component, in order to avoid double-counting and because of some imprecision in defining it.

By this procedure, it was possible to create variables for the sector composition at the municipal level in the 19th century, measured as the share of employed people per category. Naturally, this estimated sector composition includes only professions and individuals mentioned in the Almanacs, being e biased toward urban activities. Furthermore, it should be stressed that such variables reflect only the share of people working in each activity; it is not possible to generalize claims about the composition, structure, or distribution of capital from these estimates.

A second advantage of these sources is the allowance to create a completely new variable for the share of German-speaking immigrants in each sector, reflecting their on-the-job skills. In this regard, however, the inexistence of a complete list of immigrants for the period considered is a limitation. Thence, in labeling a worker as a foreigner, we always constructed two versions for the share of immigrants in the workforce. In the empirical analysis, the conservative classification was always used. Nevertheless, descendants of German-speaking immigrants could not be separated from immigrants themselves. Since the Almanacs used are from 1873 and 1888, this problem seems to be minor: Brazilian born descendents of German-speaking families would be, at maximum, in their second generation in this period, thence probably still sharing common cultural traits with the immigrants, especially the language.

For the second period, data for education and economic performance come from different sources. For the first, the "Annuarios de Ensino do Estado de SP" were used. These are official publications from the Education Inspectorate of the State and contain information about enrollment in different types of schools and completion in state schools, among other. The averages of these *indicators* were taken for the years 1908-1911, 1913, and 1914. Variables for economic performance in the 1910s were constructed based on (i) "Estatística Agrícola e Zootécnica do Estado de SP, 1904-1905", an agricultural census which includes classification by nationality; (ii) "Erstes Jahrbuch für die deutschsprechende Kolonie im

[10] Table A1, in the Appendix, lists all professions mentioned in the Almanacs and how they were classified in our taxonomy.
[11] This category includes steam machinery and mechanized tools, both in agriculture and manufacturing.

Staate SP, 1905", an almanac organized by the German-speaking community; and (iii) "Annuario Estatístico de SP, 1904-1907", used to complement data from the first source.

For the third period of analysis, current economic and educational *indicators* were constructed using data from "Fundação Sistema Estadual de Análise de Dados (SEADE)", compiled after the dataset "Informações dos Municípios Paulistas (IMP)".

Finally, considering the expansion of the agricultural frontier in the 19th and 20th centuries, the political borders of municipalities were under continuous modification. To unify data from the three periods considered, minimum comparable areas (MCAs) were used, based on Carvalho Filho and Colistete (2010), with two major modifications. First, we consider the MCA "Grande Campinas" without the municipality Limeira (which is an independent MCA in our sample). The reason is that the axis Campinas-Limeira-Rio Claro concentrated most of the German-speaking immigrants. To include Limeira in the MCA of a municipality like Campinas, which already had a large and dynamic economic system in the 19th century, would disproportionally inflate the impact of these immigrants. Second, we have excluded the MCA "Grande São Paulo", which includes municipalities in the capital of the State. The reason is that the capital is an outlier in terms of the number of German schools, type of immigrant, and economic performance (Witzel-Souza, 2013, p. 16)[12].

Table 1 brings some summary statistics, with special focus on data from the Almanacs. Regarding these, the relative stability in the share of workforce per type of activity between 1873 and 1888 suggests that the compilation and unification of the different sources can be trusted. The only major change occurs in terms of the share of people employed in public administration, which grows from 21% to 34%. From these categories, German-speaking immigrants were prominent in manufacturing and services, above their averages in the general workforce. In line with the historical literature, it is also possible to notice that their presence was minor in "rental activities", given harder access to land acquisition and the financial constraints to which most of those immigrants were submitted.

The variables for education show very low levels for historical schooling and are in line with historical evidence about the precarious situation of the Brazilian educational system[13]. The MCAs "Grande Botucatu" and "Grande Campinas", which present the highest levels of

[12] Other minor modifications were required, such as the inclusion of districts mentioned in the Almanacs. A complete list of MCAs is available upon request.
[13] For comparative figures with other Brazilian States and across countries: Carvalho Filho and Colistete (2010, pp. 9, 10).

absolute enrollment and literacy in 1872, respectively, had enrollment and literacy rates (with respect to the whole population) of just 4.5% and 18.8%. And the situation did not improve much in the years to come. For the average years 1908-1911, 1913 and 1914, "Grande Campinas" assumed the first position in terms of absolute enrollment, but it represented only 6.7% of the population. With respect to the main independent variable of this paper, "German schools", one notices an increase over time, as new immigration waves occurred and old immigrants clustered to create their ethnic schools.

IV. Methodology

The empirical analysis is based on a three-period approach. For the first, we evaluate the impact of the presence of German-speaking immigrants, their on-the-job skills, and ethnic schools on enrollment and literacy in 1872. For the 1910s, the main interest is about the ethnic schools created until the corresponding period. Different indicators are used for enrollment in different types of schools. These are categorized for private, municipal and state schools. In doing so, we emphasize that the path dependence of education is conditional on the type of school being considered. Finally, in the 2000s, we assess how the current capacity to accumulate human capital is influenced by its historical counterpart. In addition, given that absolute enrollment in primary schooling converges among municipalities as enrollment rates converge to 100% (keeping population constant), we further ask whether historical schooling affects current stocks of human capital, measured by illiteracy and average years of schooling.

In all regressions, a relatively homogenous set of independent variables is included to capture the main characteristics of the municipalities. Although it is not always possible to perfectly match such variables due to constraints in the assembled data, especially when considering the time span of the study and the different sources of information, we nevertheless control for the same type of geographic characteristics and use very similar variables for the economic structure and economic situation at each period considered. In addition, except for the regressions in 1872, the variables for economic conditions were always constructed using data at least one year earlier than the dependent variables. This rules out the possibility of direct simultaneity between educational conditions and the economic performance of a municipality.

For the first period, the baseline is an OLS estimation with the following functional form:

$$Educ_{1872} = \beta_1 German\ schools_{1872} + \beta_2 \#\ German\ speakers_{1872} + \beta_3 \#\ Other\ immigrants_{1872} + \beta_4 \#\ Slaves_{1872} + \beta_5 Immigrants\ in\ public\ administration_{1872} + X'\Gamma + \varepsilon$$

Absolute enrollment and literacy are used as dependent variables in this estimation. The idea is to observe if German-speaking immigrants had a direct impact on the capacity to accumulate human capital and its stock, respectively. Controls include the number of non German-speaking immigrants, total number of slaves, and the indicator "$Immigrants\ in\ public\ administration_{1872}$". This last intends to proxy institutional conditions at the municipal level by measuring its degree of political openness. This variable is constructed as the proportion of foreigners (of any nationality) in the public administration of a municipality. Controls for municipal characteristics, X, include population, a set of variables for economic conditions and structure, and a set of geographical covariates[14].

The main variables of interest are "$\#\ German\ schools_{1872}$" and "$German\ speakers_{1872}$", which capture the immediate impact of these immigrants on the educational system. By controlling for the institutionalized level of schooling of these immigrants, the total number of German-speakers is interpreted as a catch-up *indicator* to observe if any other influence coming from the immigrants can be observed beyond human capital, such as would be expected from cultural explanations.

In the sequence, this baseline regression is re-estimated to incorporate the on-the-job-skill component. Two indicators were used alternatively: the share of German-speaking immigrants in the total number of professions and their shares for specific sectors (manufacturing, rental activities, services, and merchants). As discussed in the results, however, an excessively high multicollinearity occurs among the on-the-job skills, the presence of German-speaking immigrants, and their schools. For this reason, regression (1) is re-estimated including the on-the-job components but excluding either the German schools, or the number of German-speakers, or both.

[14] The economic set includes municipal budget in 1872 (also to reflect the capacity of a municipality to offer public schooling) and the share of workforce in manufacturing, services, and rental activities, as constructed with the Almanacs. The geographical set includes area, latitude, altitude, and distance to the capital of the Province.

The estimation using OLS is argued to suffice here. In 1872, the German-speaking immigration to São Paulo was at the turning point from the wave of sharecroppers to official settlers. Although the early sharecroppers might have had enough time (from 1847 to 1872) to internally migrate in the countryside and self-select their locations with respect to the educational conditions of a municipality, the last sharecroppers and the early settlers were being randomly allocated with respect to such educational conditions. Furthermore, it seems the case that the old immigrants (1847-1872) clustered around the municipalities where they had been allocated as sharecroppers. The correlation between the number of farms in a municipality where indentured labor was employed in the 1850s/1860s and the number of German-speakers in 1872 reaches 0.8. Considering that the allocation of indentured laborers to the farms was independent of educational conditions, the allocation of German-speaking immigrants in 1872 is most likely to be exogenous to the prevailing educational conditions of those municipalities. .

In the second period analysis, the determinants of educational conditions at the beginning of the 20th century are inquired:

$$Educ_{1910s} = \beta_1 German\ schools_{1910s} + \beta_2 \%\ Foreign\ farm\ workers_{1910s} + \beta_3 \%\ Foreign\ landowners_{1910s} + X'\Gamma + \varepsilon$$

This baseline model is always estimated five times each, considering different *indicators* for the educational performance: absolute enrollment in private, municipal, and state schools, completion of the basic cycle in state schools, and total enrollment[15].

The set of controls for municipal characteristics follows that of the first period[16]. The economic conditions now include, in addition, the percentage of land dedicated to coffee production and total municipal expenditures (which, again, are likely to reflect municipal funds for investments in education). One important difference is that the economic structure is now based on data from the Almanac of 1888, under the implicit assumption that such structure was persistent over time. The institutional *indicator*, previously measured in terms of political openness, was substituted here by an indicator of "economic openness", measured as the success of immigrants in acquiring land: the variable *"*$Foreign\ landowners_{1910s}$*"*

[15] The absolute levels of these variables were preferred to the enrollment rates provided by the original data because the last are themselves based on fixed estimates of the total number of children in schooling age.
[16] The variable for distance in the 1910s and 2000s measures the distance in straight line to the capital of the Province, differently from the original distance in 1872.

measures the proportion of land owned by foreigners in 1905. In order to compare the opportunity costs of immigrants working on their own-land and on plantations, the share of foreign workers in farms was also included and mirrors the previous joint effect of German-speakers and other immigrants. Finally, one direct *indicator* for the supply of public education is added, namely, the total number of state schools in a municipality.

The main variable of interest here is the number of German schools created until that period. The baseline regression (2) makes the explicit assumption that the impact of German-speaking immigrants on early accumulation of human capital would have occurred only through their schooling system. On the other hand, both on-the-job skills and the presence of German-speaking immigrants in 1872 might have had an effect. First, because it is likely that many immigrants from the period 1850-1870 were still alive in the 1910s. Second, there might have existed intergenerational enhancements in the demand for education stemming from the cultural patterns set by these immigrants back in the 1870s. To test for these possibilities, the baseline regression is re-estimated by including either (i) only the German-speakers in 1872, or (ii) their corresponding on-the-job skills, or (iii) the possible combinations between these variables.

A methodological robustness check is also carried out for this second period. In the 1910s, the likelihood that German-speaking immigrants had internally migrated in the countryside is much enlarged than for 1872. It is also much more likely that they have had enough time to adapt their living conditions in a given municipality, especially with respect to the construction of schools, conditional on local educational conditions. It is now much more pressing that lower enrollment could be the cause for the creation of a German school. For this reason, we propose an IV estimation, using the number of sharecropping colonies (1850s/1860s)[17] and the distance to the capital in 1872 as instruments for the potentially endogenous "$German\ schools_{1910s}$". The instruments are potentially highly correlated with the assessed endogenous variable: even though we allow for internal migration, the emergence of immigrant clusters creates some inertia in this process, making it more likely to immigrants to stay closer to regions where older immigration waves have already settled. This is also conditioned by communication and transportation facilities, which explains the importance of the second instrument. The simple existence of a sharecropping colony in the 1850s is also very unlikely to have any direct influence on the educational performance 60

[17] "Sharecropping colonies" refer here to farms which employed the sharecropping system or similar forms of free labor contracts. The term "colonies" is used in line with the historical literature in Brazil, for which "colony" might refer not only to settlement colonies, but also to clusters of immigrants in farms and urban centers.

years later. However, it might be the case that the existence of such a colony impacted early institutional and economic conditions. Therefore, in order to pass the exclusion restriction, the estimation includes all variables for economic and institutional conditions, as discussed in the baseline[18].

Finally, for the third period, we investigate how current educational performance and human capital stocks are influenced by their historical counterparts:

$$Educ_{2000s} = \beta_1 Educ_{1910s} + X'\Gamma + \varepsilon$$

Similar to previous specifications, the set of economic variables includes sector structure, economic performance (measured by municipal income) and municipal expenditures. It should be stressed, however, that the economic structure is now based on the value added per sector and that municipal expenditures are restricted to those related to education. In addition, the set of geographical characteristics now include the average rainfall and temperature at the municipal level.

In order to assess the path dependence of education conditional on the type of school, the baseline regression is estimated 5 times, matching each dependent variable to its historical correspondent, *i.e.*, current absolute enrollment in each type of school is regressed on that specific type of school in the 1910s (same for completion and total enrollment). This procedure has, however, a problematic *ceteris paribus* interpretation: an increase in the number of enrolled children holding population constant implies an increase in enrollment rates, which have already converged to 100% for most of the municipalities[19]. For this reason, we also evaluate the impact of historical schooling on current illiteracy rates and years of education, used to measure stocks of human capital. Finally, the education component of the municipal HDI is also used as dependent variable, reflecting both stocks and flows of human capital[20].

[18] As a further check, the institutional component for 1872 (the proportion of foreigners in the public administration) was also included in the set of independent variables. Results are not sensitive to this modification.

[19] This ratio is sometimes above 1 because it considers the average over a five years-period and shows only matriculation, which does not penalize for repetition.

[20] The municipal HDI is computed by the UNDP altogether with Fundação João Pinheiro, and IPEA, adapting the calculation of global HDI to the level of Brazilian municipalities. The educational component is the geometric average between: (i) the percentage of population older than 18 with complete basic schooling (weight 1) and (ii) the flows of enrollment in primary and secondary schools categorized by age groups (weight 2). Source: http://www.atlasbrasil.org.br/2013/pt/o_atlas/idhm/, accessed at June, 18th, 2015.

Finally, following the previous procedures, we also evaluate if the German schools, the presence of German-speaking immigrants in 1872, and their corresponding on-the-job skills have any direct impact on current educational performance. As before, the possible combinations among these variables have been considered, especially to deal with the aforementioned multicollinearity among them.

V. Results and Discussion

V.I. Specification (1) – German-Speaking Immigrants and Education in 1872

The baseline regressions in Table 3 show that German schools created until 1872 had a positive and significant impact on the number of enrolled children, but not on the total number of literate people, which is reasonable, especially considering that these schools were very recent at the period, thence not having the necessary time span to influence the stock of human capital, but only its accumulation process.

The estimate for the German presence, on the other hand, goes against two basic hypotheses put forward in this paper. First, in terms of enrollment, the coefficient shows a relatively large negative impact: for every 10 additional German-speaking immigrants in a municipality, the coefficient implies a decrease of 3 enrolled children. This opposes the argument of a relatively high demand for education stemming from German-speaking immigrants. This pattern can be explained, however, by the historical situation of these immigrants. In 1872, it is likely that most of German-speaking immigrants were still in rural areas, either as indentured laborers (at the declining phase of the sharecropping system), or as newcomers in settlements colonies[21]. Indeed, if we substitute the presence of German-speaking immigrants by the number of sharecropping colonies, the corresponding coefficient reaches -12 (significant at the 5%); and if both are jointly included, they turn out to be statistically non-significant, but the coefficient for the German presence becomes positive. Second, it is noticeable that the increased presence of German-speaking immigrants had no direct impact on the stock of human capital as measured by literacy. This result goes against the hypothesis that these were amongst the best educated immigrants. While the general claim that German-speaking immigrants had possibly the highest literacy levels cannot be rejected only by this result, which is focused on

[21] There is historical evidence of a spread of rural schools, including schools in the largest coffee plantations employing sharecroppers (Witzel-Souza, 2014). Nevertheless, educational conditions were precarious and the opportunity costs of children were very high: for example, the Vice-Consul of Switzerland reported that children aged 5 years helped their parents in the first coffee-picking in the late 1840s (Gentil, 1851, p. 53).

a very specific period of time and region, it raises the important question of differentiating immigrants not only by their nationalities, but also by period of immigration and (potentially) social status.

The other independent variables behave as expected. Of these, the large impact of the institutional component on absolute literacy is particularly interesting. Evaluated at the average of foreigners in such positions, the coefficient implies an increase of 224.64 literate people, which represents about 12% of the mean literacy in the municipalities considered in the sample[22]. When combined with the non-significance of immigrants (German-speakers and others), this result helps to qualify some findings of the recent literature focused on the impact of immigration in Brazil. Even if immigrants had a relative advantage in terms of human capital, this would translate into higher educational performance in the regions where they settled probably only through adequate economic and institutional conditions. The non-significance of the presence of immigrants and the large impact of their presence in political institutions and institutionalized schooling signal in this direction.

Most of the independent variables are robust to the inclusion of the on-the-job components (Table 4). However, the main variables of interest, including German schools, become non-significant. These specifications should be observed with caution, though: there is an excessively high multicollinearity between German schools and all categories of on-the-job skills (the weakest, for instance, occurs with respect to rental activities and reaches 0.82) and the adjusted-R^2 is not increased by the inclusion of the multiple category of on-the-job skills and even decreases when the total proportion of Germans in the workforce is taken into account.

To avoid this problem, we re-estimate the regressions in Table 4 excluding either (i) German-speakers in 1872, or (ii) German schools, or (iii) both. The on-the-job skill components turn out to be significant only for enrollment and only if the German schools are excluded (individually or jointly). In addition, in these cases, results are driven only by the German presence in the services' sector. However, given that these results occur only if a relevant variable is known to be omitted (German schools), it is safe to conclude that the on-the-job skills had no direct impact on the early process of human capital accumulation.

[22] (Mean Proportion of Foreigners in Public Administration)*(Coefficient) = 0.0164*13621.9 = 224.64. 264.64/(Mean Literate People 1872) = 264.4/1817.164 = 0.1236.

V.II. Specification (2) – German Schools and Education in the 1910s

In this section, we start by evaluating the direct impact of German schools in the baseline regressions for enrollment in different types of schools. In the sequence, we incorporate both the presence of German-speaking immigrants in 1872 (to capture any persistence in the cultural component) and their on-the-job skills.

Table 5 shows that German schools had a significant and positive impact not only on enrollment in private, but also in state schools, rendering also a positive impact on total enrollment[23]. The impact of German schools on the private system is expected and would be even tautological if not by its magnitude. Indeed, the estimated increase of 70 students per additional German schools, *ceteris paribus*, represents 36% of the mean number of enrolled children per municipality in the private system. But the most interesting case refers to the positive and significant impact of German schools on the enrollment in state schools, even after controlling for the total number of state schools in a municipality[24]. Although the impact is not large (for comparisons with the previous case, it represents 7% of the mean number of enrolled children in state schools), its interpretation becomes stronger by observing that such relation is unidirectional: while the existence of German schools impacts enrollment both in private and state schools, the number of state schools has a positive impact just on the later.

This suggests the existence of direct and indirect influences from the German-speaking community toward the Brazilian educational system. Such impacts could be explained by spillovers in the supply of education or by contagion effects in the demand for schooling. In line with the first argument, the expertise of teachers in the German schools and even some material conditions can be thought of as bearing positive externalities for the educational system of a given locality[25]. As an interesting anecdotal evidence, in 1873, 5 out of 6 teachers in the German School of Santos had Portuguese-Brazilian surnames (based on Luné and Fonseca, 1873). It is very likely that these teachers would be perfectly adaptable to the Brazilian educational system and that they would have acquired some traits and expertise

[23] On the other hand, no effect of German schools was found for enrollment in municipal schools, neither completion in state schools.
[24] This is in line with Stolz *et al.* (2011), who find no evidence of crowding-out from immigrants occupying high-skilled positions (which could have left native Brazilians with less incentives to invest in education).
[25] Stolz *et al.* (2011, p. 24): "Human capital intensive migration in contrast might [...] provide teachers and institutions [...] even for native Brazilians".

from teaching in the German school[26]. In turn, the explanation focusing on the demand for education can be framed under Buarque de Holanda's (1941) argument of a more intense and smoother integration of German-speaking immigrants in São Paulo[27]. In line, there is some qualitative evidence of German-speaking immigrants, their descendents, and native Brazilians working together in different types of cultural institutions in the countryside of São Paulo, including reading clubs (Kreutz, 2000; Witzel-Souza, 2014). In addition, it is likely that children of German-speaking immigrants had increased contact with native Brazilians, creating another channel of contagion for demanding education[28].

In the baseline regressions, it is also noticeable the difference in the variables explaining enrollment in municipal schools. In this particular case, for which the adjusted-R^2 is much smaller than for other types of school, it is possible to notice the positive and significant impact (at the 10% level) of the share of foreigners as landowners, opposed to a negative impact (non-significant, though) of their shares as workers in the farms, possibly in line with the opportunity costs' argument of the previous section[29].

Finally, by comparing the results for enrollment and completion in state schools, it becomes clear that the determinants to send a child to school were not the same as the ones to maintain her/him until the end of the basic educational cycle. The very low adjusted-R^2 is suggestive and an F-test proves that the independent variables are jointly non-significant.

In a set of alternative specifications, German schools in the 1910s and German presence in 1872 were jointly included. In this case, the first variable becomes always non-significant, while the second turns out to have a positive and significant impact for enrollment in state schools[30]. The problem here is that these variables are highly correlated. Indeed, for the three indicators of German schools (in 1872, in the 1910s, and late 1930s), the one for the 1910s shows the highest correlation with the number of German-speakers in 1872. In a similar strategy as for the on-the-job skills in the previous section, all the estimations are re-run omitting German schools, but including the number of German speakers in 1872. With this procedure, the only significant impact occurs with enrollment in state schools. Considering

[26] As an additional anecdotal motivation, Leonardo Gardenal, in a recent research proposal (being written), shows that the person responsible for the foundation of the first public school in the municipality of Rio Claro was João von Atzingen, a descendant of first generation of Swiss and German families.
[27] The enhanced demand for education is an underlying motivation in Carvalho Filho and Colistete (2010).
[28] I thank Marlene Waske for this suggestion.
[29] On the other hand, such relation of signs is inverted for private and state schools (but non-significant).
[30] These specifications have not been reported to save space. The do-file for the whole project is available online at: ____.

the previous discussion about the positive effects from German schools on the Brazilian public education, and the current finding of inexistence of any impact of German-speakers on private schools, we are confident in concluding that the number of German-speakers in 1872 had no direct impact on education in the 1910s.

This conclusion is reinforced when taking into account the potential effects of the on-the-job skills in 1873 and 1888 on the educational performance in the 1910s (both aggregated and separated by category)[31]. In these cases, the previous models were re-estimated including either (i) only the on-the-job skills (either for 1873 or 1888), or (ii) joint with the presence of German-speakers in 1872, or (iii) joint with the German schools in the 1910s, or (iv) joint with German-speakers in 1872 and German schools in the 1910s. The behavior of these variables is very erratic under different specifications. However, it is still safe to conclude that the on-the-job skills had no major impact on later accumulation of human capital. This conclusion is reached by observing that none of the categories for 1873 is statistically significant when all other variables for the German presence are excluded[32], *i.e.*, even knowing that there is an important omitted component, these on-the-job skills are not able even to capture such effect. For 1888, the proportions of German-speakers in services and commerce turn out to be significant in explaining state and private enrollment, when these variables are included without any other component for the presence of German-speaking immigrants. However, whenever combined with any other indicator for the German presence, this effect dissipates and other categories turn out to be significant in very erratic manners.

As a final check, the variable German schools in the 1910s is instrumented with the number of sharecropping colonies in a municipality back in the 1850s/1860s and with the distance to the capital in 1872, as discussed in the methodology. We observe that results are very robust to this change of estimation procedure, especially the coefficients for German schools and their potential spillover effects on state schools. One interesting difference refers here to the negative effect that state schools now show in terms of enrollment in municipal schools, potentially reflecting some degree of substitutability between them, which was not observed with the OLS estimation. Finally, instruments perform well both in terms of passing the exclusion restriction and not suffering from weakness.

[31] Please refer to note 30.
[32] With the exception of the proportion of total German-speaking workers (Coefficient = 1.1; p-value = 0.053).

V.III. The Path Dependence of Current Educational Performance and Human Capital Stocks

In the final stage, we investigate the impact of historical schooling on current educational performance, both in terms of current enrollment, as well as for current stocks of human capital, as measured by illiteracy and average years of education at the municipal level. A final check uses the educational component of the Municipal HDI, which combines flows of enrollment per different age-group with stocks of human capital.

The baseline regressions (Table 6) provide strong evidence that enrollment in the public educational system (municipal and state schools) and completion in state schools converged over time. This is not surprising, given the convergence in enrollment rates toward 100% in primary schooling and taking into account that the models hold constant the population at the municipal level. In this case, more interestingly is the persistence in terms of enrollment in private schools, with a positive and sizeable effect. It shows that municipalities which started better in this type of school still have an advantage nowadays in such modality of education.

In addition to the baseline, models were re-estimated further including (i) just German presence in 1872, (ii) just German schools created until late 1930s, and (ii) both. The presence of old immigrants did not turn out to be significant in any case, showing that the direct impact of these immigrants per se was restricted to the very first period of analysis (their opportunity costs, as explained for 1872). The presence of a German school until the 1930s, on the other hand, turned out to be always significant and with a very large negative impact for enrollment in state schools and total current enrollment. This basically goes in line with the convergence argument presented before: given the potential spillover effects of German schools on the historical enrollment in state schools and considering the convergence in enrollment rates in the last, it is natural to expect such a negative sign[33].

When the on-the-job skill components for 1873 and 1888 are included in different combinations with the presence of German-speakers in 1872 and with German schools, some different patterns emerge, though. For most cases, we observe again the erratic pattern which was discussed in the previous section. However, some specific on-the-job skills present a

[33] The coefficients are -3000 (p-value =0.005) and -1565.56 (p-value = 0.077) for enrollment in state schools when including and excluding the German-speakers in 1872, respectively. And coefficient = -731.38 (p-value = 0.086) for total enrollment, when including German-speakers in 1872.

robust impact, independent of the specification. First, the proportion of German-speakers in manufacturing for 1873 is shown to negatively influence current private enrollment levels (coefficients ranging from -173.09 to -213.58). Second, for 1888, the proportion of German-speakers in the total activities (-22.28 to -42.68) and their presence in services (-175.73 to -194.39) are shown to negatively influence current completion in state schools.

The second result is again intuitive due to the idea of convergence in enrollment rates and increased number of children completing the basic school cycle. The first, however, proves to be more challenging, in the sense that no robust evidence was found of any influence for the on-the-job skills on enrollment, neither for 1872, nor for the 1910s. One speculative answer to this problem is that the only transmission channel we are considering for the impact of on-the-job skills refers to their impact on human capital accumulation. However, it is reasonable to think about indirect impacts: for instance, differences in the historical levels of on-the-job skills of immigrants might have influenced not only current economic structure of a municipality (which are controlled for in the regressions), but also its evolution over time (which is not). In this case, our early indicators for the on-the-job skills could be capturing the effect of these potentially omitted factors. While this seems to be a promising research field, it is not addressed in the research question of the current paper.

Some interesting patterns emerge when considering stocks of human capital as the dependent variable, rather than enrollment. In the baseline regressions (Table 7), the most significant historical variables in explaining current percentage of illiteracy, average years of education and the educational component of municipal HDI are enrollment and completion in state schools.

Enrollment in state schools is always significant in explaining lower current illiteracy, with coefficients ranging from -0.00057 to -0.00077. Considering the smallest coefficient, we observe that 9 municipalities would have diminished at least 1 percentage point in current illiteracy due to better earlier enrollment[34]. The best case occurs with the MCA of Campinas, where current illiteracy is lower by 2.6 percentage points due to an increased historical enrollment in state schools. When controlling for the German-speakers and German schools (which are themselves non-significant), the completion in state schools also turns out to have a sizeable effect. With a coefficient of -0.0034, 14 municipalities would have at least 1

[34] For this evaluation, we take the number of children who should have been enrolled in order to increase one percentage point (*i.e.* 1/0.00057) and then compare it with the actual number of enrolled children in the 1910s.

percentage point lower illiteracy nowadays due to increased completion in the 1910s. The AMC of Bragança Paulista is the most benefited here (with a decrease of 1.9% in illiteracy).

Similar patterns emerge with years of schooling. In this case, enrollment is less relevant, but the importance of completion in state schools increases. Considering historical levels of completion in state schools, the coefficients imply that no municipality would have been able to increase one whole year of average schooling only due to historical completion. Nevertheless, at least 25% of the municipalities would have 0.38 years of schooling more nowadays due to higher completion in state schools back in the 1910s.

As a summary measure to capture both current flows and stocks of human capital, the educational component of the municipal HDI was taken to be the dependent variable. In terms of current flows of human capital accumulation, this measure is interesting because it involves also matriculation in high school and categorization of enrollment by age group. Results are consistent with previous estimates and show the primacy of historical enrollment and completion in state schools to explain higher MHDI at the educational component. Evaluated at the mean of the sample, the smallest coefficient for completion in state schools in the 1910s leads to an increase of 0.015 in the indicator, which is about 2.2% of the mean of this component of MHDI.

VI. Concluding Remarks

In this paper, we analyzed the path dependence of human capital accumulation in São Paulo, Brazil. In particular, it was asked whether and how the relation between current educational performance and its historical correspondent might differ when adjusted for different types of school. In this, we focused on German-speaking immigrants, whose immigration waves can be considered as an external shock to the historical accumulation of human capital, both in terms of formal schooling and on-the-job skills.

The presence of German-speaking immigrants *per se* did not show a persistent impact: despite a negative effect on enrollment in 1872, to be interpreted as the opportunity costs of those immigrants (mostly in settlement colonies and working at the final phases of the sharecropping system), the presence of German-speakers in a municipality in the 19th century did not impact, in any systematic or robust way, the later accumulation of human capital.

On the other hand, the institutionalization of their potentially higher human capital levels in ethnic schools proved to be a major contribution to increase the levels of enrollment, both in 1872 and the 1910s. German schools were found to influence not only enrollment in private, but also in state schools, therefore having an impact on the overall level of enrollment in the 1910s. The last effect was interpreted as suggestive of spillover and contagion effects. The direct impact of these schools dissipate over time, but one should keep in mind the spillover effects between German schools and state schools in the 1910s when evaluating the positive impact that the last has on current stocks of human capital, as measured by illiteracy and years of schooling.

Less conclusive results were obtained in terms of the on-the-job skill component of immigrants. While no robust effect was found for the early accumulation of human capital, some direct impacts were identified on current levels of enrollment and completion. This raises the hypothesis that such on-the-job skills might have had other transmission channels (say, through technological adoption or changes in the economic structure) rather than a direct impact on formal education, a certainly interesting topic for further research.

Finally, we showed that current enrollment levels are highly dependent on their historical counterparts, but the path dependence is conditional on the type of school: while there is convergence in the public educational system toward 100% enrollment rates in basic schooling (and thence also in absolute enrollment, keeping population constant), one also observes a long positive persistence in absolute enrollment in private schools. Current stocks of human capital were further shown to depend strongly on enrollment and completion in state schools back in the 1910s. This allows the conclusion that municipalities which started better-off in educational terms might have converged on their current capacity to accumulate human capital, but still show a persistent advantage in the levels of their current stocks.

VIII. Bibliography

Acemoglu, Daron, Simon Johnson, and James A. Robinson (2001). "The Colonial Origins of Comparative Development: An Empirical Investigation". *American Economic Review,* 91, pp. 1369-1401.

_____ (2002). "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution". Q*uarterly Journal of Economics,* 117, pp: 1231-1294.

Acemoglu, Daron, Simon Johnson, James A. Robinson, and Pierre Yared (2005). "From Education to Democracy?" NBER Working Paper 11204.

Acemoglu, Daron, Francisco Gallego, and James A. Robinson (2014). "Institutions, Human Capital and Development". NBER Working Paper 19933.

Becker, Sascha O. and Ludger Woessmann (2007). "Was Weber Wrong? A Human Capital Theory of Protestant Economic History". Working Paper University of Munich, CESifo, and IZA (PEPG/07-04).

_____ (2010). "The Effect of Protestantism on Education Before the Industrialization: Evidence from 1816 Prussia". *Economic Letters*, Vol. 107, pp. 224-228.

Bezerra, Maria Cristina S. (2007). "Educação Étnica: a pluralidade das propostas educacionais de origem germânica no Estado de São Paulo". PhD Thesis, Universidade Estadual de Campinas.

Buarque de Holanda, Sergio (1941). "Prefácio do Tradutor". In Thomas Davatz (Author): *Memórias de um Colono no Brasil (1858).* São Paulo: Ed. Martins Fontes.

Carvalho Filho, Irineu de, and Renato P. Colistete (2010). "Education Performance: Was It All Determined 100 Year Ago? Evidence from São Paulo, Brazil". Working Paper N. 24494. Available at: http://mpra.ub.uni-muenchen.de/24494/1/MPRA_paper_24494.pdf [accessed in 10.08.2013].

Carvalho Filho, Irineu de, and Leonardo M. Monasterio (2011). "Immigration and the Origins of Regional Inequality: Government-Sponsored European Migration to Southern Brazil Before World War I". Working Paper N. 27954, available at http://mpra.ub.uni-muenchen.de/27954 [accessed in 10.08.2013].

Davatz, Thomas (1941 [1858]). "Memórias de um Colono no Brasil (1858)". São Paulo: Martins Fontes.

Dean, Warren (1977). "Rio Claro: Um Sistema Brasileiro de Grande Lavoura, 1820-1920". Rio de Janeiro: Editora Paz e Terra.

Easterly, William and Ross Levine (2003). "Tropics, Germs, and Crops: How Endowments Influence Economic Development". *Journal of Monetary Economics*, Vol. 50, pp. 3-39.

Engerman, Stanley L. and Kenneth L. Sokoloff (2003). "Institutional and Non-Institutional Explanations of Economic Differences". NBER Working Paper 9989.

Engerman, Stanley L. and Kenneth L. Sokoloff (2008). "Debating the Role of Institutions in Political and Economic Development: Theory, History, and Findings". *Annual Review of Political Science* (11), pp. 119-135.

Gennaioli, Nicola, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer (2013a). "Human Capital and Regional Development". *The Quarterly Journal of Economics*, Vol. 128 (1), Oxford University Press, pp. 105-164.

_____ (2013b). "Growth in Regions". NBER Working Paper 18397.

Glaeser, Edward L., Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer (2004). "Do Institutions Cause Growth?". J*ournal of Economic Growth* (9), pp. 271-303.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales (2005). "Does Culture Affect Economic Outcomes?". Working Paper, Preliminary Draft, August 2005.

Heflinger Jr., José Eduardo (2007). "Ibicaba: O Berço da Imigração Européia de Cunho Particular (Ibicaba: Die Wiege der Privat Organisierten Europäischen Einwanderung)". Limeira, SP: Editora Unigráfica – Potuguês/Deutsch.

Heflinger Jr., José Eduardo (2009). "A Revolta dos Parceiros na Ibicaba (The Rebellion of the Sharecroppers in Ibicaba)". Limeira, SP: Editora Unigráfica – Português/Inglês.

Heinke, Ernst (1905). "Lose Blätter aus der Geschichte der deutschen Kolonie von São Paulo (1800-1920), pp. 249-287. In *Erstes Jahrbuch für die Deutschsprechende Kolonie im Staate São Paulo 1905.* São Paulo: Typographia Adolpho Uhle.

Kreutz, Lúcio (2005). "Escolas Étnicas dos Imigrantes Alemães no Brasil". *Martius Staden Institute Jahrbuch,* Vol. 52, pp. 91-106.

Luné, Antônio J. B. and Paulo D. da Fonseca (1873). "Almanak da Província de São Paulo para 1873". São Paulo: Imprensa Oficial do Estado/Arquivo do Estado. Reprodução Fac-similar da edição da Typographia Americana, 1973.

Martínez-Fritscher, André Carlos, Aldo Musacchio, and Martina Viarengo (2010). "The Great Leap Forward: The Political Economy of Education in Brazil, 1889-1930". Harvard Business School Working Papers, No. 10-075.

Nunn, Nathan (2009). "The Importance of History for Economic Development". NBER Working Paper 4899.

Pande, Rohini and Christopher Udry (2005). "Institutions and Development: A View from Below". Economic Growth Center Working Paper N. 928, Yale University.

Perret-Gentil, 1851. "A Colonia Senador Vergueiro". Santos: Typographia Imparcial, 1851.

Przeworski, Adam (2004). "The Last Instance: Are Institutions the Primary Cause of Economic Development?" Working Paper New York University (CEBRAP Conference 2003 on "Institutions, Behavior, and Outcomes").

Rocha, Rudi, Claudio Ferraz, and Rodrigo Soares (2010). "Settlement Colonies Across Plantation Fields: Evidence on the Relationship Between Human Capital and Long Term Development". *Brazilian Meeting of Econometrics*. Available at http://virtualbib.fgv.br/ocs/index.php/sbe/EBE10/paper/view/2328/1133 [accessed in 10.08.2013].

Seckler, Jorge (1888). "Almanach da Província de São Paulo para 1888. Administrativo, Commercial e Industrial". São Paulo: Jorge Seckler & Comp.

Sokoloff, Kenneth L. and Engerman, Stanley L.(2000). "History Lessons: Institutions, Factor Endowments, and Paths of Development in the New World". *Journal of Economic Perspectives* (3), Vol. 14, pp. 217-232.

Sommer, Friedrich. (1953). "São Paulo und die Deutschen" - Instituto Martius-Staden, São Paulo: Artigos Deutsche Zeitung, São Paulo (Artigos I - X).

Spolaore, Enrico and Romain Wacziarg (2013). "How Deep Are the Roots of Economic Development?". *Journal of Economic Literature* (2), Vol. 51, pp. 325-369.

Stolcke, Verena and Michael M. Hall (1983). "The Introduction of Free Labour on São Paulo Coffee Plantations. *The Journal of Peasant Studies* (1), Vol. 10.

Stolz, Yvonne, Jörg Baten, and Tarcísio Botelho (2011). "Growth Effects of 19th Century Mass Migrations: 'Fome Zero' for Brazil". Working Paper in Economics and Finance N. 20, University of Tübingen, available at http://hdl.handle.net/10419/52238 [accessed in 10.08.2013].

Summerhill, William R. (2010). "Colonial Institutions, Slavery, Inequality, and Development: Evidence from São Paulo, Brazil". MPRA Working Paper No. 22162.

Viotti da Costa, Emília (1998). "Da Senzala à Colônia". São Paulo: Fundação Editora da UNESP.

Witzel-Souza, Bruno G. (2013). German Immigration to São Paulo (1840-1870): Causal Relations for Enhancements in Educational Performance. Working Paper - Seminar "Labor Mobility, Migration, and Rural Development", University of Kassel / University of Göttingen.

_____ (2014). "The Combined Effect of Institutions and Human Capital for Economic Development: A Case Study of German Immigration to São Paulo, Brazil (1840-1920)". Master's Thesis: Georg-August-Universität Göttingen.

Table 1 - Summary statistics by type of variable

Variable	Obs	Mean	S.D.	Min	Max
Sector Composition					
Share of Rental Activities - 1873	72	27.45%	27.45%	0%	93.88%
Share of Rental Activities - 1888	83	21.93%	21.93%	0%	59.52%
Share of Manufactures - 1873	72	14.31%	14.31%	0%	44.62%
Share of Manufactures - 1888	83	13.58%	13.58%	0%	51.12%
Share of Services - 1873	72	7.50%	7.49%	0%	65.53%
Share of Services - 1888	83	8.39%	8.39%	0%	30.00%
Share of Public Administration - 1873	72	20.81%	19.67%	1.42%	85.71%
Share of Public Administration - 1888	89	34.28%	33.51%	0%	100.00%
Education					
Absolute Enrollment - 1872	73	293.08	215.99	15	1082
Absolute Literacy - 1872	73	1817.16	1836.89	132	11049
Total Absolute Enrollment - 1910s	85	1199.77	1197.74	210	7775
Enrollment in State Schools - 1910s	145	571.56	625.94	51	4624
Enrollment in Municipal Schools - 1910s	96	155.48	172.69	12	1015
Enrollment in Private Schools - 1910s	102	192.78	411.10	8	3087
Completion in State Schools - 1910s	103	200.75	90.38	0	549
Average Years of Education - 2000	139	6.43	0.70	4.23	8.42
Education Component of MHDI - 2010	139	0.67	0.04	0.55	0.76
Percentage of Illiteracy - 2010	139	6.91	2.16	2.96	14.80
German-speaking Immigrants					
# German-speakers - 1872	73	54.27	133.95	0	682
German Schools - 1872	145	0.03	0.25	0	2
German Schools - 1910s	145	0.11	0.60	0	5
German Schools - 1930s	145	0.34	1.46	0	14
Share of German Workers - 1873	64	2.37%	4.09%	0%	17.05%
Share of German Workers - 1888	74	2.84%	5.43%	0%	31.00%
Share of German in Manuf. - 1873	61	4.79%	7.83%	0%	39.29%
Share of German in Manuf. - 1888	70	5.38%	9.20%	0%	50.00%
Share of German in Services - 1873	62	3.53%	7.06%	0%	32.35%
Share of German in Services - 1888	69	3.09%	5.02%	0%	25.00%
Share of German in Commerce - 1873	64	2.46%	4.82%	0%	25.00%
Share of German in Commerce - 1888	73	1.85%	4.22%	0%	21.69%
Share of German in Rental Act. - 1873	59	0.85%	3.32%	0%	24.14%
Share of German in Rental Act. - 1888	69	3.54%	12.03%	0%	76.92%

Note: For the share of workforce per sector, the category "services" exclude trade and commercial activities; in the final compilation for the regressions, such categories are merged together.

Table 2 - Difference-in-means test identified by German-speaking immigrants and their ethnic schools

	Variables		
Identifiers	Enrollment 1872	Literate 1872	Total Enroll. 1910s
More German-speakers than average	330.53	2641.60	2257.49
Less German-speakers than average	283.40	1603.95	1025.90
Result of the Diff-in-means test	No difference	Higher average (p-value = 0.0252)	Higher average (p-value = 0.0004)
At least one German school	599.00	5913.00	3106.45
No German school	279.97	1641.63	1054.96
Result of the Diff-in-means test	Higher average (p-value = 0.0056)	Higher average (p-value = 0.0000)	Higher average (p-value = 0.0000)

Table 3 - Impact of German-speaking immigrants and German schools on enrollment and literacy (1872)

VARIABLES	enrolled72	literate72
German Schools -1872	182.5**	317.9
	(78.40)	(603.1)
# German-speaking Immigrants - 1872	-0.318*	0.511
	(0.175)	(1.939)
# Other Immigrants	0.198	0.255
	(0.124)	(1.037)
# Slaves	-0.0993**	-0.274
	(0.0477)	(0.303)
Population	0.0250**	0.174***
	(0.00920)	(0.0507)
Municipal Budget	0.00349	0.0671**
	(0.00260)	(0.0257)
Immigrants in Public Administration	803.9	13,622**
	(666.2)	(5,173)
Observations	39	39
Adjusted R-squared	0.624	0.814

Notes: (i) Robust standard errors in parentheses; (ii) *** p<0.01, ** p<0.05, * p<0.1; (iii) All models include an intercept, controls for characteristics of the municipalities (distance to the capital of the Province in 1872, area, latitude, altitude), and economic structure (percentage of people employed in agriculture/rental activities, manufacturing, and services).

Table 4 - Impact of German-speaking immigrants, German schools and on-the-job skills on enrollment and literacy (1872)

VARIABLES	(1) enrolled72	(2) literate72	(3) enrolled72	(4) literate72
German Schools - 1872	165.2	1,272	189.7	1,409
	(203.7)	(762.1)	(495.8)	(3,639)
# German-speaker immigrants - 1872	-0.330	1.160	-0.383	1.689
	(0.210)	(1.895)	(0.278)	(2.122)
# German-speakers - Workers Total	0.399	-21.98		
	(4.225)	(16.06)		
# German-speakers - Manufactures			12.02	-211.4
			(22.11)	(131.5)
# German-speakers - Services			4.535	-25.51
			(26.40)	(199.6)
# German-speakers - Trade			-7.246	196.8
			(26.38)	(157.9)
# German-speakers - Rental Activ.			-35.64*	178.4
			(17.60)	(151.6)
# Other Immigrants	0.197	0.321	0.147	0.180
	(0.127)	(0.973)	(0.125)	(1.118)
# Slaves	-0.0996*	-0.258	-0.0635	-0.277
	(0.0493)	(0.278)	(0.0580)	(0.342)
Population	0.0250**	0.172***	0.0232**	0.172***
	(0.00950)	(0.0452)	(0.0102)	(0.0521)
Municipal Budget	0.00328	0.0792***	0.000442	0.106***
	(0.00353)	(0.0157)	(0.00475)	(0.0335)
Immigrants in Public Administration	792.7	14,237**	944.7	13,523**
	(684.0)	(5,168)	(622.0)	(5,405)
Observations	39	39	39	39
Adjusted R-squared	0.608	0.814	0.631	0.809

Notes: (i) Robust standard errors in parentheses; (ii) *** p<0.01, ** p<0.05, * p<0.1; (iii) All models include an intercept, controls for characteristics of the municipalities (distance to the capital of the Province in 1872, area, latitude, altitude), and economic structure (percentage of people employed in agriculture/rental activities, manufacturing, and services).

Table 5 - Impact of German Schools on enrollment (different types of schools) and on completion (in state schools) in the 1910s

VARIABLES	(1) Total Enrollment (1910s)	(2) Enrollment State Schools (1910s)	(3) Enrollment Private Schools (1910s)	(4) Enrollment Municipal Schools (1910s)	(5) Completion State Schools (1910s)
German Schools - 1910s	130.0*	38.42**	69.83**	19.11	-8.462
	(68.46)	(15.45)	(34.21)	(26.42)	(20.16)
Population - 1910s	0.00925***	0.00140	0.000464	0.00631***	-0.00103
	(0.00295)	(0.00154)	(0.00175)	(0.00209)	(0.00159)
Foreign Farm Workers - 1910s	222.0	71.85	105.6	-138.9	11.09
	(332.6)	(43.63)	(175.8)	(103.5)	(75.01)
Foreign Landowners - 1910s	141.9	-89.07	-307.5	561.9*	78.84
	(764.4)	(133.4)	(388.2)	(287.8)	(219.0)
Total Municip. Expenditures - 1910s	0.00141***	0.000262**	0.00103***	0.000217	6.97e-05
	(0.000337)	(0.000116)	(0.000147)	(0.000156)	(0.000120)
Number of State Schools1 - 1910s	39.95***	38.59***	4.176	-3.358	1.688
	(7.469)	(1.904)	(3.694)	(2.116)	(1.643)
Observations	47	69	51	55	55
Adjusted R-squared	0.956	0.994	0.836	0.527	0.043

Notes: (i) Robust standard errors in parentheses; (ii) *** p<0.01, ** p<0.05, * p<0.1; (iii) All models include an intercept, controls for characteristics of the municipalities (distance to the capital of the Province in straight line, percentage of coffee cultivation in total agricultural area, area, latitude, altitude), and economic structure (percentage of people employed in agriculture/rental activities, manufacturing, and services).

Table 6 - Impact of historical enrollment on current enrollment, separated by type of school

VARIABLES	(1) Total Enroll. Current	(2) Enroll. State Current	(3) Enroll. Private Current	(4) Enroll. Munic. Current	(5) Completion State Schools Current	(6) Total Enroll. Current	(7) Enroll. State Current	(8) Enroll. Private Current	(9) Enroll. Munic. Current	(10) Completion State Schools Current	(11) Total Enroll. Current	(12) Enroll. State Current	(13) Enroll. Private Current	(14) Enroll. Munic. Current	(15) Completion State Schools Current
Total Enrollment - 1910s	-2.320***					-2.264***					-3.442***				
	(0.435)					(0.430)					(0.754)				
Enroll. State Schools - 1910s		-6.452***					-6.017***					-7.381***			
		(1.961)					(1.672)					(2.523)			
Enroll. Priv. Schools - 1910s			1.995***					1.994***					3.207**		
			(0.544)					(0.576)					(1.339)		
Enroll. Munic. Schools - 1910s				-4.961*					-5.247*					-3.882	
				(2.605)					(2.679)					(5.430)	
Compl. State Schools - 1910s					-1.947*					-1.976*					-2.494*
					(1.023)					(1.056)					(1.364)
German Schools - 1940s						-325.2	-1,466*	2.927	259.3	-55.28	-731.4*	-3,000***	230.5	1,033	-202.3
						(284.3)	(821.5)	(124.8)	(514.0)	(108.8)	(412.5)	(1,004)	(179.0)	(819.8)	(180.8)
# Germans - 1872											0.275	9.422	-3.069	-1.787	0.166
											(3.366)	(5.969)	(2.196)	(5.284)	(1.257)
Observations	81	137	97	91	99	81	137	97	91	99	47	70	53	52	59
Adjusted R-squared	0.999	0.984	0.993	0.987	0.986	0.999	0.985	0.993	0.987	0.986	0.998	0.970	0.977	0.952	0.948

Notes: (i) Robust standard errors in parentheses ; (ii) *** p<0.01, ** p<0.05, * p<0.1; (iii) The dependent variables are taken as averages for the years 2005-2010, in order to avoid random oscillations in enrollment and completion; (iv) All models include an intercept, controls for population (average 1999-2004), municipal income (average 1999-2004), economic structure controls (percentage of value added in public administration, agriculture, industry, and services, taken as the average for 1999-2004), and geographic controls (altitude, latitude, area, average rainfall, average temperature, and distance in straight line to the capital).

Table 7 - Summary of partial effects of historical schooling on current stocks of human capital

	% Illiteracy (2010)	Avg. Years Educ. (2000)	Educ. MHDI (2010)
Total Enrollment - 1910s	-	-	-
Enrollment State Schools - 1910s)	3 (3) [-0.00057 ; -0.00077]	3 (2) [0.00021 ; 0.00028]	3 (1) [1.06e-05]
Enrollment Private Schoools - 1910s	-	-	-
Enrollment Municipal Schools -1910s	-	-	-
Completion State Schools - 1910s	3 (1) [-0.00354]	3 (3) [0.001 ; 0.0014]	3 (3) [6.81e-05 ; 7.04e-05]

Notes: (i) The first value in each entry represents the number of baseline regressions (always 3 estimates: (a) only with historical schooling; (b) including only German schools; (c) including German schools and # Germans 1872); (ii) The value in parentheses represents the number of models in which the corresponding variable was statistically significant at least at the 10% level; (iii) values in brackets represent the range of coefficients, *i.e* .the minimum and maximum coefficients among the significant ones.

Appendix

Table A1 - Categorization of Professions from the Almanacs (1873 and 1888)

Classification	Categories
Public Administration	Public Administration, without Ecclesiastic positions. (N1)
Rental Activities	Farmers (fazendeiros) and Husbandman (lavrador); Capitalists and Owners (Capitalistas e Proprietários). (N2)
Manufacturing	Coppersmiths ("Caldeireiros"); Carpenters; Upholsterers ("Colchoeiro"); Civil construction (Excluding Engineers and Architects); Tanners; Riding Equipment (Except Farriers); Armourers; Food Manufacturing; Manufacturing of Alcoholic Beverages (Excluding Beer); Manufacturing of Non-Alcoholic Beverages; Manufacturing of Carts; Beer Production; Cigarettes and Tobacco Production; Manufacturing of Hats; Other manufactures; Blacksmiths, Locksmiths, Refiners, and Farriers; Tinkers, Coppersmiths, Coopers, Turners; Tinkers; Press and Graphics; Machinists; Potters; Jewelers; Bakers, Confectioners; Sugar cane Mills (Production of Sugar and Spirits); Watchmakers; Clothes Production; Shoemakers ("Sapateiros e Tamanqueiros"); Sawmills, Joinery, and Wood products; "Fogueteiros". (N3)
Higher Technology	Machines for agricultural processing; Manufactures with steam power; Mechanized manufactures.
Trade and Commerce	Wholesale trade; Retail trade; Drovers and peddlers ("Tropeiros e mascates"). (N4)
Services	Butchers; Lawyers and Proctors; Professions related to arts; Hairdressers and Barbers; Coffee shops, Taverns, and Billiard houses; Stalls; Animals, Charts, and Pasture Renting; Dentists; Mortuaries; Architects and Engineers; Pharmacists; Photographers; Hotels, Restaurants, and Eatery; Doctors and Surgeons; Midwives; Other Services. (N5)

Sources: Classification based on Professions, Trades, and Offices mentioned in Luné and Fonseca (1873) and Seckler (1888).

Notes:

(N1) Specific subcategories include: **1873** - Administration of public markets ("Praças dos mercados"), but not their renters.

(N2) Specific subcategories include: **1873** - All types of agricultural production, Cattlemen, and Vegetable producers; Commission houses; Baking Houses; Collectors and Agents; Licensed Agents and Collectors; Commissioners; **1888** - "Envernista"; Private companies; Bank agents; Agents; Coffee dealers; Agents for collection and publication ("Agentes de coletas e publicações"); Commissioning houses; Banking agencies; Steam agencies; Export and Import agencies; Agencies' offices.

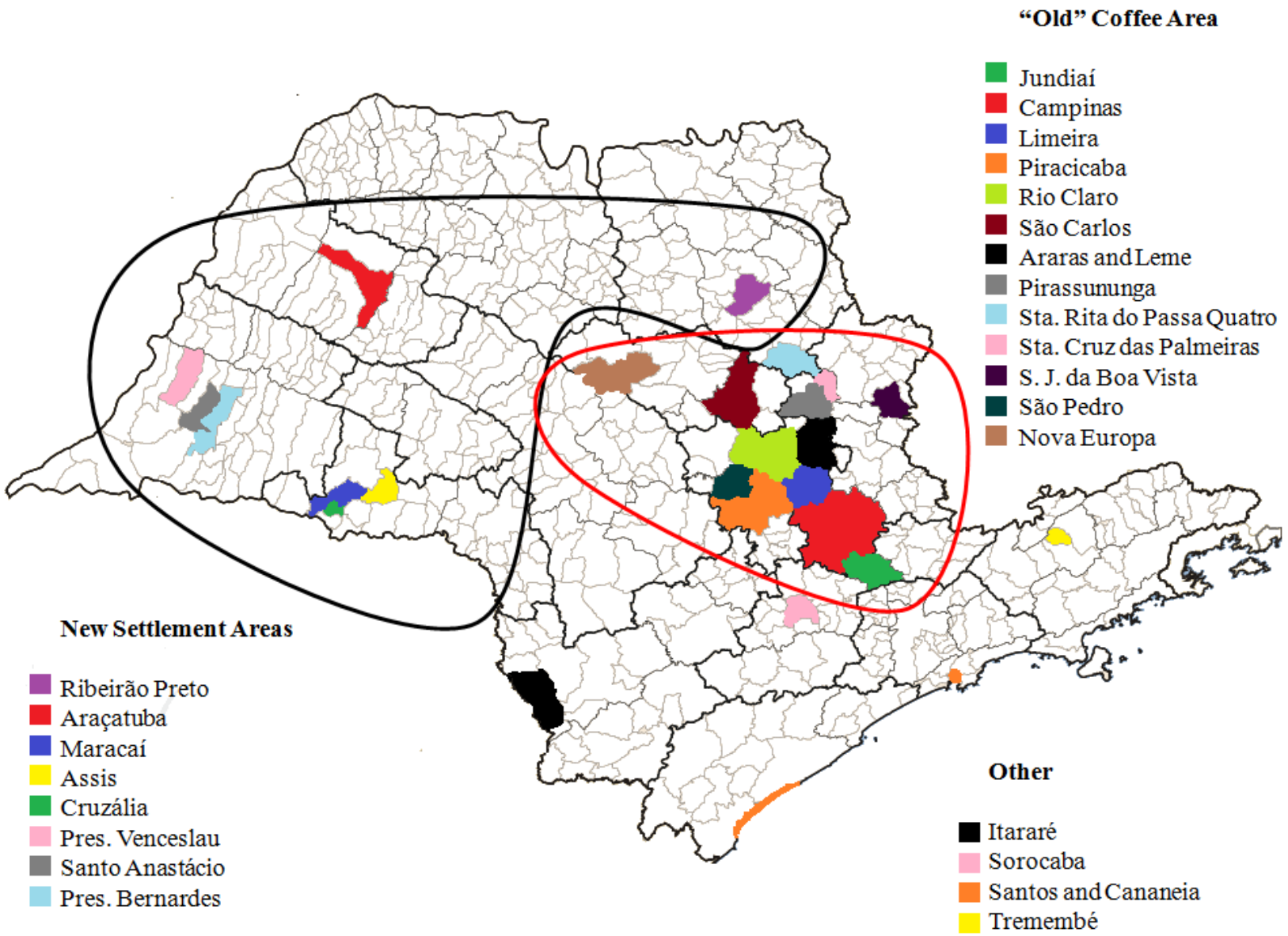
(N3) Specific subcategories include: **1873** - Masons and Construction Masters; Glaziers; House painters, signboard painters and paper liners; Ashers ("Calcinadores"); Constructors of Houses from Taipa ("Taipeiros"); Contractor of buildings and projects in wood; Saddlers; Production and sell of seats, "serigotes" and "lombilhos" (equipment for riding); Dyer and Saddler; Producer of saddles and harness; Chocolate and sparkling water production; Sausages production; Manioc manufacturing; Manufacturer of cassava and tapioca flour; Maize Spirits; Vinegar and Wine; Liquors; Tee producers; Manufacturing of Cart, Wain, and Carriage; Cigars, Shredded tobacco, cigarettes, Canjica Tobacco; Silk, Beaver, and Hare's Hats; Sun hats; Fabric of washing and shaping straw hats; Wax and fat candles; Fabric of tobacco and honey; Fireworks' fabrics; Fabric of chalk; Fabric of machines; Cotton Fabric; Wood Saw Fabric; Marble Saw Fabric; Workers with looms; Producers of mills ("Fabricantes de engenhos"); Foundry of iron,

bronze, and machines production; Machinist-Blacksmith ("Maquinista ferreiro"); Veterinaries and Farriers; Refiners; "Broqueadores"; Wood turner; Typesetters; Bookbinders; Typographical printers; Office for binding pictures; Lithographer; Fabric of Blank Books; Jewelry traders who further worked on the material; Engravers; Cravers; Gilders; Platters; Artistic painters (on this trade), and carver/woodworker; Confectioner and sugar refiner; Master of milling ("Mestre de moenda"); Fabric of sugar; Mill to press rice and produce spirits; Farmers producing spirits from sugar cane; Watch houses, when with some manufacturing activity on this trade; Also farmers with sawmill equipments; **1888 -** Glaziers; Tile and Roof Producers ("Telheiros e caieiras"); Stone Caterers for Public Work; Constructors of Houses from Taipa ("Taipeiros"); Quarries ("Pedreiras"); Pavers ("Asfaltadores"); Saddler and Upholsterer; Producers of seats, "lombilhos", "serigotes" and equipment for travel; Leather Braiders; Harnesses Producers; Producers of Cheese and Butter; Mills for Cornmeal ("Moinhos para fubá"); Fabrics of pasta; Fabrics of Sausages; Fabric of Ice cream; Wine production; Wine and Candles Production; Liquors; Fabric of National Beverages; Fabric of Orange Wine; Fabric of Sparkling Water and Ice; Manufacturing of Carts; Brewers and mixed production (Beer and Liquors); Fabric of special pressed tobacco; Wax Candles; Fabric of Candles, Soap, and Oil; Fabric of Crockery ("Louças de barro"); Textile production; Fabric of Guitars; Fabric of Pasta; Fabric of Wire Objects; Fabric and Deposit of Chalk; Fabric of melted fat ("Fábrica de banha derretida'); Fabric for Farina Extraction "Ypiranga" ("Fábrica Ypiranga de extração fecular"); Fabric of Gunpowder; Fabric of Noodles; Fabrics of Honey and Tobacco; Fabric of Fireworks; Fabric of nets (probably Fishnets); Pottery; Farriers and Braiders; Veterinaries and Farriers; Cutlers; Foundry and Mechanical Manufacturers; Mechanics; Locksmiths and Machinists; Coppersmiths and retailers of these products ("Latoeiros e mascates de obras de folha"); Tinsmiths and Braziers; Newspapers and Typographies using Steam Power; Fabric of Tiles and Bricks; Railroad Machinists; Sawmill and Machinist.

(N4) Specific subcategories include: **1873 -** Warehouses and deposits; Exporters of tobacco and honey; International traders (Houses of export and import); Kiosks; Inns and Merchants (“Tavernas e negociantes”) have been classified just in this category; Marchers ("Marchantes"); Free traders ("Negociantes de tropa solta"); **1888** - Owners of animal troops (“Tropas de carga”); Rural merchants; Merchants of jewelry; Marchers (“Marchantes”); Herdsman (“Boiadeiro”).

(N5) Specific subcategories include: **1873 -** Teachers of music, painting, and arts; Tuner and repairers of instruments; Portraitist; Violist ("Violeiro"); Directors of musical groups; Sculptor ("Fabricante de imagens"); Artists in general; "Barber and Bleeder"; Bath Houses; Public Baths; Gaming houses ("Jogos de Bola"); Renters of Charts; Owners of ranches; Ranches and Pastures; Civil Engineers, Geographers; Land Surveyors ("Agrimensores"); Homeopaths and Allopaths; Wholesale Drugstores; Inns; Nurses; Ship-owners and Agents of Ships; Promoters of events (festivities, funerals, religious events, etc.); Hirers of furniture; Bookkeepers; Dealers of lottery tickets; Auctioneers; Self employed and helpers ("Próprios e camaradas"); Openers ("Abridores"); Florists; Dockyards ("Calafates"); **1888 -** Violists (“Violeiros”); Organist; Marble Workers; Portraitist; “Botica”; Hospitals and a “Hotel for Convalescent People”; Center for Private Telephones; Telephones; Railroad Stationmaster (“Chefe de estação ferroviária”); Employees of the Railroad Bananal; Canoeist; Office for Pyrotechnic; Fishers; Cylinders (maybe producers– in the original, just “Cilindros”); Mill masters and Masters of cylinders; Water suppliers; Suppliers of bags for coffee; Sworn Translators; Tugboats; Providers of equipment for water and gas; Books' Agency (“Agência de Livros”); Chiropodist (“Calista”); Message deliverers (“Correieiros”); “Milk” (in the original, mentioned just as “Leite” - I supposed just the delivery of the product in the urban centers); Other non-identified professions include: Holders (“Titulares”), “Canastreiros”, “Pontões”, “Pontes”, and “Rink”.

Figure 1 - Municipalities of São Paulo: Regions with Clusters of German Immigrants



Source: Witzel-Souza, 2014, Appendix (p. xix)