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CANA, CAFÉ, CACAU: AGRARIAN STRUCTURE AND EDUCATIONAL INEQUALITIES IN BRAZIL*

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ABSTRACT

The present paper explores the relationship between agrarian structure and human capital formation between and within Brazil's federal units. It is argued that whether states' agriculture is in plantation style, based on cheap coerced labor, or organized around family farming matters for the formulation of educational policies. According to the main claim, landlords were not interested in paying higher taxes to educate the masses and curtailed the expansion of schooling in order to keep a cheap workforce and maintain their monopoly over the decision-making process. Describing several episodes in Brazil's history of public instruction, the paper stresses the distributional conflicts over education as well as the rural aristocracy's resistance towards broadly-targeted, citizenship-enhancing educational policies. The descriptive evidence is complemented by statistical analyses employing historical as well as more recent data. It is shown that states characterized by a more egalitarian land distribution, which are not under

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the dominance of powerful landlords, exhibit better educational coverage and enhanced instruction quality. They also spend more on schooling.

Keywords: land inequality, education, landlords, Brazil

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RESUMEN

El presente artículo estudia la relación entre la estructura agraria y la formación de capital humano, tanto dentro como entre las unidades federales de Brasil. Se argumenta que la agricultura de los Estados es de estilo plantación — basado en mano de obra forzada barata, o por el contrario organizada alrededor de la granja familiar — es crucial para la formulación de las políticas educativas. De acuerdo a esta hipótesis, los propietarios de la tierra no estaban interesados en pagar impuestos más altos para educar a las masas y restringieron la expansión escolar con la intención de mantener una mano de obra barata y el monopolio del proceso de toma de decisiones. A través de la descripción de distintos episodios de la historia de la instrucción pública en Brasil, el artículo muestra los conflictos distributivos sobre la educación y la resistencia de la aristocracia rural en relación con los más amplios objetivos ciudadanos para intensificar las políticas educativas. La evidencia descriptiva se complementa con el análisis estadístico de datos históricos y recientes. Se muestra que los Estados con una distribución más igualitaria de la tierra, que no están bajo el dominio de poderosos propietarios de la tierra, tuvieron una mejor cobertura y calidad educativa. Asimismo, demostramos que invirtieron más en escolarización.

Palabras clave: desigualdad de tierra, latifundistas, educación, Brasil

1. INTRODUCTION

Few claims seem to be as uncontested within the development debate as the importance of schooling for the prosperity of nations. The new growth theory emphasizes the role of human capital in increasing economic output. Also, recent studies suggest that investments in education are among the most effective tools for pulling individuals out of the poverty trap or reducing social inequalities within countries. Furthermore, it has been argued that educated citizens are politically more engaged and better prepared to hold politicians accountable for their actions.

If human capital is so important for explaining economic growth, inequality, poverty and political accountability, what are the factors driving

the production of educational policies, the accumulation of human capital and the distributional conflicts over different schooling levels? Surprisingly, this question has only received scant attention from the development literature. Following Gary Becker's (1964) seminal work, economists frequently refer to the costs and returns from schooling when explaining different levels of human capital. Political scientists emphasize the role of electoral competition for the provision of broadly targeted educational policies. Within the field of political economy, scholars stress the political power distribution and the predominance of private interests over public purposes in the formulation and implementation of educational policies. Much of this existing literature, however, can be criticized for largely ignoring distributional conflicts over different educational levels and arguing in a rather static and unhistorical fashion.

Recently, a growing body of literature has focused on structural factors when analyzing educational outcomes. Among these factors, modernization and globalization are frequently cited. One important element, however, has been neglected: nations' agrarian production system. Whether a country's agriculture is characterized by large plantations based on cheap hired labor or rather organized around family farming may have left long-lasting footprints on its educational systems. Although some macrocomparative studies have analyzed this issue in one or another way (Lindert 2004a; Erickson and Vollrath 2004; Galor *et al*. 2009; Wegenast 2009), the causal mechanisms linking agrarian production systems to human capital formation have been largely omitted. In a first attempt to address this shortcoming, this paper probes more deeply into the relationship between agrarian structure and education, trying to capture large landowners' attitudes toward mass schooling. For this purpose, it will concentrate on Brazil's landowning elites, providing both qualitative and quantitative evidence for the proposed claim.

The analysis reaffirms that agriculture shaped regional development processes by having long-lasting effects on educational policies. It is claimed that regions exhibiting a plantation-style agrarian structure tend to neglect broadly targeted educational policies, spending disproportionately more on higher education for the elite. The results of both descriptive as well as inferential statistical analyses point out that federal units with high degrees of land inequality and an agrarian economy historically based on the cultivation of crops grown on large plantations show lower schooling coverage, an inferior instruction quality and spend less on education. In contrast, states exhibiting a history of smaller family-owned farms were among the first to develop an encompassing school system featuring better educational indicators.

Different causal mechanisms may explain the proposed relationship. The paper's main argument suggests that Brazil's politically influential agrarian elite had no interest in the promotion of schooling. Most likely, large landowners were reluctant to subsidize the education of the masses by paying

higher taxes. Not only would expanded education cost more through taxes, but education could lead rural workers to seek better-paid jobs in the developing urban sector, threatening the supply of a cheap labor force. In addition, keeping the biggest share of the population illiterate would guarantee landlords' monopoly over the decision-making process, given the existence of suffrage laws based on literacy. Furthermore, it would hamper individuals' capacity for political mobilization and articulation. Finally, school visits would keep the young population from working on landowners' fields.

The paper proceeds in the following way: the next section briefly reviews the existing literature, pointing to the paper's proposed theoretical as well as empirical contribution and elaborating on the case selection criteria. Subsequently, the possible mechanisms lying behind the relationship between agrarian structure and educational outcomes will be elucidated. Section four refers to some instances of Brazil's history of education and describes landlords' instruments of political domination. States' different agrarian structures are presented subsequently. A descriptive analysis of 19th century schooling data within and across single states as well as a depiction of more recent data revealing a path-dependence in agrarian structure and educational performance are presented in the following part. Section seven summarizes the results of cross-sectional regression analyses on a range of educational indicators for the 21st century. The final section concludes by highlighting the main findings and pointing to areas of future research.

2. LITERATURE REVIEW, EMPIRICAL CONTRIBUTION AND CASE SELECTION

Different authors have analyzed how landownership structures might exert a persistent influence on the politics of societies. Barrington Moore (1966) was among the first scholars to consider agrarian class relations as a predictor of political transformation processes. Studying regime transitions, Moore explained European democratic breakdowns with the existence of large landholdings and the survival of a powerful class of landowners into the period of modernization. Subsequently, other scholars linked patterns of land inequality to change or resilience of political regimes. Stressing the social control patterns of regions characterized by high rural inequality, Rueschemeyer *et al*. (1992), for example, argue that small- and medium-scale agriculture is conducive to democratization, whereas countries with large landholdings are inimical to democratic transition.

More recently, Acemoglu and Robinson (2000, 2006) and Boix (2003) emphasized the role of redistribution when assessing the impact of land inequality on regime outcomes. In their work, landlords — as owners of immobile assets — would face greater threats of taxation and expropriation, if democratization were to occur. Thus, they try to impede the opening up of

the political system. Boix (2003, p. 40) goes as far as stating that «[T]he absence of landlordism constitutes a necessary precondition for the triumph of democracy.»

Closely related to the papers cited above is the influential work of Stanley Engerman and Kenneth Sokoloff (1997, 2005) linking initial factor endowments to different paths of development within the Americas. Stressing the role of geography for the development of nations, the authors link geographic conditions to particular paths of colonization, which, according to them, translated into different institutional arrangements. Their main claim is that Latin America's land endowments encouraged the production of commodities featuring economies of scale and the employment of slave labor — so called cash crops. This initial inequality led to the development of institutional structures that advantaged members of elite classes, conferring them with more political influence and better access to economic opportunities. These institutions perpetuated the high levels of inequality and contributed to the persistence of poor development in the long run.

Despite the role attributed to land inequality for nations' development process, the effect of agrarian structures on the distinct patterns of human capital accumulation remains underexplored by the literature. This is remarkable because, as early as 1959, Douglass North acknowledged a link between agrarian production patterns and education. According to the author, a landowner under the unequal plantation agrarian type «will be extremely reluctant to devote his tax monies to expenditures for education or research other than that related to the staple commodity» (North 1959, p. 946).

Among the few studies connecting educational outcomes with agrarian structures, three cross-national analyses and two recent case studies can be pointed out. Lindert (2004a, 2004b) considers various factors explaining student enrollment in primary school between 1881 and 1937. By using the share of men who voted as proxy for landed interest power, the author employs cross-sectional regression analysis and concludes that much of the blame for delaying the expansion of primary education resided in powerful landed elites «opposed to schooling the masses at tax payer expenses» (Lindert 2004b, p. 33). Studying education across the New World from 1800 to 1925, Mariscal and Sokoloff (2000) find that differences in land inequality explain differences in public provision of schooling, arguing that land disparities create collective action problems within the political units responsible for education funding. Wegenast (2009) uses countries' export composition to proxy for the agrarian structure and concludes that the export of cash crops has led countries to underinvest in secondary schooling and partly explains the educational differences found between Asia and Latin America.

In a case study of Indian districts, Banerjee and Iyer (2005) demonstrate that areas in which property rights were historically given to landlords received significantly lower investments in health and education. Although very insightful and methodologically innovative, the paper does not further

explore the reasons for the lack of educational spending within the Indian districts typically dominated by landlords[1]. Galor *et al*. (2009) find a negative effect of land inequality on education expenditure using cross-sectional data on the United States from the beginning of the 20th century. The authors claim that capitalists benefited from the accumulation of human capital by the masses, while landlords were «the prime hurdle for industrial development and social mobility» (Ibid, p. 173).

As is evident from the discussed literature, empirical documentation of the relationship between agrarian structure and education is limited. Furthermore, no previous study seems to be able to distinguish which mechanisms are at work. Most of the scholars settle for providing assumptions that may explain the statistical correlation. So far, authors have, for example, failed to look into landlords' attitudes toward educational expansion in greater detail.

With their economy based primarily on agricultural products for several centuries and their inherent variation of agrarian structures, the Brazilian states provide a rich setting for further assessing the relationship between agriculture and education. Despite the historical importance of agriculture for the Brazilian economy, the impact of structural variables such as the agrarian production system or the country's schooling performance remain unexplored. To the best of the current author's knowledge, Naritomi *et al*. (2007) offer the first attempt to associate episodes of Brazilian agrarian production with institutional quality and provision of public goods. The authors show that municipalities affected by the rent-seeking cycles of the colonial period («sugarcane cycle» and «gold cycle») feature worse institutions and less broadly targeted public policies.

In line with the last paper, this study attempts to address the gap in the current development literature by asking whether the agrarian production system has a lasting impact on educational policies. Answering this question within a single-country context is particularly useful for different reasons. Foremost, it reduces the complexity of having to deal with different institutional arrangements (e.g. legal, electoral or constitutive system) or macrosocial forces such as multiple colonizers, which is a typical drawback of cross-country approaches[2]. Apart from relatively constant macroinstitutional variables, we have detailed information about how agrarian structure and schooling might have coevolved. Thus, potential problems arising from the omitted variable bias or endogeneity are minimized.

Finally, the question of why Brazil was selected to test the proposed hypotheses at a subnational level must be addressed. Since the early 19th

[1] The authors limit themselves to observing that «the key to what happened may lie in the relative inability of the landlord districts to claim their fair share of public investment» (Banerjee and Iyer 2005, p. 1191).

[2] This does not imply, however, that Brazil's federal units do not exhibit different regional histories or different informal institutions.

century, responsibility for funding primary and secondary schooling falls mainly to the states and municipalities, with educational indicators varying substantially across the federal units. Also, agrarian products have dominated the Brazilian production and export structure throughout history. Concerning the states' landownership patterns, there is enough variation to possibly justify differences within observable educational outcomes. In states such as Espírito Santo, Santa Catarina or Paraná, for example, factor endowments and the settlement process led to an agrarian structure based on smaller properties. In contrast, provinces hosting the sugarcane or coffee cycle share a common history of land disparities and powerful agrarian interests. A final practical reason concerns the availability of historical as well as more recent state-level data. Brazil is probably one of the few developing countries to have kept records of its educational figures during the 19th century and reports reliable data for the past decades.

3. THE ARGUMENTS

As outlined in the last section, large landowners are believed to have historically exerted considerable political influence over the policymaking process, blocking large transformation processes such as democratization. Max Weber (1917), for example, blamed east Prussian Junkers for much of Prussia's political ills. Following this line of reasoning, the present paper focuses on rural class relations and attributes the lack of schooling opportunities to the special interests of a politically influential landowning elite. It assumes that landlords have high incentives to influence public policy[3]. The variation in levels of political power, resulting from diverging agrarian structures, may predict educational outcomes.

Different political economy arguments are presented in order to explain landed elites' resistance toward mass education. Considering that the expansion of schooling is a costly undertaking requiring public money and that human capital is not necessarily complementary to plantation work, landlords had no interest in financing the education of the masses through higher taxation. Lindert (2004b, p. 33), for example, argues that where «political voice was restricted to those holding substantial property, poor children got little help from the taxpayers.» Another economic reason for keeping the population uneducated was landlords' dependence on the constant supply of cheap labor. Educated workers could emigrate to the emerging urban sector, leading to a shortage of labor and an increase in salaries (see Galor *et al*. 2009). In addition, school visits would keep the young population from working on landowners' fields.

[3] Frieden (1991), for example, argues that sectors like agriculture, in which assets are specific and cannot be easily transferred for other uses, have the most to gain from influencing governments.

Politically, landlords tried to maintain their monopoly over the decision-making process by restricting the population's access to schooling. In Brazil, for example, suffrage laws were conditioned on literacy by the «Lei Saraiva» in 1881 and remained unchanged until 1988. Given that 70 per cent of the total population over 9 years of age was illiterate in 1920 (see Engerman and Sokoloff 2001; Table 4), restricting the franchise and keeping workers uneducated was certainly an effective tool to avoid political competition. Furthermore, it is known from political sociology that education is conducive to political mobilization and participation (see Downs 1957 or Brady *et al*. 1995)[4]. Thus, by blocking the expansion of the schooling system, the agrarian elite constrained workers' ability to overcome their collective action problem, preventing them from mobilizing to seek better working conditions and more political empowerment.

Apart from the opposition coming from the landowning class, it can be expected that family-type agriculture based on smaller plots is conducive to the accumulation of human capital due to other reasons of an individual, socioeconomic nature. Since land is frequently used as a collateral asset to gain capital market access, rural property owners can better afford to send their children to school[5]. Owning land titles also increases the likelihood of agriculture investments. Compared to landless hired laborers or tenants, land owners are more likely to invest in their property, for example, by buying modern technology such as tractors or fertilizers, as shown by Galiani and Schargrodsky (2006). Furthermore, these last two authors show that land titling affects fertility and reduces a household's size. Fewer children make post-basic education more affordable for their parents[6].

Finally, empirical evidence shows that investments in new agricultural technologies are greater in areas with a high share of landed relative to landless households (see Foster and Rosenzweig 1996, 2004 or Banerjee and Iyer 2005). The earlier and more intense introduction of new technology increases parents' incentives to send their children to post-basic schools, given that modern agriculture requires qualified skills. Some findings show that technological change and the corresponding rise in yields made education more valuable and led to an increased demand for schooling. Foster and Rosenzweig (2004), for example, demonstrate that expected future agricultural technology increases the number of schools as well as enrollment in landed households.

[4] Employing a probability sample of 1484 rural Senegalese citizens, Kuenzi (2006) examines the effect of formal and informal education on political participation. Among other interesting results, the author finds a positive and statistically significant effect of formal education on voting and community participation. Using a data set for sixty-nine village communities in two north Indian States, Krishna (2002) concludes that both more educated and informed people are politically more active.

[5] For studies analyzing the relationship between land inequality and credit market access, see Galor and Zeira (1993) or Field and Torero (2006).

[6] For studies on fertility and schooling, see Barro and Becker (1989) or Dessy (2000).

It is important to note that this paper concentrates on the political economy argument, rather than analyzing the individual socioeconomic motivations of people living under distinct agrarian structures to invest in education. Thus, it will mostly stress the role of large landowners in the formulation of educational policies. For this purpose, the next section summarizes the Brazilian history of education, presenting descriptive evidence of how the country's schooling system was shaped by the interests of special groups such as the traditional rural aristocracy. Its main purpose is to shed light on the causal mechanisms that may lie behind the statistical associations to be presented in the upcoming empirical analysis.

4. A COMMON HISTORY OF LANDLORDS (OR THE LACK THEREOF)

In order to understand the formation of the society and the modern state in Brazil, one inevitably has to consider the role played by the country's rural oligarchy. Describing the distribution of power within Brazil, Chilcote (1990, p. 10), for example, notes that the «ruling class has traditionally been composed of a small group of families whose power stems from the ownership of property.»

As owners of large plots of land, these politically influential landowners were highly dependent on the supply of a cheap labor force, as plantation work was very labor intensive. Landlords' concern in maintaining the supply of a cheap workforce and the monopoly over the rural properties was eminent and traceable by different courses of action. One of these measures, for example, consisted in blocking the access to land for the peasant population. This was achieved with the help of the government, who stipulated land prices that were unaffordable for the rural poor. The use of violence in order to dislodge invaders or rural occupants without land titling was also very common (see Guimaraes 1968, pp. 91-92). Furthermore, the establishment of semifeudal forms of tenancy, or the use of debt peonage, was increasingly employed to retain the traditional coercion power over labor.

Brazil's educational backwardness can be directly linked to the country's landed elites mentioned above. In the country's 500 years of history, serious attempts to implement a sound educational system were not made before the second half of the 20th century. As noted by Havighurst and Moreira (1965), the Jesuit colleges were almost the only centers of intellectual culture in Brazil during the colonial era. The main beneficiaries were sons of the rural aristocracy, owners of sugar plantations and sugar mills. After Brazil's independence from Portugal, primary as well as secondary education fell into the hands of the provincial legislative assemblies. The decentralization of primary and secondary schooling can be seen as the central state's attempt to free itself from almost all educational responsibilities.

Reports of traditional rural forces resisting educational expansion plans are often found in local newspaper reports of the 19th century. An article

from the newspaper *O Universal* (June 14, 1842), for example, addressed the question of whether it was dangerous to educate the lower classes of society. The newspaper advocated the benefits of educating the poor affirming that «ignorance is the company of anarchy and demagogy.» Furthermore, the editor claimed that the instruction would only strengthen people's comprehension over the «inviolability of properties — an important pillar of the Brazilian society» (see Faria Filho 1999, p. 120, translated by the author). The article clearly addresses the traditional landed elites' fear concerning educational expansion.

Another example of landlords' repudiation of mass schooling is an initiative by the Emperor D. Pedro I in the year 1823, which illustrates the unequal importance that basic public instruction had vis-à-vis university education. While a project of educating Brazil's youth (*Tratado de Educacao para a Mocidade Brasileira*) was never approved by the Constituent Assembly dominated by conservative representatives of the traditional agrarian sector, the creation of two universities in the cities of São Paulo and Olinda was promptly and unanimously decided (Saviani 1987, p. 41). A few months later, landlords would send their children to the law faculties of these universities to prepare them for public life. It was the only schooling project approved by the Assembly, which is emblematic of the government's resistance to broadly targeted public instruction.

The situation of Brazil's schooling system did not improve with the end of the monarchy. The so-called Old Republic (1889-1930) is believed to have largely represented the interests of the agrarian elite[7]. Both the executive and legislative bodies were used to maintain the power of states' oligarchies and promote federal decentralization. This oligarchy was directly linked to the agricultural export economy and the *latifundia* structure (see Saviani 1987, p. 37). The constitution abolished free and compulsory education, reversing education legislation and maintaining this situation for more than four decades. In addition, it conditioned the right to vote on literacy criteria. In this manner, privileges from the slavery period and patriarchal forms of access to economic and social resources were maintained. The law *Lei Maior* from 1891 declined the establishment of a national organization for education, pushing for even greater decentralization of the educational system. Governors of the provinces appointed school inspectors who were chosen by the so-called *colonels* to control the pedagogic activities of teachers[8]. In this way, workers' contestation or manifestations of discontent were easily suppressed.

At last, the first major educational reform known as *Lei Rocha Vaz* or *Reforma Joao Alves* in the year 1925 obliged the union to partially subsidize

[7] This period of Brazilian history is known as *República das Oligarquias* (Republic of the Oligarchies). During this period, all presidents came from two major political parties: *Partido Republicano Paulista* (PRP) and *Partido Republicano Mineiro* (PRM). Both parties represented the interests of the agrarian elite, especially the coffee producers from São Paulo and Minas Gerais.

[8] Brazilian landowners were (and often still are) considered as being colonels («*coronéis*»).

primary teachers' salary in rural schools. As mentioned in an account of the national Ministry for Education, however, the apparent shortage of federal resources, the elites' fear of the massive incorporation of new voters and the defense of states' autonomy left this dimension of the reform completely ineffective (see MEC 2000). Even the proposal of reintroducing free and compulsory primary schooling, discussed during the constitutional revision of 1925-1926, could not be approved. As will become evident in section 6, the politically important states of Minas Gerais and São Paulo — home of powerful landlords — exhibited poorer educational records than more egalitarian states throughout this period.

After the world economic crisis of 1929, the steep decline in Brazil's coffee exports and massive flight of capital, industrial development began to emerge as capital was being gradually transferred from the agricultural to the industrial sector. With the abolition of the Old Republic and the establishment of the Second Republic, rising social movements, increasing industrialization, the growing demand for a specialized labor force and the gradual reduction of governments' subsidies for agricultural production generated a broader consensus over the necessity for educational spending.

The intent to institutionalize public, free, compulsory and gender-equal education by the reformers around minister Campos (the so-called «pioneers of the new education») resulted in a major ideological clash between traditional sectors of the society (mainly the church and the coffee, cattle and sugar oligarchies) and a renovating movement (representing the interests of a growing middle class, composed mainly of intellectuals, bureaucrats, merchants, industrial workers and military officers). With the implementation of public and free education, traditional forces were not only afraid of a private school drain, but also worried about losing their privileges as a consequence of the school enrollment of broad social classes. Chapter II of the 1934 Constitution can be seen as a victory of the renovating movement over the old elites. As evident in the next paragraph, however, this victory only lasted for 3 years.

A backlash to this positive development took place with the enacting of the 1937 constitution and the beginning of the so-called *Estado Novo*, which can be seen as a product of elites' fears concerning the growing request for more social democratization and the exclusionary nature of the modernization process. According to Romanelli (1978, p. 153), the political context under the *Estado Novo* forced the previous ideological dispute over the educational question to enter a particular state of «hibernation.» The Constitution of 1937 put considerably less emphasis on education than the previous one, stressing the liberty of the individual initiative and exempting the State from providing universal education (see article 129). Social stratification and the country's cultural heritage heavily influenced the choice of the educational model to be followed. In the composition

of the new schooling system, the interests of the prevailing patriarchal rural elite — with its archaic educational ideas — prevailed (see Romanelli 1978, p. 56).

With the end of the *Estado Novo* in 1946, a new constitution of liberal and democratic character returned to the principle of «education as everyone's right» developed in the first half of the 1930s and expanded federal competencies to legislate over national education. The discussion around the *Lei das Diretrizes*, a law that took 13 years to be finally approved by Congress in the year 1961, is another good example for the intense ideological battles fought between conservative and liberal democratic forces (the so-called «pioneers»). Among other achievements, a Ministry of Education (*Ministério da Educacao e Cultura — MEC*), a national plan for education (*Plano Nacional de Educacao*) and a national literacy program (*Plano Nacional de Alfabetizacao*) were established.

Although this law was an important attempt to unify the country's educational system, the reform was not far-reaching and was perceived as unprogressive, reactionary, inefficient and a mere anachronism by many intellectuals (see Fernandes 1966, p. 347 or Lima 1974, p. 65). In the end, the alliance between rural conservatives and the antidemocratic forces within the modern sector managed to curtail profound reforms, defeating the more ambitious intentions of the liberal democrats (see Romanelli 1978, p. 190). Values of the old social order were perpetuated through the selective and discriminatory secondary and higher educational system, designated to prepare the elite for liberal professions. Referring to the *Lei das Diretrizes*, Fernandes (1966, p. 353) maintains that «the senators yielded to the real owners of power, in an undeniable demonstration that the whole Congress is still enslaved by the particularistic interests of the dominating traditional class» (translated by the author). Furthermore, he affirms that it was a «backward educational system, coherent with the old Brazilian manorial, seigniorial regime» (Ibid, p. 24).

During the military regime from 1964 to 1985, the Brazilian schooling system promoted by the state had the intention to propagate the dominant ideology and guarantee the reproduction of the social structure (see, e.g. Beisiegel 1974, pp. 178-179 or Manfredi 1978, pp. 158-159). After the redemocratization, a substantial improvement of educational indicators can be noted. Especially in the last 15 years, illiteracy has decreased considerably and primary as well as secondary schooling coverage have reached satisfactory levels. Nevertheless, the country's educational system still lacks quality and lags behind many other developing countries. A second major problem is Brazil's disproportional educational spending. The following statistical analysis will show that — even in more recent times — educational backwardness remains especially pronounced in states that are dependent on a rural economy and, at the same time, exhibit unequal agrarian structures.

By briefly summarizing Brazil's history of education, this section demonstrated that the country's schooling system often reflected the interests of the ruling classes, especially the rural aristocracy. The subsequent section describes the historical roots of the unequal land ownership patterns, stressing the differences of the agrarian structure across Brazil. According to the paper's argumentation, these differences can be made accountable for the cross-state variance in landlords' political power and the observable divergence in the human capital formation process. As will become evident, the influence of a landed elite left enduring footprints on the educational records of many states.

5. BRAZIL'S AGRARIAN STRUCTURE: FIVE CENTURIES OF LAND CONCENTRATION

The highly unequal Brazilian land distribution with the predominance of large estates has its origin in the colonial period. As the Brazilian historian Caio Prado Jr wrote, «latifundium, slavery and the export trade remained for more than three hundred years the principle institutions of Brazilian society» (as cited in Dean 1971, p. 607). And, despite evidence of the superior economic viability of smaller estates observable in other regions such as Western Europe, the country's land tenure system remained concentrated. According to Guimaraes (1968, p. 201), the Brazilian plantation system reached modern times with sufficient power to maintain control over the agrarian economy.

In a first attempt to populate the recently discovered country, Portugal's King João III divided Brazil into fifteen territories called *Capitanias Hereditárias* (Hereditary Captaincies) — areas granted to Portuguese grantees (captains) with hereditary succession. Seeking to extract profit out of sugarcane plantations, a second settlement attempt was initiated in the 17th century, fostering the so-called «sugarcane cycle[9].» In another land-concentrating effort, the crown offered royal grants in the form of large tracts of land (*sesmarias*) to anyone able to pay 300-400 milreis (375-500 US$ in the year 1800) to cover the formalities. Granted unsystematically and corruptly, the *sesmarias* contributed to the formation of an aristocratic class of *latifundia* owners enjoying complete property rights over their holdings.

Even the abolition of slavery did not alter the land tenure system and Brazil entered the 20th century with a highly unequal land distribution, characterized by the coexistence of *latifundios* and the so-called *minifundios*

[9] The sugarcane cycle was Brazil's first organized economic activity and lasted from the 16th to the 18th century. Sugar mills were installed along the north- and southeast coast, with the states of Bahia and Pernambuco being the major producers. Cultivation took place on very large estates and was based on African slave labor. With the emergence of sugar beet and the cultivation know-how gained from the Dutch, Brazilian sugar production lost its importance in the 18th century.

TABLE 1
LAND CONCENTRATION ACROSS STATES

States	Landgini (1950)	Area of 50% smallest plots (1967)
Distrito Federal		3.3
Goiás		4.7
Espírito Santo	0.529	14.1
Roraima	0.614	13.9
Santa Catarina	0.669	9.4
Paraná	0.73	9.2
Ceará	0.747	4.7
Rio Grande do Sul	0.757	7.8
Minas Gerais	0.759	4.6
São Paulo	0.77	5.5
Rio de Janeiro	0.79	3.7
Bahia	0.799	4.4
Piauí	0.8	4.1
Paraíba	0.808	4.3
Rio Grande do Norte	0.808	4.2
Sergipe	0.813	3.9
Pernambuco	0.834	3.8
Mato Grosso	0.844	1.1
Alagoas	0.845	4.5
Pará	0.888	2.5
Acre	0.907	0.3
Amazonas	0.923	1.9
Rondonia	0.928	0.4
Maranhão	0.932	3.1
Amapá	0.935	1.6

(very small plots of land incapable of ensuring an adequate living). Table 1 shows the land concentration measured by the Gini index as of 1950 and the percentage of the total area corresponding to the 50 per cent smallest plots

up to the median in the year 1967[10]. The northern states with very low population densities such as Pará, Acre, Amazonas, Rondonia, Maranhão or Amapá exhibit the highest land inequalities. Except for Maranhão, these are all frontier states in which the geography is dominated by the Amazon Forest. With Gini indices ranging from 0.76 to 0.85, historically important states with a past of plantation-style, export-oriented agricultural production still exhibited a concentrated land ownership structure in 1950. The historical sugarcane plantations from Pernambuco, Paraíba and Alagoas, the cocoa and sugarcane cultivations in Bahia[11], the coffee production in São Paulo, Minas Gerais and Rio de Janeiro[12] or the cattle breeding and mineral extraction in Mato Grosso and Minas Gerais left footprints on the states' land tenure conditions.

Four states are frequently referred to as having a different agrarian land structure: Santa Catarina, Espírito Santo, Paraná and — to a lesser extent — Rio Grande do Sul. Plots between 25 and 30 hectares were no exception within these states, guaranteeing families' subsistence and small surpluses (see IBGE 1946, p. 58). Within these states, the *latifundia* system was never as widespread and powerful as in the coffee or sugar plantation zones[13]. In 1960, the percentage of plots smaller than 100 hectares corresponding to the states' total area in Espírito Santo, Santa Catarina and Paraná were 54.7, 52.4 and 46.3 per cent, respectively. These numbers were significantly lower in federal units with a *latifundia* tradition such as Pernambuco (35.2 per cent), Bahia (33.6 per cent) or Alagoas (32.2 per cent; see Guimaraes 1968, p. 221).

In the state of Santa Catarina, the concession of the already mentioned *sesmarias* during the 17th and 18th centuries was granted to the destitute population rather than to nobles or wealthy individuals (Fiori 1991, p. 27). Because of this, according to Cabral (1968, p. 192), Santa Catarina never experienced the «colonial society that prevailed in other areas, the wealthy and powerful sugar barons, the masters and slaves. The latifundia system

[10] The data on the land Ginis were taken from the report of the 1995-1996 *Censo Agropecuário* from the *Insituto Brasileiro de Geografia e Estatística* (*IBGE*). Data on the area corresponding to the 50 per cent smallest plots are from Hoffmann (1998).

[11] A lucrative enterprise in the south of Bahia from the late 18th century until the New York stock market crash in 1929, the cultivation of cocoa became a symbol of colonels' wealth and power. Even after abolition of slavery, semifeudalist working conditions remained.

[12] The so-called «coffee cycle» took place from 1800 to 1930 and was the driving force of Brazil's economy from the second half of the 19th century. Around 1838, coffee accounted for over 50 per cent of the country's total exports (see Guimaraes 1968, p. 80). Like other cash crops, the cultivation of the so-called black gold was very labor intensive and barons were dependent on the supply of slaves or cheap hired labor.

[13] It is important to note that the successful settlement of European immigrants was only possible in rural areas not directly affected by the economic and political power of landlords. As put forward by Guimaraes (1968, p. 131), the northeast and the state of Minas Gerais did not exhibit a single case of successful European settlement.

never established itself, while the small property regime spread rapidly contributing to the emergence of free labor» (translated by the author). Furthermore, with the Land Law of 1850, the Portuguese Crown had given nearly a third of the province of Santa Catarina, and large areas of Rio Grande do Sul and Paraná to colonization companies. Secure land titles and reasonable properties were guaranteed to mainly German, Italian and Polish immigrants. As a consequence, the agrarian structure of these states was formed mostly around smaller family properties (see Hoffmann 1980). These European settlers were attracted in order to address the labor shortage and to stimulate the cultivation of crops such as maize or wheat, vital for the domestic market and neglected by the large plantations.

In Espírito Santo especially, the arrival of immigrants from other states — attracted by moderate land prices resulting from the state's land-selling policy at the end of the 19th century — promoted the proliferation of smaller family farms. In the year 1920, the average size of rural properties in the state was 42 hectares in the Vale do Rio Doce and 77.1 in the Vale do Itapemirim, low figures compared to the rest of Brazil (see Almada 1993, p. 31)[14]. Although Espírito Santo received an important number of European colonizers, immigration did not play the same important role as in Brazil's southern states (see Almada 1993, p. 25).

As evident in Table 1, two other states figure among the most equal ones: Roraima and Ceará. Roraima's low Gini index is a direct consequence of this state's equally distributed and very large plots. Its median area of total properties in 1967 was 772 hectares (see Hoffmann 1998, p. 7). Thus, the state's apparently equal land distribution is simply a shortcoming of the Gini index. When additional land concentration measures are taken into account, Ceará also fares worse than the southern states or Espírito Santo. An indication of this is the relatively modest total area of the 50 per cent smallest rural properties shown in Table 1. As will become evident in the next section, the interstate concentration patterns presented here have remained largely unaltered throughout the last decades.

Having briefly analyzed the colonial roots of Brazil's land inequalities and outlined the regional differences within states' agrarian structure, the next section addresses the consequences of this variation for states' educational performance. Making use of historical data, it draws a picture of the different educational performances across Brazil's federal units in the 19th and 20th centuries. Furthermore, it briefly describes the formulation of educational policies and the schooling indicators within the states of Santa Catarina and Espírito Santo.

[14] The national average of rural properties in the same year was 270 hectares (see Guimaraes 1968, p. 209).

6. AGRARIAN STRUCTURE AND SCHOOLING IN 19TH AND 20TH CENTURIES BRAZIL

Profiting from *the Brazilian Government Document Digitization Project* undertaken by the *Center of Research Libraries*[15], the question of whether the provinces mainly organized around family farming such as the southern states, Espírito Santo and, to a minor extent, Sergipe exhibit better educational indicators, as previously hypothesized, will be investigated.

Table 2 lists the average primary school students' registrations in the years 1865, 1869, 1875 and 1885 (divided by the total population in 1872 and 1890)[16]. Clearly, the four provinces exhibiting the most equal land distribution are among the regions with the highest primary school matriculations. Sergipe has the second highest level of primary students, followed by Rio Grande do Sul, Santa Catarina, Espírito Santo and Paraná[17]. Furthermore, it is striking how economically important provinces such as Bahia (a major producer of cocoa) or Minas Gerais (a major cattle breeder and coffee producer) or São Paulo (a major coffee producer and the motor of the Brazilian economy from the second half of the 19th century until 1920) neglected primary education compared to the other states. The high figures for frontier states with extremely low population densities such as Pará, Mato Grosso and Amazonas have to be interpreted with care. Given their geography, dominated by the rain forest, the population of Brazil's three biggest states was concentrated in capital cities such as Belém, Cuiabá or Manaus. It is to be expected that the surveyed populations do not include residents outside these major urban areas, distorting the results. Schools outside these few major settlement areas were extremely rare.

Data showing states' expenditure on primary education and literacy rates confirm the cross-state variance in human capital formation depicted above. By the year 1870, for example, the province of Santa Catarina spent

[15] Among other interesting information, the project gathers provincial presidential reports issued annually during the Imperial period. Subject access to selected quantitative information is provided through links from the Subject Guide to Statistics in the Presidential Reports of the Brazilian Provinces, 1830-1889 compiled by Ann Hartness (http://brazil.crl.edu/bsd/bsd/hartness/index.html; March 11, 2009).

[16] Data on primary school registration rates were gathered for each province by accessing the various items catalogued under the category «primary education, public» available at http://brazil.crl.edu/bsd/bsd/hartness/predpub.html. The demographic data are from *IPEA* and can be retrieved from http://www.ipeadata.gov.br/ipeaweb.dll/ipeadata?113967296 (March 13, 2009).

[17] Although sugarcane was an important commodity for Sergipe's economy, the state was leading in the production of cotton (Nunes 2006, p. 20). The cultivation of cotton did not require large investments and was affordable for any small farmer. Thus, it is comprehensible that Sergipe had a family farm share of 23 per cent in 1950, whereas the mean for the whole country was a mere 6 per cent (Barraclough 1973, p. 122). Nunes (2006 p. 21) points out that the *latifundia* system that divided the society into landlords and slaves in other northeastern provinces never played a significant role in this state.

TABLE 2
PRIMARY SCHOOL REGISTRATION, 1865–1885

Provinces	**Number of registered primary school students divided by total population**
Paraíba	0.0083
Bahia	0.0092
Minas Gerais	0.0092
Rio Janeiro and Court	0.0097
Goiás	0.0097
Ceará	0.0103
São Paulo	0.0123
Maranhão	0.0126
Pernambuco	0.0130
Rio Grande do Norte	0.0133
Amazonas	0.0141
Alagoas	0.0146
Mato Grosso	0.0147
Paraná	0.0162
Espírito Santo	0.0165
Santa Catarina	0.0172
Rio Grande do Sul	0.0198
Sergipe	0.0254
Pará	0.0260

over three times more than Minas Gerais or Bahia on per capita primary education[18]. Table 3 confirms the leading position of the southern states and Espírito Santo as far as literacy figures are concerned. In 1900, all four states exhibited lower illiteracy rates than the two politically most influential provinces at that time: São Paulo and Minas Gerais. In Bahia and Pernambuco — prime examples of agrarian economies based on the *latifundia* system — less

[18] Educational spending data were gathered for each single province by accessing the various items catalogued under the category «educational expenditures» available at http://brazil.crl.edu/bsd/bsd/hartness/educexp.html (September 20, 2009).

TABLE 3
LITERACY RATES IN 1900

Provinces	**Percentage of illiterate population (over 14 years of age)**
Rio de Janeiro	51.83
Amazonas	58.27
Pará	58.65
Espírito Santo	59.42
Rio Grande do Sul	60.38
Mato Grosso	63.34
Santa Catarina	63.54
Paraná	64.60
Maranhão	65.37
São Paulo	65.71
Minas Gerais	65.92
Sergipe	69.98
Rio Grande do Norte	71.08
Goiás	71.14
Bahia	71.39
Ceará	71.58
Pernambuco	72.19
Alagoas	73.34
Paraíba	73.71
Piauí	74.29

than 30 per cent of the population was literate. Again, the low-illiteracy numbers for frontier states such as Amazonas, Pará or Mato Grosso are rather a reflection of their extremely low population density than an effort to educate their citizens.

Descriptive evidence of provinces' effort to expand and ameliorate public schooling confirms the picture shown by the historical statistics. With the so-called *Ato Adicional* of 1824, provinces were allowed to make their own legislation governing public primary and secondary instruction. Compared to most of the other Brazilian states, Santa Catarina showed an early preoccupation with extending and consolidating the schooling system. As early as 1874, schooling was declared compulsory within the boundaries of the state. Rather

than representing a mere legal determination, Ulhôa Cintra, the provincial president at that time, was concerned with truly enforcing compulsory education (see Fiori 1991, p. 53). Recognizing that public instruction was still characterized by deficient school inspection, unprepared teachers and poor-quality instruction, the provincial Assembly of Santa Catarina approved an educational reform in the year 1881. Among other measures, the reform introduced selection processes for the awarding of teaching chairs, lifelong tenure, secularization of schooling, mixed schools and redefined the inspection system.

In 1911, Governor Vidal Ramos introduced additional ambitious educational reforms that profoundly altered the state's public instruction system. The efficient reorganization of public schooling promoted by Ramos was admired by other states (see Fiori 1991, p. 83). New teaching and learning concepts — rejecting servile memorization of learning matter — were propagated and there was a strong concern with the quality of schooling, which led to an increase in knowledge requirements for teachers and improved statistical coverage (Fiori 1991, p. 96). Writing on the state's schooling system, the federal deputy Lebon Regis affirmed that teaching supervision in Santa Catarina is «a reality like in no other state» (Regis 1917, p. 18, translated by the author).

Like Santa Catarina, the state of Espírito Santo also exhibits an agrarian structure in which smaller family farms always played a fundamental role. However, as previously highlighted, this state was primarily populated by internal immigrants rather than European settlers. By analyzing the state's educational performance, it is possible to verify whether the positive schooling development in the south can be attributed exclusively to European immigration. Table 2 reveals that Espírito Santo exhibited similar primary school enrollment rates for the period 1865-1885 to the southern states. Furthermore, literacy rates for the years 1940 and 1950 reveal that municipalities organized around family farming showed a lower percentage of illiteracy among the population within this state. Thus, municipalities with greater numbers of smaller farms such as Santa Tereza, Santa Leopoldina or Cachoeiro had literacy rates of 43.63, 49.71 and 44.22 per cent, respectively. These figures were significantly lower in municipalities dominated by large rural properties such as Alegre (34.70 per cent), Mimoso do Sul (30.38 per cent) or Muqui (36.82 per cent). The state's average literacy for the same year was 39.75 per cent (see IBGE 1953, p. 6). Thus, it seems unlikely that the superior educational performance of southern states is solely an expression of European immigrants' push for more education.

Looking into the 20th century, one can find a remarkable resilience of states' agrarian structure and a path-dependent pattern for educational figures in most of the federal units. Tables 4 and 5 provide information on land Gini indices and the percentage of the states' rural area corresponding to the 50 per cent smallest plots[19]. Considerable changes of both indicators are

[19] Data for the year 1967 are from the first official register of rural estates kept by *IBRA* (*Instituto Brasileiro de Reforma Agrária*). Data for the remaining years were drawn from the *INCR*

TABLE 4
GINI INDEX OF THE LAND DISTRIBUTION WITHIN BRAZIL'S FEDERAL UNITS

States	1967	1972	1978	1992	1998
Rondônia	0.948	0.903	0.770	0.644	0.644
Acre	0.944	0.955	0.962	0.889	0.872
Amazonas	0.844	0.857	0.935	0.937	0.929
Roraima	0.522	0.568	0.531	0.874	0.796
Pará	0.871	0.883	0.863	0.892	0.889
Amapá	0.832	0.873	0.905	0.845	0.780
Maranhão	0.795	0.784	0.790	0.748	0.766
Piauí	0.776	0.775	0.780	0.751	0.774
Ceará	0.761	0.740	0.727	0.694	0.705
Rio Grande do Norte	0.784	0.792	0.777	0.747	0.766
Paraíba	0.791	0.784	0.775	0.761	0.766
Pernabuco	0.816	0.787	0.772	0.765	0.764
Alagoas	0.800	0.795	0.784	0.790	0.790
Sergipe	0.808	0.799	0.799	0.795	0.795
Bahia	0.787	0.776	0.836	0.808	0.831
Minas Gerais	0.769	0.761	0.773	0.754	0.762
Espírito Santo	0.569	0.597	0.609	0.629	0.645
Rio de Janeiro	0.799	0.751	0.761	0.737	0.751
São Paulo	0.765	0.760	0.769	0.758	0.763
Paraná	0.707	0.704	0.705	0.706	0.715
Santa Catarina	0.678	0.642	0.645	0.643	0.649
Rio Grande do Sul	0.745	0.729	0.718	0.725	0.730
Mato Grosso	0.858	0.867	0.855	0.817	0.811
Goias	0.761	0.755	0.741	0.721	0.731
Distrito Federal	0.857	0.775	0.810	0.788	0.811

(F'note continued)
(*Instituto Nacional de Colonizacao e Reforma Agrária*) register. The data are available in Hoffmann (1998).

TABLE 5
PERCENTAGE OF TOTAL AREA CORRESPONDING TO THE 50 PER CENT SMALLEST PLOTS

States	1967	1972	1978	1992	1998
Rondônia	0.4	2.7	10.3	14.1	13.9
Acre	0.3	0.6	0.5	4.1	4.9
Amazonas	1.9	2.2	0.8	1.6	2.1
Roraima	13.9	13.0	8.6	4.3	8.2
Pará	2.5	2.1	2.9	2.8	3.2
Amapá	1.6	1.8	2.6	5.6	8.1
Maranhão	3.1	4.9	5.0	6.8	6.2
Piauí	4.1	4.6	4.9	6.7	5.9
Ceará	4.7	5.9	6.4	7.6	7.1
Rio Grande do Norte	4.2	4.3	4.8	5.7	5.1
Paraíba	4.3	4.7	5.0	5.3	5.1
Pernabuco	3.8	4.5	4.8	4.9	4.9
Alagoas	4.5	4.8	5.0	4.8	4.8
Sergipe	3.9	3.8	3.8	3.9	3.9
Bahia	4.4	5.0	3.6	4.3	3.6
Minas Gerais	4.6	5.2	5.1	5.8	5.4
Espírito Santo	14.1	13.4	13.1	11.8	11.0
Rio de Janeiro	3.7	5.7	5.4	6.1	5.6
São Paulo	5.5	5.9	5.6	5.9	5.7
Paraná	9.2	9.6	9.4	9.3	8.9
Santa Catarina	9.4	11.7	11.8	12.1	11.8
Rio Grande do Sul	7.8	8.6	9.2	8.8	8.5
Mato Grosso	1.1	1.2	1.5	2.8	2.8
Goias	4.7	5.5	5.9	6.4	6.0
Distrito Federal	3.3	4.6	3.1	4.4	3.9

limited to the northern states. In Roraima, the Gini index increased drastically in the year 1992. However, as already outlined, the relatively low Gini indices for this state in the previous years merely reflected the small number of very large land properties[20].

Rondônia experienced an extraordinary drop in the Gini index, with a simultaneous reduction in the rural property mean. In this state, government intervention in the rural property structure formation was the most pronounced one. In respect to the percentage area corresponding to the 50 per cent smallest plots, Amapá and Acre — along with the already mentioned states of Roraima and Rondônia — exhibit the biggest variance in land inequality. All these drastic changes can be attributed to the fact that the northern states have been colonized relatively recently. In general, this table reveals that the variance across and within Brazil's federal units was very modest for the analyzed period.

When changes in states' economic structure and educational performance are analyzed in light of the reported resilience in land inequality, an interesting pattern can be observed. Table 6 shows that the ten Brazilian states exhibiting the lowest share of citizens with less than 4 years of schooling in the year 1970 are either predominantly urban (or do not rely much on rural economies) such as Rio de Janeiro, Distrito Federal, São Paulo or Amapá or maintain high incomes from agriculture while enjoying relatively low land inequality such as Rio Grande do Sul, Santa Catarina, Roraima, Espírito Santo or Paraná[21]. It is striking, for example, that while 23 per cent of Rio Grande do Sul's income is generated by the rural economy, it has a higher rate of citizens with at least 4 years of schooling than São Paulo, economically the most developed state in the country. In contrast, rural states, characterized by higher levels of land inequality, such as Maranhão, Acre, Mato Grosso, Pará or Amazonas, fare worse regarding the analyzed educational indicator. Thus, it seems fairly safe to conclude that the relationship between land inequality and education has survived within rural states well into modern times. Considering that, by the end of the 1960s, half of Brazil's territory was still in the hands of plantation owners (see Hagopian 1996); this conclusion does not appear particularly surprising.

The descriptive statistics reported above, although corroborating the main argument of this paper, can only serve as preliminary evidence. Given the scarcity of historical data, more sophisticated statistical tools cannot be applied. The next section makes use of more recent data, asking whether the

[20] See page 118.

[21] The source of the presented data on schooling and the percentage of states' rural income as a share of their GDP is *IBGE*. Data on the Gini index and the area corresponding to the 50 per cent smallest plots are from *IBRA*. All these indicators are available at www.ipeadata.gov.br (March 10, 2009).

TABLE 6
LAND CONCENTRATION, SCHOOLING AND RURAL INCOME AROUND 1970

States	Less than 4 years of schooling (%) (25 years and older) 1970	Percentage of total area corresponding to 50% smallest plots 1967	Gini index of land distribution 1967	Share of agricultural GDP over total GDP 1970
Rio de Janeiro	46.3	5.7	0.799	0.02
Distrito Federal	49.2	4.6	0.857	0.004
Rio Grande do Sul	54.8	8.6	0.745	0.23
São Paulo	55.9	5.9	0.765	0.06
Santa Catarina	67.1	1.7	0.678	0.25
Minas Gerais	73.9	5.2	0.769	0.18
Roraima	74.2	13.0	0.522	0.34
Amapá	75.2	1.8	0.832	0.08
Espírito Santo	76.5	13.4	0.569	0.21
Paraná	76.7	9.6	0.707	0.28
Rondônia	77.4	2.7	0.948	0.22
Pará	77.6	2.1	0.871	0.23
Amazonas	78.1	2.2	0.844	0.24
Pernambuco	80.1	4.5	0.816	0.14
Goias	81	5.5	0.761	0.35
Mato Grosso	81.8	1.2	0.858	0.37
Bahia	84.6	5.0	0.787	0.23
Rio Grande do Norte	85	4.3	0.784	0.19
Ceará	86	5.9	0.761	0.19
Sergipe	86.8	3.8	0.808	0.21
Paraíba	87.1	4.7	0.791	0.27
Acre	87.5	0.6	0.944	0.41
Alagoas	88	4.8	0.800	0.29
Piauí	89.8	4.6	0.776	0.32
Maranhão	90.1	4.9	0.795	0.43

association between agrarian structure and educational outcomes holds for more recent years.

7. CROSS-SECTIONAL ANALYSIS

For the cross-sectional regression analyses presented in this part, a variety of educational indicators have been chosen. As a starting point, an output measure reflecting states' secondary schooling coverage has been selected for the year 2000: the share of the population between 15 and 17 years of age attending secondary education[22]. This indicator may give us a particularly good idea of the scope of each state's secondary school system. In contrast to the historical analysis, this part concentrates on public secondary schooling, given that cross-state differences are much larger for this educational level in present times.

To proxy for states' agrarian structure, the land Gini index for the year 1995 was used. Data are from the 1995-1996 *Censo Agropecuário* from the *IBGE*, which unfortunately is the last agrarian census carried out in the country[23]. As already noted, the Gini index does not always reflect states' agrarian structure in a valid manner (e.g. when states' land ownership structure consists of very large, equally distributed plots). In fact, the measure does not necessarily reflect the size of landholdings. Therefore, the percentage of the total area corresponding to the rural plots smaller than the median (the 50 per cent smallest plots), taken from Hoffmann (1998, p. 9), was also employed.

Several control variables frequently found in the literature have been included. Unless otherwise noted, all of them represent the year 2000. The percentage of children between 5 and 9 years of age was considered in order to account for possible demographic differences across states. Those federal units with a relatively high share of young people are expected to devote more resources to basic schooling and have more students enrolled at these educational levels. Since the performance of educational systems is found to be worse in rural areas, the total share of the rural population in each state was taken[24]. To measure the impact of economic modernization on educational indicators, states' per capita income in 2000 was included in all models[25]. Richer units are expected to show a more highly developed secondary school system. In order to take account of recent findings showing a positive correlation between electoral competition and educational spending and coverage (e.g. Hecock 2006), the level of political competitiveness within

[22] Data are from the *IBGE* demographic census of the year 2000, available at http://www.ibge.gov.br/home or http://www.ipeadata.gov.br (April 10, 2009).

[23] These data may also be retrieved from the websites listed in the previous footnote.

[24] Data for both variables are from the IBGE demographic census.

[25] Data were estimated by IPEA: http://www.ipeadata.gov.br.

each state was also considered. The variable was measured by the number of effective parties in states' legislative assembly following the operationalization proposed by Laakso and Teegapera (1979)[26]. Finally, regional dummies for Brazil's north and northeast were included to account for possible structural instability. Both regions clearly lag behind in most of the country's economic and social indicators and, as previously shown, also exhibit the greatest land inequalities.

Table 7 shows the results of simple ordinary least squares (OLS) regressions using robust standard errors. In order to normalize the distribution of the dependent variable, the negative reciprocal was taken. After the transformation, a skewness–kurtosis test certified that the sample at hand came from a normally distributed population. In addition, Cook and Weisberg tests for heteroscedasticity indicate that the null hypothesis of constant error variance cannot be rejected — which applies for all the regression results reported in this paper.

Clearly, land inequality measured by the Gini index significantly decreases the share of the population between 15 and 17 years of age attending secondary education (model 1 of Table 7). The effect magnitude is considerable, as secondary school attendance drops by 0.21 standard deviations with each one standard deviation increase in land Gini indices. Only the coefficients of the dummy variables accounting for the northeastern and northern states are larger. All remaining control variables are non-significant. The results are similar when the percentage of the total area corresponding to the 50 per cent smallest plots is used as an alternative operationalization of the agrarian structure (model 2)[27]. The more the total rural area is constituted by smaller plots, the higher the rate of secondary school attendance. Under this model specification, the demographic variable measuring the share of the population between 5 and 9 years of age also turns out to be significant at the 10 per cent level, decreasing secondary school attendance. It can be expected that states showing a very young population tend to concentrate on primary schooling. Employing alternative educational indicators, such as the share of the population above the age of 9 years having completed 8 years of study as a dependent variable, yields very similar results[28].

[26] Following the seminal works of Duverger (1954) and Sartori (1976), the effective number of parties has become one of the most frequently used aggregate quantities to describe partisan configurations or electoral competition. In this paper, alternative operationalizations of electoral competition such as the indices of competitiveness developed by Santos (1997) for Brazil were also applied, but did not change the results substantially. The data used can be retrieved from http://www.ucam.edu.br/leex/ (May 10, 2009).

[27] A reduction of the number of observations from twenty-seven (model 1) to twenty-five (model 2) is due to missing data on the share of the 50 per cent smallest plots for the states of Mato Grosso do Sul and Tocantins.

[28] Because of space constraints, these results will not be reported here but are available upon request.

TABLE 7
DEPENDENT VARIABLE: SHARE OF POPULATION BETWEEN 15 AND 17 YEARS OF AGE ATTENDING SECONDARY EDUCATION

Variables	**Model 1**	**Model 2**
Landgini	−8.060 (3.300)**	
Share of plots smaller than the median (50% smallest)		0.145 (0.079)*
Rural population	0.021 (0.040)	−0.008 (0.048)
Population 5-9 years	−0.371 (0.305)	−0.588 (0.300)*
Per capita income	0.005 (0.005)	0.003 (0.004)
Effective number of parties	0.049 (0.098)	0.020 (0.124)
North	−1.872 (0.897)*	−1.059 (1.089)
Northeast	−2.491 (0.707)***	−3.060 (0.871)***
Constant	15.522 (4.173)***	13.524 (4.532)**
Number of observations	27	25
R^2	0.866	0.854
Prob> F	0.0000	0.0000

Note: Ordinary least square (OLS) regressions using robust standard errors. Standard errors are given in parentheses.

**Significant for $P < 0.05$; *$P < 0.1$; ***$P < 0.01$.

An important caveat of educational indicators that measure attendance or attainment is their inability to account for schooling quality. A state, for example, may have nearly 100 per cent of its children attending elementary school. Effectively, however, only a small minority of them might in fact be able to read and write. Thus, it is necessary to assess the efforts made by the states to deliver high-quality educational policies. In 2005, Brazil's Ministry of Education (*MEC*) together with the *Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira* (*INEP*) developed an index of school

TABLE 8
DEPENDENT VARIABLES: QUALITY OF SECONDARY EDUCATION

Variables	Model 1	Model 2	Model 3
Landgini	−2.954 (0.678)****	−3.443 (0.909)***	
Share of plots smaller than the median (50% smallest)			0.045 (0.024)*
Rural population	0.007 (0.007)	0.011 (0.009)	0.007 (0.014)
Per capita income	0.001 (0.00017)*	0.001 (0.0006)*	0.001 (0.0009)
Effective number of parties	0.022 (0.024)	0.035 (0.029)	0.037 (0.030)
North		−0.222 (0.210)	−0.202 (0.270)
Northeast		−0.028 (0.160)	−0.158 (0.247)
Constant	4.605 (0.733)****	4.888 (0.797)****	1.917 (0.498)***
Number of observations	27	27	25
R^2	0.557	0.610	0.549
Prob> F	0.0001	0.0005	0.0009

Note: Ordinary least square (OLS) regressions using robust standard errors. Standard errors are given in parentheses.

****Significant for $P < 0.001$; ***$P < 0.01$; *$P < 0.1$.

quality for each state. The *IDEB* index combines information on students' performance on standardized examinations (*Prova Brasil* or *Seab*) with information on students' school performance (average pass rate)[29]. The index ranges from 0 to 10, with higher values indicating better quality.

Table 8 reveals that the secondary schooling system of states exhibiting concentrated land ownership patterns suffers from an inferior teaching quality. Even after the introduction of the regional dummies (model 2), the main variable measuring states' agrarian structure remains negative and

[29] The IDEB index can be downloaded at http://ideb.inep.gov.br/Site/ (February 10, 2009).

highly significant. When standardized coefficients are calculated[30], the variable *landgini* has the greatest effect magnitude of all. Each one standard deviation increase decreases the *IDEB* index score by 0.62 standard deviations. Furthermore, it seems that richer states also exhibit better-prepared secondary students. This assertion, however, does not hold for model 3. All other coefficients remain identical when the alternative operationalization of land concentration (share of the 50 per cent smallest plots) is employed[31]. Note that the percentage of the population between 5 and 9 years of age was excluded from the analysis as there are no theoretical grounds to believe that states' demography has an impact on schooling quality.

Up to this point, only output variables have been employed to describe each state's educational system. Many authors argue in favor of the superiority of these indicators relative to incidence-based measures. Government-spending levels, for example, can be distorted by patterns of «hidden» rents[32]. Nevertheless, this paper will make use of educational spending figures in order to test the political economy mechanism formulated in section 3 explicitly. Assuming that the rural elite has no interest in the promotion of broadly targeted educational policies, it can be expected that governments under the influence of this elite will refrain from investing in the school system. The next analysis uses states' overall educational expenditures divided by their total population between the years 2003 and 2005 as a dependent variable. The data are reported by *IPEA* and is expressed in *Reais* (thousand)[33]. To transform the variable into a normally distributed one, the negative reciprocal root was taken.

Rather than proxy the influence of agrarian elites by drawing on the landownership patterns within each state, a more direct measure of landlords' political articulation capacity will be employed. The so-called *bancada ruralista* is a good indicator of landowners' current political power. This powerful rural interest group encompasses federal deputies and senators from different political parties that defend the interests of large landowners within the National Congress. During the legislature of 2003-2007, the *bancada ruralista* consisted of 111 federal deputies (from a total of 513 seats), as calculated by the *Departamento Intersindical de Assessoria parlamentar* (*Diap*). These deputies were extremely successful in maintaining the current land distribution patterns and agricultural work relations. In the Chamber of Deputies, for example, they repeatedly blocked the constitutional amendment *PEC 438/2001,* which foresees the confiscation of properties employing slave work.

For each new legislature, the *Diap* publishes the names of federal deputies and senators pertaining to the referred interest group, examining whether

[30] Results are available upon request.

[31] The effect size of the area corresponding to the 50 per cent smallest plots is similar to that reported for the land Gini index.

[32] See, for example, Baum and Lake (2003, p. 336).

[33] Data can be downloaded from www.ipeadata.gov.br (February 19, 2009).

TABLE 9
DEPENDENT VARIABLES: TOTAL EDUCATIONAL EXPENDITURE DIVIDED BY POPULATION

Bancada ruralista	−0.024 (0.011)**
Population between 10 and 19 years	0.119 (0.065)*
Left	0.499 (0.126)***
Center	0.219 (0.125)
Federal government transfers	0.015 (0.004)***
Per capita Income	0.001 (0.001)
Effective number of parties	−0.022 (0.037)
North	−0.135 (0.187)
Northeast	−0.758 (0.259)**
Constant	−4.677 (01.645)**
Number of observations	25
R^2	0.829
Prob> F	0.0000

Note: Ordinary least square (OLS) regressions using robust standard errors. Standard errors are given in parentheses.
**Significant for $P < 0.05$; *$P < 0.1$; ***$P < 0.01$.

congressmen embraced the causes of this particular advocacy group in the plenary sessions, the commissions or in interviews. Most of the representatives openly state their membership in their curricula posted on the chamber of deputies' website. The total number of federal deputies and senators belonging to the *bancada ruralista* in each state during the legislature

2003-2007 will be employed as a measure of landlords' political influence[34]. In addition to the control variables included in the former models[35], two more were added: the federal educational transfers to the states in the period 2003-2005 (reported by *IPEA*) and a dummy variable reflecting the partisanship of the major state legislative party in the year 2004[36]. According to conventional wisdom, left-wing parties are expected to spend more on social policies.

As can be seen in Table 9, the higher the number of members belonging to the described interest group within each state, the less is spent on education. The coefficient for the variable *bancada* is negative and significant at the 5 per cent level. Three control variables reached statistical significance. In accordance with the literature, left-wing parties seem to spend more on schooling. Also, the more educational transfers the federal government makes to the single states, the higher their total expenditure on education. Finally, demographically younger states (with a higher share of their population between 10 and 19 years of age) disburse more on the schooling system. Once more, northeastern states lag behind, spending less on education than the other states.

Concerning the robustness of the results, several checks were carried out. First, the robustness of including and excluding one or more control variables in the preferred specification was verified, applying a technique recently developed by Barslund (2007). The author provides a STATA module to perform robustness checks of alternative specifications[37]. The command estimates a set of regressions in which the dependent variable is regressed on core variables — which are included in all regressions — and all possible combinations of other (non-core) variables. An analysis of predictors' variance inflation factor (VIF) confirmed that the results are not driven by multicollinearity.[38] In addition, two varieties of robust regressions that resist the pull of outliers — giving them better-than-OLS efficiency in case of non-normal, outlier-prone error distributions — were applied[39]. In addition, dropping one state at a time did not alter the results substantially. The tests indicate that all models presented in this section are robust to alternative specifications and are not driven by single outliers.

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[34] These data are available at *Diap*'s Website: www.diap.gov.br (February 19, 2009).

[35] The variable measuring the effective number of parties was taken for the year 2002, per capita income and the share of the population between 10 and 19 years of age for the year 2000.

[36] These data were kindly provided by George Avelino.

[37] The ado-file for the command «checkrob» can be downloaded at http://fmwww.bc.edu/repec/bocode/c/checkrob.ado.

[38] Chatterjee *et al*. (2000) suggest the following guideline for the presence of multicollinearity: The largest VIF is greater than ten or the mean VIF is larger than one.

[39] The two robust regressions performed are quantile regressions and another technique that rests upon iteratively reweighted least square (IRLS) procedures. They were estimated by the STATA commands «rreg» and «qreg.»

8. CONCLUSIONS

Given the general academic consent regarding the importance of education for countries' development, it is surprising how little attention the social sciences have paid to the effect of structural variables such as landownership patterns on the formation of human capital. Trying to address this shortcoming within the literature, this paper explored the impact of different agrarian structures on the schooling system of the Brazilian states.

The paper has concentrated on the political economy argument, suggesting that landlords had no interest in the expansion of schooling out of the fear of higher taxes as well as the loss of a cheap, coerced labor force and their monopoly over the decision-making process. By describing several episodes of Brazil's history of education, the paper provided positive evidence for the proposed causal mechanism. In this manner, it tried to remediate a frequently found shortcoming of quantitative, macrocomparative studies, which limit themselves to showing significant correlations without truly addressing and testing particular channels. Brazil proved particularly useful for this purpose, given that it has a tradition of plantation-style agriculture and, simultaneously, exhibits federal units with a rural economy organized around smaller family farms. Moreover, the country's primary and secondary education lies largely in the hands of each individual state.

The overview of Brazil's history of education revealed the importance of politically influential groups such as landlords in the formulation of educational policies. It showed, especially, that traditional forces represented by the rural aristocracy tried to maintain the elitist character of the educational system, depriving the masses from citizenship-enhancing schooling while favoring the development of higher education. Long-winded and mostly unsuccessful attempts to reform the educational system illustrated this point. Through this course of action, the rural elite maintained their strong political power and the agrarian structure characterized by high land inequality and coercive working relations for a long time.

Descriptive analysis of historical data showed that economically important provinces whose agriculture was based on plantations employing slave or cheap hired labor lagged behind with respect to student registration rates. More recent data evidenced little variation of land distribution patterns across and within states as well as enduring educational backwardness in predominantly agrarian and unequal federal units. Inferential statistics corroborated the paper's main claim. Cross-section regression analysis showed that states exhibiting higher land equality systematically outperform less egalitarian units concerning school coverage and educational quality. This is especially true for the secondary school system. Finally, states with a high number of congressmen belonging to the interest group *bancada ruralista* invest less in education. Thus, supportive evidence was provided to demonstrate large landlords' aversion to governmental schooling expenditures.

Much room remains for future research. Upcoming studies should concentrate on disentangling and testing the single channels through which the agrarian structure impacts countries' educational policies. This would surely improve our understanding of the formulation of public policies and, above all, would be particularly relevant for many developing countries which are still highly dependent on agricultural production. Another interesting line of research to be explored is the possible interconnectedness of the rural and industrial elites and its impact on human capital formation.

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