Big BRICs, Weak Foundations: The Beginning of Public Elementary Education in Brazil, Russia, India, and China, 1880–1930

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Abstract

Our paper provides a comparative perspective on the development of primary education in four of the largest developing economies circa 1910, BRIC – Brazil, Russia, India and China. Unlike traditional comparative exercises focusing on differences within developed economies or between developed and developing economies, we focus on comparisons within and between these four developing economies. These four countries encompassed almost 50 percent of the world's population in 1910, but remarkably few of their citizens attended any school in the early 20th century. We present new, comparable data drawn from archival and unpublished information on school inputs and outputs for BRIC. Similar to recent studies that emphasize the importance of income, political decentralization and the level of political voice to the spread of primary education in developed economies, we also find these factors to be important in the context of BRIC. We also find that other factors such as such as local ethnic and religious heterogeneity and the institutional legacies of colonialism and serfdom help explain the low achievement levels of these countries *and* the incredible amount of heterogeneity within each BRIC.

1. Introduction

History offers numerous examples of the role played by human capital investment in economic development. In perhaps the most striking example, economic historians and growth economists have argued that the "Great Divergence" between the developed and underdeveloped world in the 19th century was reinforced – if not caused – by rapid improvements in schooling that occurred in the advanced economies. For example, the leading positions of the US and German economies in 1900 have been linked to their highly developed education systems (Goldin and Katz, 2008; and Becker et al., 2009). Few nations in the last century have undergone growth convergence without *also* experiencing sustained increases in human capital investment. Therefore, explaining differences in economic development today may hinge on understanding why many societies *failed* to develop adequate primary education in the late 19th and early 20th centuries.

This challenge was laid down by Richard Easterlin in "Why isn't the Whole World Developed?" his famous 1980 presidential address to the Economic History Association (Easterlin, 1981). Thirty years later, our paper takes an explicitly comparative approach to his challenge. Unlike most comparative research in economic history, which focuses on differences within developed economies, or between developed and developing economies,[1] our paper compares and contrasts the provision of primary education in four of the largest *developing* economies at the turn of the 20th century: Brazil, Russia, India and China (BRIC). By 1900, approximately 10, 23, 9, and less than 5 percent of school-age children in Brazil, Russia, India and China respectively were enrolled in primary school, compared to more than 75 percent in

[1] For example, see Allen (2005) and Broadberry and Gupta (2006). Important recent exceptions to these practices include Frankema (2010) and Lindert (2010).

Germany, UK and the USA.[2] What factors constrained the development of primary education in BRIC? Were they similar to or different from constraints operating (or absent) in other parts of the world?

Researchers have identified a number of factors responsible for the success of United States, Germany, and other developed countries in achieving high rates of primary school enrollment by the 19th century. While recognizing that high incomes made primary education relatively affordable (and desirable) in these countries, Goldin (2001), Lindert (2004), Go and Lindert (2010), and Gallego (2010), among others, also emphasize how the decentralization of education policymaking (including fiscal authority) to local institutions with broad popular participation played a key role in the successful expansion of public primary schooling. Political structures mattered because they gave a larger share of the populace control over local tax revenues and prevented elites from blocking the use of these resources for the financing of public primary education. Moreover, societies that successfully expanded primary education also possessed relatively homogeneous populations (both in terms of preferences and wealth) at the local level, which enabled majorities to coalesce around support for public schools.

These factors provide a framework for understanding the weak educational foundations of BRIC. Like most other countries in this period, BRIC had a very limited franchise and relatively unequal access to local political institutions. Russia had property and class restrictions in local voting that persisted after 1906 and the first national elections to the Duma; Brazil had property and literacy restrictions until 1889 and literacy restrictions afterwards; and both countries possessed institutions and inequality that stemmed from their histories of coercive

[2] For comparative information on enrollment rates in the early 20th century, see Chaudhary (2010), Lindert (2004, especially vol. 2), and the evidence presented below. Note that Lindert's figures for 1900 for Russia (14.9) and India (4.7) differ than the ones we provide here. Our Russia figure only includes European Russia, while both of our Russian and Indian enrollment rates assume that the share of the population that was school age – 5 to 14 years old – was 15 percent.

labor regimes. British India was a dependent colony with no national elections, and a small group of traditional landed and upper caste elites dominated local political institutions. Even when provincial elections were introduced in India in 1919, the franchise was extended to a very small elite share of the population. In China, there were few formal political channels for the overwhelming majority of the population. During the late Qing dynasty there was a supposed centralization of power, but in practice, elites in the provinces controlled politics and the provision of public goods. In the Republican period after 1911, local elites consolidated their control, despite the existence of a national government that was at least nominally elected.

A limited franchise and restricted voice in local polities characterized many developing economies in the early 20th century, and has often been linked to the lack of public resources invested in the expansion of primary education in such societies (Lindert, 2004 and 2010; and Gallego, 2010). Consistent with this, many poor communities across BRIC were forced to rely on voluntary private contributions to fund informal primary schooling because of limited central government capacity and elite control over local public institutions. The result was limited schooling, often of indifferent quality.

Yet, we do observe considerable variation in schooling outcomes *within* each member of BRIC. What can account for this variation? We argue that economic and political heterogeneity within each of the BRICs led to significant *intra-country* divergence in schooling outcomes in the early 20th century. Each country possessed substantial local and regional variation in economic conditions that led to differences in the resources available for schooling (and in demand for the provision of primary education). For instance, certain provinces of Brazil and China benefited from their export orientation, which allowed them to provide greater public funds for education and potentially increased the private returns to schooling. When the rubber

exporting provinces of Brazil received windfall tax gains as the international price of rubber increased, they allocated more funds to primary education. In China, coastal provinces enjoyed better opportunities for trade, which led to higher public revenues from custom duties and greater returns to human capital investments. In India, the coastal provinces also had higher public and private spending because they had large state bureaucracies generating higher local demand for educated Indian workers. Finally, in Russia and the other countries, significant local variation in agricultural conditions and industrial activity generated heterogeneity in private *and* public incomes.

But, economic differences do not capture the entire story. There were considerable differences *within* BRIC in local political structures, their relations to central governments, and their openness to involvement by the non-elite populations.[3] The institutional structures defined the authority available to local governments over education policies such as curriculum and teacher qualifications and, especially, over access to different fiscal resources. For example, in Brazil the federal system after 1891 allowed provinces to tax exports and retain those receipts. In comparison, the colonial government of India always retained authority over revenues such as income and export taxes. The central government gave provincial and other local governments a fixed pot of money, which they could then allocate to different local services, including primary education. This perhaps accounts for the wider variation in spending across Brazilian provinces compared to Indian provinces. In Russia, the granting of property tax authority to the *zemstvo* increased the funds available to support education in those provinces that received this new institution of local government. In China, the late Qing and early Republican eras saw a significant amount of heterogeneity emerge in the relationships between local elites and state

[3] This is consistent with Go and Lindert's (2010) account of the differences in school investments and enrollments between the northern and southern United States in the first half of the 19th century.

institutions. This variation influenced how centrally mandated educational reforms were interpreted locally, and it affected the size and source of revenues available to fund schools.

In our analysis we do not assume that a unified elite was trying to block expenditures on education. Rather, elite interests in fostering education varied according to local economic conditions and the availability of different sources of funding. Moreover, if local institutions were organized to encourage relatively equal political participation, then elites were often less successful in blocking public spending on primary education. Such was the case in parts of Russia where peasants were granted greater representation in the *zemstvo* institutions. In comparison, Indian local councils were designed in such a manner that a majority of the population had limited political voice and a small proportion of landed and upper caste elites were able to influence the allocation of funds based on their preferences for expanding secondary education at the expense of primary education. The expansion of the franchise in Brazil came with a literacy requirement that increased the incentives for local (municipality and state-level) elites to expand schooling to consolidate political power. The absence of open local political institutions in China weakened incentives for spending on primary education out of public funds. However, in highly commercial areas, it was in the interests of the economic and political elite to encourage school expansion to build up the skills of the workforce. Overall, it was this interaction between economic benefits, elite preferences, and the extent of political participation that induced higher educational investments within some areas of BRIC.

The rest of the paper is organized as follows. The next section describes the basic comparative patterns on primary education expenditures and enrollments for BRIC and other countries, circa 1910. Drawing on a variety of original and archival sources, we also report and comment on within-country variation in expenditures and enrollment for BRIC. Section 3

presents four case studies describing the political economy of primary school finance in each of the BRICs. Section 4 compares and contrasts the general lessons learned from the individual case studies. A brief concluding section outlines directions for future research.

2. Comparative Perspective

In Table 1 we present comparative data on primary education circa 1910 from BRICs and a set of comparison countries. In the comparison set we include high-income European countries such as England and Germany; middle-income European countries such as Hungary and Spain; Japan – the leading economy in Asia at the time; and other middle-income countries such as South Africa, Uruguay, Chile and Mexico. The education data for BRICs are from individual country surveys, reports, and archival documents, while the data for the other countries come from a contemporary report by the Commissioner of the U.S. Department of Education (United States, 1910).[4]

Table 1 starkly reveals the low education levels and expenditures in BRIC countries relative to the rest of the world. Estimated primary school enrollment rates averaged 17 percent, far below the less developed parts of Europe (Italy - 53 percent, Spain 68 percent), South Africa (48 percent) and Mexico (37 percent).[5] Bolivia is the only country with a comparable enrollment rate (17 percent) to BRICs. The poverty of BRICs was clearly an important factor driving the low enrollment rates. In 1913, GDP per capita averaged a mere $981 for BRIC compared to

[4] Where applicable, we checked this report against the numbers reported by Benavot and Riddle (1988), Easterlin (1981) and Lindert (2004).

[5] We measure enrollment rates as the number of enrolled children in primary schools over the total school-age population, which we proxy with 15 percent of the total population for each country. For India and Brazil, where we have some idea of the age structure of the population for other years, 15 percent turns out to be a reasonable assumption. The relevant share of the population for Russia was possibly closer to 20 percent, which implies that the reported enrollments in Tables 1 and 2 may be slight overstatements. However, we feel that the *within*-country variation in enrollments is not affected by the choice of denominator, and Russia still emerges with high schooling outcomes if 20 percent is employed. "Primary students" refers to students in surveyed institutions of basic or elementary education below secondary schools. The original data gatherers may have missed some informal schools and private academies, but we are confident that our measures are improvements on the existing literature.

$1,387 for Japan, the 'poorest' country in our comparison set. But income alone cannot account for the vast differences in educational performance. Hungary's GDP per capita is 1.4 times higher than Russia, but primary school enrollment rates are 4.3 times higher. The differences are even more striking for Asia. Japanese GDP per capita is 2 and 2.5 times higher than India and China, but Japanese enrollment rates are 5.7 and 12.7 times higher, respectively. While we may not expect a one for one relationship between GDP and enrollment, these patterns are very stark.

Spending on education may not adequately reflect actual investments in human capital in modern developed economies, where the quality of inputs may have a larger marginal impact than greater quantities (Hanushek and Wossman, 2007). But for most of the world before World War I, the level of expenditures on primary education may be more revealing because basic access to schooling was limited. When we look at primary school expenditures per school age population, we see similar patterns as with the enrollment rates. BRICs averaged less than a $1 on school age children compared to $20 in England (21 times higher) and $2 in Japan and Mexico.[6] Russia is the leader among BRICs, spending over $1.50 per student, while the other BRICS spent less than $0.20 per student. Income differences can partially account for these differences, but they are not the whole story. Comparisons of expenditures per enrolled student offer another explanation related to the political economy of schooling.

Unlike expenditures per school age children and enrollment rates, primary school expenditures per student are relatively high for BRICs. On average, BRIC countries spend $3.5 per enrolled student, higher than Spain ($2.5) and Japan ($2.85). While BRIC countries enrolled less than 1 in 5 children of primary school age, the enrolled students enjoyed relatively high expenditures. The implication is that for BRIC, the education systems were biased towards the

[6] These expenditure numbers are in 1910 dollars. The BRIC values are population-weighted means. We note that some of these numbers – for BRICs and elsewhere – may not include all spending by lower levels of government.

relatively small share of the population that could easily afford to enroll their children in primary schools. Lindert (2003, 2004) describes such educational systems as elitist.[7]

Although informative, the comparative data in Table 1 just confirms established facts about cross-country educational development (for example, Lindert 2004). Primary school enrollment rates are correlated with GDP per capita, and educational systems tend to cater to elites in less politically open societies. But our main contribution in this section is to show the enormous variation in educational outcomes (enrollments) and inputs (expenditures) *within* BRIC.[8] Table 2 reports primary school enrollment rates circa 1910 by region or province, which highlights the wide variation among provinces in these countries. The provinces in Brazil and India with low levels of enrollment had comparable enrollment to the typical province in China. Yet provinces with above average enrollment in Brazil or India look more like Russia, which had a higher GDP per capita. China has the greatest inequality in enrollment rates within BRIC countries, followed by Brazil and India, and then Russia. It is worth noting that these numbers are themselves averages over very large regions – in the Russian case, individual provinces had enrollment rates as low as 15 percent (Ufa) and as high as 58 percent (Petersburg).

The substantial heterogeneity is also on display in Table 3, which shows the variation in elementary expenditures per children of school age within BRIC. In the richer regions of Russia, such as the Baltic and Capital (Moscow and Petersburg) provinces, spending was almost double

[7] As the vast majority of primary schools in BRIC possessed a single classroom, small BRIC school sizes as defined by total enrollment per total teachers – compared favorably to the rest of the world, although one must be cautious in drawing strong conclusions from such an indicator. For one thing, such a measure says nothing about the quality of instruction. Moreover, because we are measuring school size with students per teacher, we may be missing the emergence of a small number of graded schools in BRIC. Recent work by McKinnon and Minns (2009) has shown that the shift to multi-grade schools in British Columbia led to substantial improvements in educational outcomes in the early 20th century. At minimum, the relatively low student-teacher ratios in BRIC do suggest that the small number of students who did manage to attend school received somewhat more face time with teachers than in other societies.

[8] The sources of the regional numbers that follow are noted in the notes accompanying the Tables. For more detail on the underlying sources for India, Brazil, and Russia, see Chaudhary (2009), Martinez et al. (2010), and Nafziger (2010b), respectively.

the level in the less developed interior regions. In Brazil the variation was such that in rich states like São Paulo the level of expenditures per children was higher than in any province or region in Russia.[9] Yet the poorest provinces in Brazil had expenditures of less than 30 cents per children. The patterns are similar for China and India. Less developed parts of British India such as United Provinces were spending less than 10 cents of a dollar per child compared to 43 cents in Bombay. The variation is largest for China with Henan province spending 7 cents per children compared to $1.36 in Liaoning province.[10]

The within-country correlations suggest that income levels were key determinants of primary schooling in BRIC. The educational systems that developed by 1910, however, were also the outcomes of other institutional, demographic, and historical factors that varied significantly between and within BRICs. Economic historians and other scholars of the economics of education have pointed to several critical elements that allowed a few societies to achieve universal primary schooling by the early 20th century. Lindert (2004), Gallego (2010), and others argue that the rise of mass democracy, coupled with the decentralization of education policy and fiscal decisions to local authorities, allowed a number of countries to finance the expansion of primary schooling. Policies that endowed a larger percentage of citizens with political voice and a direct say in local public finances allowed communities to channel property taxes and other revenues towards the provision of public schooling, while overcoming elite objections and underlying collective action problems in the process.

Such political structures are especially successful at expanding schooling when the

[9] Note that while these expenditures are in comparable 1910 dollars, they do not take into account differences (across or even within countries) in the relative costs of educational inputs such as school buildings, instructional supplies, and teacher salaries. Incorporating such differences into cross-country comparisons is an important topic for future research.

[10] There are likely some data quality problems for China in 1912, although scholars do emphasize the continuity of bureaucracies between the Qing and Republican eras.

population with political voice was relatively homogeneous in terms of wealth and culture.[11] But when political institutions are relatively weak or inaccessible to most of the population, ethnic and cultural heterogeneity may inhibit collective decision-making over education policies, thereby allowing for elite capture of the process.[12] In such cases, elites might actively seek to exclude the masses from politics, or may neglect tax-supported public investments in schooling in lieu of private education (De La Croix and Doepke, 2009; Sokoloff and Zolt, 2007; and Lindert, 2003 and 2004). Finally, several scholars have noted that political structures (suffrage rules, elections, legislative bodies, etc.) and population and/or wealth inequality may be joint consequences of the way a society was settled, whether it did or did not have coercive or discriminatory institutions such as slavery, and the initial allocation of productive resources (Engerman and Sokoloff, 2002 and 2005; Iyer, 2010; and Martinez-Fritscher et al., 2010). Thus, the systems of primary schooling that evolved in different societies by the early 20th century often had deep historical roots.

We find that much of the differences in primary school expenditures across *and* within BRIC may be explained by these factors: population heterogeneity, institutional legacies, and, especially, political characteristics. The interaction between these characteristics and economic conditions dictated the amount of public resources available for education at different levels of government. In Brazil and Russia, state and local governments with fairly well specified fiscal

[11] Goldin and Katz (2008, Chp. 4), Engerman and Sokoloff (2002), and Go and Lindert (2010) note that the relative homogeneity (at least at the community level), low inequality, and early expansion of (male) suffrage in the United States created conditions that were especially conducive to locally financed public education. In contrast, societies such as colonial India, the U.S. South, or even Britain before 1870 were less democratic and less decentralized when it came to decisions over schooling (Margo, 1990; Naidu, 2010; Mitch, 2007; and Chaudhary, 2009 and 2010).

[12] A number of recent papers find links between ethnic heterogeneity and limited investments in public goods and services. For an example from modern Kenya, see Miguel and Gugerty (2005). Religion may also play a more direct role in terms of preferences for particular types of education or for investments in private relative to publically funded schools. Authors such as Melton (1988) and Becker and Wossman (2009) have pointed out the connection between Protestantism and the uneven expansion of primary education in Prussia and Germany over the 18th and 19th centuries. For discussions of the role that religious preferences over schooling played in the United States and British India, see Goldin and Katz (2008) and Chaudhary (2009).

powers were in charge of organizing and paying for education. The institutions of government – at least in parts of these countries – relied on locally generated tax revenues and allowed a relatively large portion of the population some political voice. In contrast, the Chinese system was decentralized under a weak central state and depended heavily on elite and community contributions because provincial and local government authorities simply did not have the public resources (i.e. tax revenues) to pay for mass education. In India, public funds were allocated from the center to provinces and districts, but decisions over how much to spend on education often remained in the hands of a small, caste-based elite. Primary schools in many districts remained privately funded as the few funds that were sent by the center were often siphoned away from the public provision of primary education.

3. Cases Studies of Primary Education in Brazil, Russia, India, and China

In this section, we present case studies for each country, in which we show that the variation in economic and political conditions *within* BRIC is larger than typically assumed in current cross-country models of the expansion of primary schooling, and that the factors described above account for a large part of the differences in education expenditures and outcomes across regions. Each case study makes two modest contributions. First, we note the geographic and economic variation within countries that may explain – in semi-exogenous ways – why some provinces or regions spent more or less on basic education. Second, we describe how heterogeneity in the political economy of education – the extent of the franchise, the nature of local political institutions, and the share of power held by local elites – in each of the countries was linked to variance in education expenditures and outcomes within countries.

3.1 Brazil

Brazil was a laggard in the provision of education even when compared to other poor Latin American countries.[13] In 1890, only 15 percent of the population of Brazil was literate. This placed Brazil as the country with the lowest literacy rate among the large economies in the Americas. This level of education, for example, looked dismal compared to literacy rates in Argentina, Chile, Colombia, Jamaica, or Uruguay, which circa 1890 had literacy rates between 30 and 50 percent (Engerman, Mariscal and Sokoloff, 2009; Engerman and Sokoloff, 2002). In fact, Brazil's literacy rate in 1890 was closer to that of Guatemala (11.3 percent) and Honduras (15.3 percent). Yet, between 1890 and 1940 Brazil had the most rapid increase in literacy in the Americas; the country caught up and even surpassed some of its more educated peers (e.g., Mexico, Colombia, and Venezuela). The increase in literacy was also accompanied by a brisk increase in the number of public schools, enrollment, and the number of teachers. This rapid expansion in the provision of public education is quite puzzling because it took place despite the fact that the 1891 Constitution introduced a literacy requirement to vote. Following Martinez-Fritscher, et al. (2010), we argue that temporal variation in electoral rules, which altered the extent of political participation, and fiscal decentralization of export tax revenues can explain a significant portion of the improvement in education and the variation in educational outcomes within Brazil.

The 1880s was an important breakpoint in electoral rules. Between the 1820s and the 1880s Brazil was a constitutional monarchy with a handpicked senate, and elected congressmen and municipal governments. Before 1881 national elections were indirect, that is, electoral colleges at the state level selected who would join the lower house. Moreover, the franchise was limited because there was an income requirement to vote (there was a lenient literacy

[13] See the evidence presented in Lindert (2004 and 2010) and Frankema (2010).

requirement as well). In 1881, a liberal minister passed a law eliminating electoral colleges, introduced secret ballots and direct elections for all electoral posts (except senate seats). Then, between 1889 and 1890, a Republican movement overthrew the monarchy and made further reforms, introducing direct elections for the president and governors, and eliminating the income requirement to vote but substituting it with a literacy requirement. After 1889, voters had to write their names and dates to get a voter registry card. The first elections in 1890 were for representatives to a new Constitutional Congress, who in 1891 drafted a federalist constitution that dramatically changed the relationship between central and local governments.

The decentralization of public finances occurred after 1891. Before the Constitution of 1891, the federal government collected the majority of taxes (mostly from exports and imports) and spent most of the total budget in the capital or on defense (Villela 2007). The 1891 Constitution gave states the sole right to tax exports, property, industries and professions, land transfers, and other transactions. Just the transfer of the right to tax exports from the central government to the states significantly increased tax revenues at the state level (Martinez-Fritscher 2009). Furthermore, articles 55 and 56 of the Constitution also gave autonomy to municipalities to organize public finances, collect taxes, and spend on schools if they wished to do so.

Following the Constitution of 1824, state governments were in charge of providing elementary education. But public elementary schools before 1891 were completely dependent on transfers from the central government to the states, and such transfers were not large. Therefore, the overall level of expenditures per school-age child (less than 30 cents) and enrollment rates (approx. 12 percent of children of school age) were extremely low in 1910, even compared to other BRICs. At that time, there was also wide disparity in funding per student, enrollment, and

literacy across states. Literacy rates fluctuated from 11 percent in states like Ceará and Paraíba to 25 percent in the state of Rio de Janeiro or 36 percent in the capital of the country, the City of Rio de Janeiro.

This variation in education outcomes across states in 1910 was correlated with the fiscal resources available to each state during the Republic (1889-1930), which, in turn, were closely tied to the export tax revenues each state could collect. Following fiscal decentralization, the elementary school system in Brazil improved steadily over the four decades of the Republic (1889-1930) as states used their new fiscal authority to increase education funding. Literacy went up from less than 20 percent to 40 percent, and enrollment rates went from 12 percent to 23 percent by 1930.[14]

Despite the progress during the Republican period, the decentralization of public finance in Brazil after 1891 was a double-edged sword. On the one hand, the Constitution of 1891 gave states the right to tax exports and, thus, increased the availability of funds to pay for education. On the other hand, having the capacity to tax exports disproportionately benefited the states that had rapidly growing commodity exports, but did not necessarily improve the tax collection of states with commodities that were faring poorly. The evidence we have shows that there was a significant increase in expenditures in elementary education per child between the 1870s and 1911-15. Yet, the increase was starker in states that exported certain high-demand commodities such as rubber, coffee, mate tea, and cattle. In contrast, states exporting sugar and cotton saw the lowest increases and Bahia, a large state that exported tobacco (as well as sugar and cacao), ended up spending less on education over the same period. States that spent more per school-age

[14] There were some efforts at improving the quality of education prior to these changes in fiscal federalism. The Ministry of the Interior pushed for a shift away from the Lancaster system of education and improvements in the quality of teacher preparation. However, the limited resources invested in these efforts limited their effects.

child had larger export tax revenue per capita, on average. The export tax revenues, in turn were determined by the export mix of each state and by international price movements. Thus, part of the heterogeneity in education expenditures and enrollment rates can be related to the way in which states revenues were affected by price movements in their main exports (Martinez-Fritscher, Musacchio, and Viarengo, 2010).[15]

The heterogeneity in expenditures among Brazilian states is striking when compared to expenditures per children within other BRIC countries. While part of the variation in expenditures comes from the fact that there was significant variance in export tax revenues, another part of the variation comes from the demand for education. Following, Lindert (2003, 2004) one would expect that states with a larger number of voters to total population—his measure of political voice—should have higher education expenditures. As expected, the change in the number of voters is highly correlated with the level of expenditures suggesting an increase in voters may have lead to a higher demand for education (Martinez-Fritscher, Musacchio, and Viarengo, 2010).

Even if there was a literacy requirement to vote in Brazil, politicians at the state level had incentives to spend on education. These incentives did not necessarily come from growing demand for skilled labor, because Brazilian industrialization did not occur with technology that was especially skill complementary (Goldin and Katz, 1998). We argue that in order to increase the number of voters state parties could mobilize in national elections, local (state and municipal) politicians spent on education to expand the number of mostly white literate males who could

[15] We also note the significant variation in enrollment and education expenditures at the municipal level. Some states such as Pernambuco, Goias, Pará, and Espírito Santo had almost 30 percent of their enrolled students in municipal schools. This is because in some states municipalities organized and collected taxes on property, land transactions, and industries, to spend on municipal schools. In fact, municipal enrollments were 20 percent of the total in Brazil in 1907. For a discussion of municipality expenditures on primary education in the state of São Paulo, see de Carvalho, et al., (2010). They attribute variation in municipal support for schooling to heterogeneity in the location of immigrants (a demand-side factor) and of coffee production, which provided tax revenues. While we focus on the state-federal relationship, our analysis is consistent with their findings.

vote. The incentive to do this emerged because the federal executive and the ruling coalition in Congress during the Republic were under the control of the Republican parties of the states of São Paulo and Minas Gerais. Dominant parties in other states usually used their capacity to mobilize voters in presidential elections as a bargaining chip with this dominant coalition in the federal government. In exchange they got some subsidies, less political or military intervention, and, more importantly, support during elections against opposition parties in the state. Since Congress scrutinized elections and electoral disputes it was easy for the ruling coalition to disqualify unwanted opposition in state elections, a practice commonly known as "beheading."

In sum, the Brazilian case illustrates three main points. First, it confirms the significant variation in expenditures and outcomes similar to the other BRIC countries. Second, this variation can be explained by economic factors, such as endowments and the international demand for commodities in the case of Brazil. Third, governments in Brazilian states that experienced a larger increase in the number of voters ended up spending more on education. That is, even if elites in Brazil controlled how much was spent on education, we find the decentralization of finance and the increase in political voice significantly improved education outcomes between 1889 and 1930. Yet, these improvements were not sufficient to close the human capital gap between Brazil and countries with comparable GDP per capita, and they accentuated regional differences in enrollments and literacy. Thus, the origin of some of Brazil's regional inequality in the accumulation of human capital can perhaps be traced to the late 19th and early 20th century.

3.2 Russia

Between serf emancipation in 1861 and the Bolshevik Revolution of 1917, the share of the school-age population enrolled in formally recognized primary institutions in European

Russia rose from less than 5 percent to just over 30 percent (Nafziger 2010b). To some extent, this came at the expense of informal and unregulated schools that catered to a significant but unknown number of children, especially among ethnic and religious minorities. Literacy rates did slowly increase, but by World War I, just slightly more than 40 percent of the population older than 9 years old could read.[16] This record placed Russia near the bottom of the European nations, with schooling outcomes that looked much more like those in the other BRICs than in the West. Influential contemporary writers such as Ianzhul et al. (1896) noted that improvements in primary education were necessary for better industrial competitiveness, the adoption of modern agricultural technologies, and a well-functioning civil society.

The primary explanation for the low provision of basic schooling is that Tsarist Russia was among the least developed economies in Europe, and both private and public funding for education were limited as a result. Per capita income levels in the countryside or among the urban working classes were quite low, while the corresponding demand for skilled labor and the returns to education were likely small (Table 1).[17] And until the last decades of the period, the central government, primarily through the Ministry of Education (the MNP) and the state-sponsored Orthodox leadership (the Holy Synod), provided only limited funding for primary schooling. The Tsarist regime allocated significantly more support to secondary and tertiary education than to basic primary education. There is little evidence to suggest that this was in response to especially high returns. Rather, this was consistent with elite capture of the central budgeting process.

In 1861, neither central nor local state authorities in Russia expended much public attention or money on education. Privately funded schools catered to the landed and urban elites,

[16] This refers to literacy in Russian or related languages (e.g. Ukrainian). On literacy, see Mironov (1991).
[17] Tables 2 and 3 show that the richer Baltic, Capital, Central Industrial, and "New" Russian provinces exhibited higher expenditures per school-age child and greater enrollment rates.

while only a small number of villages and towns (and even fewer serf owners) supported primary schools out of their own resources. In 1864, the state established an administrative structure for oversight of the Empire's schools under the MNP, but this reform did not entail the release of any new resources from the center, nor did it extend to the thousands of schools under the supervision of the Holy Synod.[18]

Over the ensuing fifty years, a back-and-forth would emerge between the MNP, the Holy Synod, and local actors over control of primary education. The MNP slowly expanded control over curriculum and teaching personnel until the early 1880s, when the emergence of Konstantin Pobedonostsev as Over-Procurator of the Holy Synod led to a shift towards parochial control of all types of local schools during the last years of Alexander III's reign. Emphasis was placed on Orthodox instruction in the classroom, and it was during this period that the parochial system took over many of the remaining informal peasant literacy schools (*shkoly gramotnye*).[19] But following the death of Alexander III and the downfall of Pobedonostsev, the MNP responded to the growing awareness of Russia's poor educational record by expanding its school inspection system and increasing its involvement in local educational affairs.[20] With the Educational Statute of 1908, the MNP formally took over the management of all primary schools in the Empire as it pushed for universal enrollment. This trend towards centralization of administration was accompanied by a sharp increase in central funding to subsidize local efforts at building and

[18] The 1864 Reform granted the right to open primary schools to five ministries (MNP, Internal Affairs, State Domains, Mining, and the Court), to the Holy Synod, and to private citizens, and to towns and rural communities (formally denoted as rural societies, or *sel'skie obshchestva*). Formally, these different entities were supposed to submit school proposals for approval by newly created district school councils. Korf (1871) provides an example of a *prigovor*, or communal agreement between a village and the local school district to sponsor a school that outlines how instruction and the school building were to be financed.

[19] Throughout the post-reform period, religious instruction remained a core component in the curriculum of almost every primary school. "Law of God" (*Zakony Boga*) courses were typically taught by local priests, regardless of who financed or administered the school. Schools in the Holy Synod's system generally had all instruction provided by the local priest and were financed by local (community) resources.

[20] A variety of private and non-Orthodox religious schools continued to exist outside this administrative structure, but by World War I the Ministry headed a school system that included most primary schools. See Eklof (1986), Sinel (1972), and Sorenson (1992).

maintaining schools. This push brought total central government spending on primary education from less than 0.6 percent of the state's budget in 1902 to just over 2.2 percent in 1913 (Hans, 1964, Tables 1 and 2). This is a small increase when compared to the United Kingdom, where central government spending on human capital investments accounted for 16.1 percent of total expenditures in 1910-12 (Davis and Huttenback, 1986). But it is large in comparison to the other BRICs at this time.

Hence, prior to the mid-1890s, funding for Russian primary schools was primarily the responsibility of local communities and sub-provincial governments. For many "public" schools, a village or town assessed its own citizens to fund the construction or rental of a building and to pay someone to provide instruction. Such arrangements often suffer from significant collective action problems, including intra-community conflicts between groups (ethnic, religious, wealth, generational, etc.) that hold different preferences over the level of school provision. Township-level units of peasant self-government (*volosti*) also contributed to primary school funding in some areas, although their contributions were less than direct expenditures by communities.[21] While finance was often locally provided, central authorities frequently intervened in education policies. For parochial schools, Church officials set down rules for how local priests were to manage their schools. For schools under the oversight of the Ministry of Education, district-level (*uezd*) school committees made many policy decisions, including teacher hiring and curriculum choices. In both cases, the administrative overseers of primary education were often distant from the communities or other local institutions that paid the bills. This conflict made it difficult to coordinate plans for large-scale school building before the late 1890s.

[21] While initiative for the school often came from the village itself, township authorities frequently stepped in to fund the initial outlays out of their own tax collections. According to data on local government expenditures in 1905, rural societies in European Russia spent about two times as much as township governments did on education (4 million vs. 2 million rubles – see Russia. Statisticheskoe, *Mirskie*, 1909).

Moreover, there was considerable heterogeneity in the political relationship between local communities and external (district, provincial, or even central) governments.[22] This is particularly evident when one compares regions with and without newly created, all-class institutions of self-government known as *zemstvo*. A reform of 1864 established district and provincial-level *zemstvo* in 34 of the 50 provinces of European Russia, a region that included most of the Russian heartland. Members of *zemstvo* assemblies were elected by different groups of property owners: private rural property owners, owners of urban property, and peasant communes. These new bodies were granted the power to levy property taxes and were explicitly called on to engage in programs encouraging local economic development, a calling that quickly came to include education.

District *zemstvo* became significant sources of financing for primary school construction and the hiring of teachers.[23] As early as 1879, over 40 percent of funds allocated to rural primary education in European Russia came from *zemstvo* budgets.[24] By 1894, this share had reached 54 percent. The majority of these funds came from property taxes, which were assessed (and infrequently re-assessed) on "immovable property" in the district by special commissions of *zemstvo* assemblymen. The resulting expenditures on primary education occasionally took the form of loans to communities; but, more often, spending involved grants and the direct hiring of teachers as *zemstvo* employees. Over the period, *zemstvo* funds came to supplant financing from rural communities, even for schools in the Church system. Between 1880 and 1894, the share of

[22] While the focus here is on the *zemstvo*, the interaction between communal villages, township authorities, and district and provincial administrators varied substantially across European Russia. In the Baltics, all education finance came from township governments. And although the central government made various efforts to establish officially sanctioned Jewish primary schools, many communities in the Pale of Settlement and elsewhere continued to rely on informal academies.

[23] By 1905, provincial and district *zemstvo* (in only 34 of the 50 provinces) were spending approximately 25 million rubles on education, or about 4 times the expenditures of all townships and rural societies together (Russia. Statisticheskoe, *Dokhody*, 1909). Provincial *zemstvo* were comprised of representatives from the district *zemstvo*. The former tended to allocate funding towards secondary and even tertiary education.

[24] These and other numbers on rural primary school expenditures are taken from Nafziger (2010b).

total expenditures on rural primary schools (in European Russia) undertaken by village communities – either directly or through the local Orthodox parish – fell from 36 to 18 percent. In provinces that did not possess *zemstvo* – primarily western Ukrainian and Belorussian ones – village (and township) and town governments continued to hold almost all responsibility for school funding. In these provinces, not only was spending on primary education per capita less (about 10 percent lower in 1911), but enrollment and growth in the number of formal schools per 1000 people was also lower.[25] Moreover, those districts where the *zemstvo* assemblies included relatively more representatives from peasant communities exhibited greater spending on education.[26] Thus, it appears the installation of this particular local political institution led to an increased provision of formal primary schooling, especially when greater voice was explicitly granted to the peasant majority.

How does the Russian experience fit into a comparative history of primary schooling? The financing of Russian primary education was initially quite decentralized, although many curriculum and administrative decisions were subject to intervention by officials of the Church or central ministries. The establishment of the *zemstvo* tightened the link between local taxable wealth and the financing of public schools while also providing the peasant majority with a forum to express their demands for schooling. While this led to some catch-up growth in schooling in the *zemstvo* provinces, the political economy of Russian primary education did not overcome a number of fundamental limitations. Among these were low income, which restricted both public and private funding for education, the poor educational legacy of serfdom (at times it had been illegal to educate serfs), and the population heterogeneity of certain parts of the

[25] In 1911, enrollment rates (out of the school age population) were 3.5 percent higher (32.9 versus 29.4) in *zemstvo* provinces. Between 1860 and 1911, the annualized rate of growth in the number of formal schools was 6.5 percent in non-*zemstvo* and 7.5 percent in *zemstvo* provinces. See Nafziger (2010b)

[26] See Nafziger (2010a and 2010b), which provide econometric support for the connection between peasant involvement in the *zemstvo* and greater spending on education.

Empire. European Russia was over 90 percent Orthodox and 85 percent Russian (or Ukrainian) speaking, but in peripheral areas where the *zemstvo* did not exist to offer a forum for proposing local public expenditures, the greater heterogeneity of the population limited the development of *formal* schooling. Communities in these areas were often unwilling to give up control of their schools to the Ministry of Education or Orthodox Church and continued to maintain informal schools (likely of poor quality) as a result.[27]

More fundamentally, the various local institutions involved in school finance – *zemstvo*, townships, rural societies, MNP district committees, etc. – were frequently subject to influence and capture by elites who did not wish to impose high assessments on themselves to fund mass education. Prior to the late 1890s, the central government did little to overcome this (or other) key limitation on the supply of basic schooling. In the early 1860s, roughly 33,500 urban and rural primary schools catered to slightly more than 830,000 students in European Russia.[28] The following half-century did see slow growth in the number of schools and enrollment rates, particularly in areas where peasants played a more direct role in local politics and public finance. Although local economic factors, population heterogeneity, and political structures help explain the variation in Tables 2 and 3, the relative success of Russia among BRIC likely stems from the increased financial involvement of the central government after the mid-1890s. Intriguingly, the timing of this acceleration of central government spending – especially under the Education Act of 1908 that called for universal enrollment - may be related to the advent of a limited form of

[27] This was especially true among Jewish and Muslim communities, which preferred to maintain informal schools rather than give up any authority over education. By 1894, there were still 16779 literacy schools, 5949 Jewish kheders, and 11589 Islamic madrases in the Empire. Comparing the 1894 and 1911 data for peripheral provinces in European Russia suggests that despite aggressive efforts by the MNP, many informal religious schools remained outside the formal administration system in 1911.

[28] The data for 1865 likely include many schools that only existed on paper. This was certainly the case for parochial schools, as the Holy Synod reported roughly 20,872 school with over 405,000 students in 1865 (*Nachal'nyia*, 1865). If these numbers are compared to those available for 1851, then the supply of parish schools increased by almost 300 percent in 14 years.

national elections (the Duma) following in the revolution of 1905. But despite these developments, primary education in Russia compared unfavorably with other parts of Europe by World War I.[29]

3.3 India

By the early 20th century, India had made limited progress in increasing mass primary education. Crude literacy rates were under 10 percent and just over 1 in 10 children of school age was enrolled in any primary school. Among BRIC, only China had worse educational outcomes. A relatively low level of GDP per capita probably constrained the amount of public and private funds available for education, but low income cannot completely explain the low spending. Public educational spending in areas under direct colonial control (British India, which accounted for almost two thirds of the Indian subcontinent) was among the lowest in the world, even lower than neighboring Indian 'Princely States' under indirect colonial control (Davis and Huttenback, 1986). The Princely States were local kingdoms of varying size ruled by individual kinds that maintained their autonomy in local affairs while deferring to colonial authority in matters of defense and foreign policy. The following discussion focuses on the constraints in British India.[30]

British officials were cognizant of the problem of the low provision of schooling. Official acts and reports often bemoaned the low levels of spending, but the goal of extending mass education was never seriously promoted for most of the colonial period (Nurullah and Naik,

[29] Even if all schools (urban and rural) are considered in 1911, the density was only 0.67 per 1000 people. Chaudhary (2009) finds that the density in 1911 was roughly 0.5 for public schools and practically the same as European Russia for all schools (roughly 0.65).

[30] While constraining factors such as social heterogeneity and low income probably operated in Princely States too, we focus on British India because it is a single administrative unit with the same institutional organization. In comparison, there is significant heterogeneity among the numerous Princely States in both the set up of educational systems and educational outcomes although recent work suggests educational outcomes on average were higher in the Princely States compared to British India (Iyer, 2010).

1951; Chaudhary, 2009). As a dependent colony, any potential benefit of educating a large share of the population was outweighed by both the monetary costs (additional taxes to fund public education) and the non-monetary costs (the potentially destabilizing effects of a more educated populace). The first big increase in public spending happened after the 1919 Montague-Chelmsford reforms, which allowed elected Indians to serve on provincial legislatures even though the franchise was limited to a very small share of the population. The second big push came before Indian Independence with the Government of India Act of 1935, which further extended elected Indian representation. Public spending on education was thus positively correlated with the increased political representation of Indians in provincial legislatures over the first half of the 20th century.

On account of the meager public funds, the colonial government actively encouraged private participation. Government funded schools managed by provincial governments and local boards (rural and urban) functioned alongside privately managed aided (receiving some public funds) and unaided schools. Beginning in the early 1880s, the provision of primary education was decentralized to rural and urban local boards, although they received important grants from provincial governments. The boards managed some schools in addition to providing grants to private aided schools. In general, there was significant heterogeneity across provinces in school systems, grant rules and subsidy amounts. Even though public revenues funded local boards, upper caste Indian elites were disproportionately represented on the local boards and in principle could influence public allocation decisions to some extent. However, the boards had no power of taxation. They received a fixed pot of money partially based on the land taxes collected in their district and, they allocated the money between primary education, local infrastructure and medical services.

Within this institutional framework, colonial policies had a marked influence on regional public spending patterns, which exacerbated pre-existing economic differences between provinces. Both enrollment and literacy rates were twice as high in the coastal provinces of Bengal, Bombay and Madras (7.1 percent literacy in 1911) compared to the interior provinces of Central Provinces and United Provinces (3.5 percent in 1911). The coastal provinces had big urban cities with larger bureaucracies such as Bombay and Calcutta that offered more opportunities for educated workers. This likely increased the private demand for education and led to subsequent improvement in outcomes. Nonetheless there were regional differences even among the coastal provinces. From 1881 to1931, Bombay led the way in public education expenditures and in developing a large network of public schools. But, public spending in Bengal, Bihar and Orissa lagged behind both Bombay and Madras.

A large share of the difference in education expenditures was due to heterogeneity of land tax revenues. Bombay and Madras had higher land revenues on average, and hence, they had more public money available to spend on education (and other local services) when compared to Bengal, where land revenues were lower on account of the Permanent Settlement. The Settlement was a contract between the English East India Company and the landlords of Bengal and Bihar whereby the revenue demand on land (land tax) was fixed in cash for perpetuity in 1793. In comparison, Temporary Settlement areas such as Bombay and Madras were assessed land taxes at higher rates that were periodically adjusted to account for changes in price levels and productivity. Public education spending, thus, varied with the land tax regime and jointly influenced the development of schooling along with private spending on education. A rough calculation suggests land revenues could explain approximately 32 percent of the variation in total spending on education (Chaudhary 2010).

Although public revenues were lower in Bengal, private revenues (such as school fees and endowments) partially compensated for the difference and were a larger share of total spending (40 percent in Bengal versus 20 percent in Bombay). Both public and private schools commonly charged fees in this period. But, the heavy emphasis on private revenues in Bengal is also evident in the patterns on primary school fees, which were higher than in Bombay (Rs. 2.4 per-pupil and Rs. 0.7 respectively in public schools in 1901-02). Bombay used relatively higher public revenues to construct new public schools charging lower fees, while Bengal developed a system of private schools and high fees. Because of the importance of private funding, Bengali elites were also perhaps more influential in reducing public spending on primary education. Only 16 percent of public funds from land taxes and other public revenues were directed to primary education in Bengal compared to 51 percent in Bombay. Although literacy rates were similar between the two provinces in the colonial period, marked differences developed after independence that may have historical roots relating to the land tax regimes. Thus, colonial policies helped determine national spending per capita, as well as the regional variation in public spending on primary education.

While colonial rule probably constrained the development of primary education and created strong interregional disparities in spending, this does not necessarily imply that India would have enjoyed better outcomes as an independent state. Indian elites, the chief beneficiaries of English education under the colonial system, were equally complicit in blocking the extension of primary education to the rural masses. Members of the upper castes and landed elites actively lobbied the Government of India against spending on vernacular primary education (Mukhopadhyay, 1984). The initial emphasis on English medium secondary education was due to colonial policies adopted following Macaulay's infamous 1835 minute that made the case for

western English education in India. Although subsequent colonial policies tried to shift the focus towards vernacular primary education, educated upper caste Indians actively embraced English medium instruction and became the chief promoters of secondary education.

The influence of elites is also visible in the provision of private aided schools that received public subsidies. Despite the public subsidy, the Government had limited control over these schools because private individuals pooled the necessary resources, set up the school, applied for a grant, and managed the school. Chaudhary (2009) finds that characteristics of the local elite strongly influenced the provision of the different types of primary schools. Brahmans and other educated upper castes successfully directed private and to a smaller extent public resources toward establishing secondary schools for their children. Districts with a larger share of Brahmans, the traditional elite caste of Hindus, had more public and private secondary schools plus a smaller ratio of primary to secondary schools.

Primary education was further constrained by the hierarchical divisions among Hindu castes and the presence of so many different castes and religions. Districts with higher levels of caste and religious diversity had fewer private aided and unaided primary schools as well as a smaller ratio of primary to secondary private schools. The presence of different religions with heterogeneous preferences compounded the situation. For example, Muslims in heavily Muslim dominant districts had worse literacy outcomes because the Muslim religious schools were less effective at the margin at developing literacy skills compared to secular colonial schools (Chaudhary and Rubin, 2010).

The Indian case, thus, highlights the challenges of delivering primary education in diverse societies where different groups have different preferences for schools, and elites exercise undue political influence. Colonial rule did not create these divisions, but colonial

policies did not ameliorate the situation. Public spending was too low and susceptible to elite capture at the local level. Only landed and educated elites were represented on local district councils. In Bengal for example, Brahmans and other higher castes together comprised over 80 percent of lawyers and almost 75 percent of landowners, the two most common occupations of district council members. Lower castes and marginalized groups like the aboriginal tribes were politically unrepresented on the councils and hence had limited political voice to influence public allocation decisions.

India's experience both parallels and contrasts with the other BRIC countries. Similar to China, there were big differences in spending and enrollment between the coastal and interior provinces. However, the size of the colonial bureaucracy and potential for educated employment were perhaps more important in accounting for these differences than income and development—urbanization rates between the coastal and interior provinces were similar. Like Brazil, the extent of political participation did influence public spending. At the national level, higher spending on education followed greater Indian representation in colonial legislatures. Nonetheless, colonial policies and the associated fiscal system were the primary drivers of inter-regional differences. And similar to Russia, the decentralization of primary education to local district councils made the distribution of public funds a function of local preferences. The difference is that in India these preferences were highly influenced by the level of caste and religious heterogeneity and the presence of socio-economic elites such as the upper castes.

3.4 China

China experienced a structural break in education in 1905. Before that, the primary education system was based upon Confucian classics and aimed at success in the Imperial Civil

Service Exam (ICSE).[31] The rewards to high achievement on this exam did generate considerable demand for privately provided traditional schooling (*sishu*) throughout the country. But these schools often catered to the children of community elites, and county quotas on the number of passing exam grades capped the returns to such human capital investment.[32] Although estimates suggest that as many as 40 percent of males attended *sishu* for at least a few years, many students achieved only limited literacy and gained few applied skills (Borthwick, 1983).

Growing openness and industrialization in the late nineteenth century generated demand for modern education, particularly in science, technology, and other applied topics (Yan, 2008). Although attempts to build modern schools started in some coastal cities as early as the 1860s, the abolishment of the ICSE in the final decade of the Qing dynasty marked the beginning of a nationwide remodeling of the education system. A Ministry of Education was established in 1905, and Offices of Provincial Education were founded in many provinces (along with similar county level institutions known as "Education Exhorting Offices" – see Abe, 1987). Between 1905 and 1907, the Ministry of Education called on community, county, and provincial officials to enact compulsory primary schooling in modern institutions, but neither central nor provincial authorities allocated significant funds towards this goal. According to data gathered by Thøgersen (2005), less than one percent of public primary school funding in three counties of Shadong province in 1908 came from extra-county government sources.

Despite the absence of central sources of school funding (as in Russia before the late

[31] The ICSE became the main avenue to wealth and power in late imperial China. In the words of Ping-ti Ho's, the exam was "the ladder to success" (1955), while a Chinese proverb called it "the gate that fishes jump through and become dragons."

[32] In the traditional education system, the initial stages in training and preparing a son for the civil service was the private responsibility of families seeking to attain or maintain elite status as "official" families. Clans and families had, whenever possible, mobilized their financial and cultural resources to provide young boys with the tools of classical literacy. The government, central or local, maintained a hands-off approach towards funding primary education.

1890s), the administrative reforms of the late Qing did enable some growth in the provision of public primary schooling. By 1909, roughly 51,700 modern schools catered to over 1.5 million students (Abe, 1987). These totals likely miss many unofficial village schools that also employed new curriculum and teaching methods. The emergence of this modern primary school system was financed by a combination of county and sub-county tax receipts, the reallocation of endowments from traditional schools, and private contributions (Thøgersen, 2005; and VanderVen, 2005). Authors such as Duara (1987) have argued that the last decades of the Qing saw increased rent-seeking by local elites and government officials at the expense of central and provincial government tax receipts. Although such a situation likely generated inefficiencies, some of these funds helped support local schools, especially in the areas where elites perceived significant benefits from expanding local primary education. This was the case for the counties of coastal Shandong province in 1908 (Thøgersen, 2005).[33]

This revolution in primary education continued to evolve after China became a republic in 1911. Much of the administrative structure of the late Qing period continued as before, including the new Ministry of Education and various provincial and county-level bodies. However, political instability and growing heterogeneity in local-central government relations kept the expansion of schooling quite slow and fostered substantial geographic variation in basic education across Republican China.[34] Underlying these political conditions were the low per capita incomes and slow pace of economic growth over this period. Like colonial India, per capita incomes – especially in the countryside – were exceptionally low in the early 20th century

[33] In the treaty ports (which were mostly located along the coast), rising entrepreneurs were one of the major patrons in financing primary education. According to the *First Education Yearbook of China*, the total amount of education donations from private parties amounted to 11,414,253 Yuan in the first twenty years of the Republic, and the leading two provinces in private donation were Jiangsu and Zhejiang, where modern industry and commerce were most prevalent.

[34] For a discussion of the heterogeneity of local-center relations under the Qing and the Republic, see Wong (2000).

(see Table 1). Low incomes not only limited the amount households and communities could invest in schooling (and reflected low returns to human capital investment), but they restricted the resources available for local or central government activity. However, certain areas (the lower Yangzi; coastal regions – see Ma, 2008; and Mitchener and Yan, 2010) did experience some hints of higher economic growth, which contributed to the heterogeneity in educational outcomes in the late Qing and Republican periods (and the variation evident in Tables 2 and 3).

After the collapse of the Empire, the new central government gradually lost control over the regional political leaders. The death of President and self-proclaimed Emperor Yuan Shikai in 1916 set off a period of internal conflict among regional powers, who fought to expand their holdings and to control the central government. Throughout this "warlord" period (1916-1927), and under the Nationalist Party's regime (1927-1937), the basic administrative structure of the Republic persisted. But due to the weakness of the central government, laws and initiatives from above generally had little impact on what transpired locally, including education policy. Moreover, the different layers of government came into increasing conflict over control of tax revenues. The Republican government provided few funds for education, but some provincial and local leaders did move to allocate resources towards schooling.[35] As pointed out by a number of scholars, the provision of schooling varied not just by province, but county to county and village to village depending on the willingness of local elites to contribute towards schooling for the masses. In effect, China's primary school system was completely decentralized by default, and not as a consequence of specific policies.

[35] In the 1910s and 1920s, education accounted for less than 3 percent of the Republic's budget, among which primary education was 64.3 percent, secondary education 21.4 percent and tertiary education 14.3 percent (calculated from *The First Education Yearbook of China*, 1934). As a sharp contrast, in some provinces where the leaders were supportive of primary education, education constituted a large part of government expenditure. A famous example is Liaoning. The leader, Zhang Zuoling, committed to a share of education spending out of government fiscal expenditures of at least 40 percent. This partly explains why Liaoning stood out in terms of the development of primary education in the Republic era.

Elite preferences dictated the structure of primary education, in part, because government and other local institutions rarely offered political voice to the masses. In the last decades of the Qing, provincial assemblies held elections among large property owners. Elections to the Republic's National Assembly (and provincial assemblies) gradually lowered requirements to participate. But these central bodies remained oriented towards the elite, and, as already suggested, they had little direct impact on schooling decisions.[36] Rather, funding and other decisions over education were almost entirely decided upon at the county level and below. And because the center was weak, elites also captured local institutions at and below the county level (e.g. the ward, the village community, school committees, education associations, etc.). But the "policy" preferences of the elites, and the particular institutions through which they were exercised, varied considerably from place to place.

According to Culp (1994), who studied elite activities in support of schooling in two counties of Zhejiang province, the level of commercial development and bureaucratic capacity of local state institutions dictated how and whether elites actively supported education. In the poorer interior county of Lanqi, support for education came not from local government institutions or elite-dominated organizations, but through lineages. Culp describes how clans continued to fund schools, even as they transitioned from exclusive traditional academies to private (*sili*) modern schools that enrolled children from outside of the lineage. In Jiashan county, which was near the coast and much more developed, local economic elite controlled government budgets and various school committees. This allowed them to fund the expansion of

[36] Chang and Nathan (1978) summarize the electoral processes for the National Assembly of 1913. They also provide provincial data on the share of the population with voting rights in the Assembly election. These data are completely uncorrelated with the provincial variation in school expenditures per school-age child (Table 3), reinforcing the conclusion that of the central government played almost no role in education decisions.

different types of public (*gongli*) schools, which were typically larger and followed a less traditional curriculum than did the private schools of Lanqi.

Such local differences in economic conditions and in the particular structure and stability of local politics helped generate substantial variation in schooling across China. This is evident in Tables 2 and 3, which exhibit enormous provincial heterogeneity in spending and enrollments in 1912 (comparable variation is present before 1911 and later in the Republican period). Particularly telling are the high expenditure levels and enrollment rates for Jiangsu, Liaoning, and Zhejiang, all of which are coastal provinces. But other provinces also showed relatively high levels of spending (Heilongjiang) and enrollments (Yunan and Shangxi). Yunnan was geographically adjacent to French Indochina, and engaged in substantial foreign trade. Merchants in Shanxi successfully accumulated capital due to their predominant position in the financial sector of the late Qing period. Furthermore, these provinces with relatively high levels of schooling were less subjected to the political and social chaos of the 1910s and 1920s. Some provinces, such as coastal Jiangsu, were under a degree of control by various western powers, which allowed them to avoid civil wars and conflicts. In these and other "quiet" areas of the Republic, a stable political regime allowed local elites to allocate more resources to primary education.

Although none of these provinces established formal political institutions that allowed mass participation, elites in the commercially developed areas were more frequently exposed to western ideas regarding politics and education.[37] This mattered because policies were often tightly related to the personal characteristics of local leaders. For example, Yan Xishan, governor of Shanxi, and Tang Jiyao, governor of Yunnan, both had some experience with overseas

[37] As pointed out by Bai and Kung (2010), preferences for western education were also a related to the spread of Protestantism in the late Qing and early Republican periods.

education. The concentration of local power in the hands of these and other such westernized "warlords" made the channeling of resources towards modern primary education somewhat more likely.

Despite the shift towards a more modern system of schooling after 1905, public primary education in China was the least developed among BRIC before and after the 1910s. The feedback between low income levels and political instability created conditions where resources were not available to finance schooling, and where the state was too weak to prevent local elites from capturing political structures and educational institutions. There were practically no formal representative bodies with real authority over education, and the vast majority of communities and clans were left to their own devices (and resources) when it came to decisions over primary schooling. Relatively few elites were supportive of expanding modern educational opportunities through greater public funding. When compared to other BRICs in 1911, China's political situation was the least settled, and this compounded the low-income levels already evident from the beginning of the Great Divergence.

4. Comparative Analysis of Case Studies

The underlying story of limited schooling within BRIC is one of low resources, low returns to education, and elite capture of fiscal systems and the policy process. At the same time, these four case studies describe how local variation in economic conditions and in particular features of the political economy of education were associated with within-country differences in primary schooling. We do not wish to oversell the comparison among these large countries, for each possessed a primary school system that arose from a specific historical context. However, we do see important parallels, as well as points of departure, between the four cases. Whether it was due to fiscal decentralization as in Brazil, the granting of political voice to local populations as in Russia and, to a limited extent, India, or greater involvement by central authorities, each

had begun to confront the absence of widespread primary schooling by 1911. But, central governments for different reasons across BRIC reduced their influence on education policy making just as they devolved more money and power to local governments. This compounded the effects of local economic, political and social factors that limited the overall development of mass primary education.

By the early 20th century, each country recognized low schooling as a serious problem and policies were enacted with the goal of improving the administration and provision of elementary education. Significant aspects of educational finance and policies were decentralized to local levels of government, but decentralization took a different form in each country. Brazil exhibited the most widespread reforms by decentralizing taxation and revenue collection authority to provinces that decided to use export tax revenues to fund primary education. While this clearly benefitted some provinces (and municipalities), other provinces were not as lucky and there was no central government support available for more funds. Hence, a lack of strong central oversight coupled with this form of decentralization contributed to extreme inter-regional disparities in spending and outcomes.

Decentralization in Russia was more intermediate with the creation of the *zemstvo*, which used local taxable wealth to promote public primary education. This led to greater school provision in areas where the peasants possessed more political voice in the new institutions, while areas without *zemstvo* displayed lower education outcomes. However, these institutions were often captured by the local landed elite, which likely restricted their impact. Only greater central government involvement and expenditures after the mid-1890s began to erode elite resistance to broad schooling.

In British India, decentralization was weak because rural local councils did not have any tax authority. They received a pot of money linked to their existing land revenues and then decided how much to spend on local public services including primary education. Moreover, elite capture by upper caste and landed Indian elites, and the high levels of caste and religious heterogeneity limited the efficacy of decentralization. In China, decentralization was more by default than by policy. Political instability allowed different types of local elites to capture education policy. Where a skilled population was desirable or elites had been exposed to western ideas of the benefits of mass education, they invested more in primary education. This occurred most prominently in the coastal areas, which were the most integrated with international commerce.

In all four cases, elites could and did turn to privately financed and exclusive schools, often at a direct cost to publically funded and more open schools. Therefore, while decentralization of public finance and expenditures on education had some benefits, the cases suggest that a central government championing the cause of public primary education may have been preferable to balance the effects of elite control at the provincial and municipal or district level. In Brazil, the central government transferred the authority over education policy to provincial and municipal governments and absolved themselves of any further responsibility. The colonial Government of India controlled the revenues available to provinces, which, in turn, controlled the revenues available to districts. Nonetheless, central authorities in India were not making decisions about the location of schools or hiring of teachers in the early 20th century. In China, the end of the Qing dynasty meant the end of most substantive involvement of the central government in local affairs. Only in Russia did the central government re-enter education in a

forceful way; not only were Russian expenditures greater, but educational outcomes outpaced the other BRICs by 1911.

Our case studies also highlight how the decentralization process among BRIC was different from developed countries. For example, in the United States, local communities came together to fund public schools from local taxable revenues with only limited guidance or intervention from federal authorities. But in our four countries, decentralization was often enacted or structured from above, or came about due to the collapse of the central regime. The devolvement of fiscal authority and education decisions in BRIC was less about local communities demanding such changes, although they were often receptive to the decentralization schemes once they were implemented. In Brazil, where there was more bottom-up demand for decentralization, it was the state and municipal elites involved in export production who demanded fiscal decentralization and not small farmers like in the United States. In Russia and India, the structure of centrally imposed local institutions did not allow the masses true political voice. And in China, the steady erosion of central authority in the late Qing and Republican periods gave traditional and new elites control over public revenues at all levels of local government.

Hence, the structure of local political institutions that emerged in BRIC allowed elites to co-opt school finance more than in developed countries. The result was often a less than desirable allocation of resources to public primary education, especially in poor areas or to ethnic or racial groups with less political voice. In Brazil, according to the 1960 census, the literacy rate among whites that attended school during the 1889-1930 was close to 70 percent, while that for blacks and indigenous groups was below 30 percent. In India, more ethnic fractionalization was correlated with lower expenditures on education. Finally, 19th century examples of

decentralization in the United States and other developed economies were often accompanied by an expanding franchise (at the local and national levels) or backed up by a committed central government (as in Prussia). Neither was really the case in BRICs.

5. Conclusion

Each of BRIC experienced some improvements in the provision of basic schooling over the period, and they all tried to modernize their school system based on what was happening in more developed countries. The modernization of schooling in China is perhaps the most dramatic effort of all, but its impact remained incomplete by mid century. Efforts at introducing and improving secular education in Russia and Brazil, and similar efforts for English-language instruction in India, were relatively successful within the confines of the slow overall pace of school expansion. Our study sheds new comparative light on the experiences of these large countries during the formative years of their primary education systems. But in doing so, we have left open a number of important issues for future research.

It is evident from the cases that there was persistent variation between and within the BRICs in the extent to which primary education was "public," (i.e., financed with some form of tax revenue and open to the majority of the population, tax-paying or otherwise) or "private" (supported by endowments, student fees, and religious organizations and exclusive in some respect). An important topic that demands more attention is whether the possibility of private education for elites crowded out spending on public schooling, as in the model of De la Croix and Doepke (2009). Understanding this dimension will also require a deeper examination of the *local* public finance structures in each country to determine the extent to which tax systems catered to interest groups uninterested in the expansion of primary education.

In our case studies and data analysis, we have focused on primary education, mostly as a compromise over data availability and the scope of the paper. But adjustments of resources took place between types of education. Each of our countries was likely to have overcommitted funds to secondary and tertiary schooling at the expense of primary education, as it was frequently in the interests of elite groups to do so. Therefore, it would be helpful to consider the role played by primary schooling within the education systems of BRIC.

In concluding, it is worth reiterating the significant gap in primary education expenditures between rich and poor provinces of BRIC. For instance, the areas around São Paulo, Shanghai, St. Petersburg, and Calcutta spent up to 4 to 5 times more per capita than did the poor rural areas in BRIC. To better understand this heterogeneity, we need a more complex model of within country variation in elite interests. For instance, a model with two different elites, one focused on agriculture for internal consumption and isolated from foreign markets, and another one connected to urban centers or exporting to other countries, may better explain the variation in the demand for public primary education and, thus, in expenditures per capita at the local level. Understanding temporal and cross-sectional variation in elite interests would also help us better diagnose why we see similar political institutions working in different ways in different areas, and why central government policies were often so limited when it came to education in BRIC.

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Note: This list does not include several items that provided the sources for Tables 2 and 3. Please see the Tables for more information.

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Table 1: Expenditures on elementary education per enrolled student and per school age population, various countries, c. 1910

Country	GDP per capita (PPP-1990 Geary-Khamis dollars), 1913 (Maddison)	Expenditure per enrolled student	Expenditures per school age population	Primary school expenditures per school age population as a % of GDP per capita	School Size (Total enrollment / Total teachers)	Estimated enrollment rate as a % of school age children
Brazil	811	1.65	0.20	0.02%	42	12.07
Russia	1,488	5.77	1.48	0.10%	34	25.66
India	673	1.25	0.16	0.02%	29	13.02
China	552	3.58	0.20	0.04%	n.a.	5.89
BRIC (Avg. weighted by population)	**981**	**3.5**	**0.69**	**0.06%**	**32**	**16.56**
Prussia		12.05	13.97		63	115.91
England and Wales	4,921	17.09	19.39	0.39%	34	113.47
German Empire/Prussia	3,648	12.17	13.68	0.37%	61	112.40
France	3,485	7.60	7.20	0.21%	37	94.86
Austria	3,465	6.86	6.72	0.19%	44	97.88
Sweden	3,073	15.50	14.54	0.47%	41	93.78
Italy	2,564	4.83	2.60	0.10%	41	53.74
Spain	2,056	2.50	1.69	0.08%	n.a.	67.64
Hungary	2,000	5.53	6.10	0.31%	104	110.24
Japan	1,387	2.85	2.13	0.15%	48	74.59
South Africa (Cape of Good Hope)	1,602	12.81	6.18	0.39%	26	48.25
Bolivia	?	5.49	0.91		43	16.57
Uruguay	3,310	4.41	2.10	0.06%	40	47.58
Chile	2,988	11.92	4.65	0.16%	44	38.99
Mexico	1,732	5.49	2.04	0.12%	n.a.	37.06

Source: For most countries the data comes from United States (1910) and for BRIC countries see Table 2. All GDP per capita data comes from the statistical appendix of Maddison (2006), except for Russia's, which comes from Gregory (1982).

Table 2. Variation in Enrollment Rates within BRICs (Primary Enrollment / Children of School Age), c. 1910

Brazil (states)	1914-15	European Russia (regions)	1910-11	British India (provinces)	1911-12	China (provinces)	1912
Alagoas	7.0	Northern Provinces	32.1	Bengal	14.6	Jiangsu	9.8
Amazonas	8.5	Ural Provinces	26.2	Bombay	18.6	Zhejiang	12.5
Bahia	7.9	Central Industrial Region	36.7	Burma	10.0	Anhui	2.3
Ceará	7.3	Central Agricultural Region	29.6	Central Provinces and Berar	10.9	Jiangxi	4.5
Federal District	32.7	Volga/Don Region	28.8	Coorg	21.9	Hubei	6.2
Espírito Santo	10.8	Left-Bank Ukraine	31.1	Eastern Bengal and Assam	15.7	Hunan	6.7
Góias	7.8	Right-Bank Ukraine	25.6	Madras	16.6	Sichuan	4.0
Maranhão	8.6	"New" Russian Provinces	34.2	North-West Frontier Province	4.9	Fujian	4.2
Minas Gerais	11.5	Belorussian Provinces	26.9	Punjab	7.0	Yunan	13.7
Mato Grosso	15.1	Baltic Provinces	41.8	United Provinces	7.2	Guizhou	2.6
Pará	16.6	Capital Provinces	34.4			Guangdong	4.0
Paraíba	6.3					Guangxi	7.0
Pernambuco	8.1					Shaanxi	5.2
Piauí	7.1					Shanxi	11.0
Paraná	13.3					Henan	3.3
Rio de Janeiro	9.7					Hebei	8.8
Rio Grande do Norte	9.4					Shandong	3.0
Rio Grande do Sul	21.3					Gansu	4.8
Santa Catarina	20.0					Xinjiang	0.7
Sergipe	10.6					Liaoning	17.4
São Paulo	13.8					Jilin	2.5
						Heilongjiang	4.6
Brazil	**12.0**	**European Russia**	**30.4**	**British India**	**13.0**	**China**	5.9
Coeff. Of variation	0.53	Coeff. Of variation	0.16	Coeff. Of variation	0.4	Coeff. Of variation	0.67

Sources by country: Brazil: Education Census of 1907 and Population Census of 1900. The population of children in school age is estimated using the population pyramids of the 1900 census. Russia: Enrollment rates comes from Pokrovskii, V.I., ed. Odnodnevnaia perepis' nachal'nykh shkol Rossiiskoi Imperii proizvedennaia 18 Ianvaria 1911 goda. 16 vols. St. Petersburg, Russia: Russia, Ministerstvo narodnago prosveshcheniia, 1916. Population totals come from Russia. Tsentral'nyi statisticheskii komitet, Ministerstvo vnutrennykh del. Statisticheskii ezhegodnik Rossii 1911 g. St. Petersburg, Russia, 1912. India: Progress of Education in India, Quinquennical Reviews, 1891-1947. Enrollment and population data for Bengal, Bihar and Orissa are from the Statistical Abstracts for 1911/12. School-Age Population is defined as 15% of the total population. China: The First Educational Statistics Yearbook and population figures from the Census of 1910. We assume that the population of children in school age is 15% of total population.

Table 3. Variation in Expenditures on Elementary Education within BRICs (US$ per Children of School Age), c. 1910

Brazil	1914-15	Regions (European Russia)	1910-11	British India	1911-12	China	1912
Alagoas	0.63	Northern Provinces	2.57	Bengal	0.12	Jiangsu	0.43
Amazonas	2.80	Ural Provinces	1.90	Bombay	0.43	Zhejiang	0.46
Bahia	0.33	Central Industrial Region	2.57	Burma	0.12	Anhui	0.11
Ceará	0.93	Central Agricultural Region	1.73	Central Provinces and Berar	0.15	Jiangxi	0.18
Distrito Federal	2.86	Volga/Don Region	1.89	Coorg	0.36	Hubei	0.12
Espírito Santo	1.79	Left-Bank Ukraine	1.97	Eastern Bengal and Assam	0.12	Hunan	0.20
Góias	0.15	Right-Bank Ukraine	1.36	Madras	0.22	Sichuan	0.08
Maranhão	0.45	"New" Russian Provinces	2.92	North-West Frontier Province	0.07	Fujian	0.20
Minas Gerais	1.64	Belorussian Provinces	1.51	Punjab	0.11	Yunan	0.28
Mato Grosso	4.07	Baltic Provinces	3.20	United Provinces	0.08	Guizhou	0.08
Pará	1.60	Capital Provinces	5.49			Guangdong	0.22
Paraíba	0.81					Guangxi	0.25
Pernambuco	0.88					Shaanxi	0.12
Piauí	0.27					Shanxi	0.22
Paraná	2.73					Henan	0.07
Rio de Janeiro	1.99					Hebei	0.28
Rio Grande do Norte	0.91					Shandong	0.11
Rio Grande do Sul	2.49					Gansu	0.06
Santa Catarina	1.41					Xinjiang	0.10
Sergipe	1.70					Liaoning	1.36
São Paulo	6.88					Jilin	0.25
						Heilongjiang	0.48
Brazil	**0.20**	**Total, European Russia**	**2.19**	**British India**	**0.16**	**China**	**0.20**

Notes: Local currencies were first deflated to 1910/11 using local price indices and then converted to US$ using 1910 exchange rates.

Sources by country: Brazil: Expenditures per children estimated using the average total expenditures on education by state for 1914-1915 (excpet for the Distrito Federal for which we used the expenditure data for 1906) divided over our estimates of population in school age. We estimate population in school age using a linear interpolation between the data we have from the census of 1890 and 1920 (Brazil, 1940) . Data for expenditures comes from Brazil (1926) and from Wileman (1909). Data for Brazil assumes that half of the federal budget was spent on elementary education in the Federal District. Russia: All schooling info, including expenditures, comes from Pokrovskii, V.I., ed. Odnodnevnaia perepis' nachal'nykh shkol Rossiiskoi Imperii proizvedennaia 18 Ianvaria 1911 goda. 16 vols. St. Petersburg, Russia: Russia, Ministerstvo narodnago prosveshcheniia, 1916. Population totals come from Russia. Tsentral'nyi statisticheskii komitet, Ministerstvo vnutrennykh del. Statisticheskii ezhegodnik Rossii 1911 g. St. Petersburg, Russia, 1912. India: Expenditures on primary education and population are from Progress of Education in India, 1907-1912, Vol. II-Appendices and Tables, Supplemental Tables, 1 and 22. School age population is estimated as 0.15 times the province population reported in the Progress of Education. China: Expenditures on primary education only come from The First Educational Statistics Yearbook divided by population in school age in 1910. We estimate the population in school age by multiplying 0.15 times the population by province according to the Census of 1910.