The expansion of mass education in Bolivia: did the Revolution overcome the colonial legacy?*

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Abstract

A widespread view suggests that, given an initial high level of inequality, Latin American States have been controlled by small elites that did not have any interest in tax collection (Sokoloff and Zolt, 2006) –since this would imply taxing themselves- or education spending (Engerman, Mariscal and Sokoloff, 2009) –which would involve a redistribution of resources. This paper aims at analyzing if educational spending in Bolivia, either fits well into this regional description up to present times or, by contrast, changed radically and took distance from the regional pattern after the 1952 Revolution. Taking advantage of new quantitative evidence, the paper stresses that the Revolution did not imply a substantial modification of the quality and redistributive character of the Bolivian education system. Three main findings support this claim: public spending in education was hardly sustainable over time; the inexistence of a substantial support to primary education may have reduce the redistributive impact of education spending; and education outputs, either in quantity or quality terms, were often among the worse in the region.

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Being the "most unequal region" in the world (De Ferranti *et al.*, 2004), inequality has a central role in the explanation of Latin American long-term development. A widespread view suggests that the current high levels of inequality are not anything new but one of the most salient features in the region since colonial times.[1] According to this literature, Latin American countries inherited very unequal societies in terms of wealth, political power and human capital at the time of their independence. Furthermore, it is argued that, given this initial level of inequality, the new Latin American States became rapidly controlled by small elites that did not have any interest in tax collection (Sokoloff and Zolt, 2006) –since this would imply taxing themselves- or education spending (Engerman, Mariscal and Sokoloff, 2009) –which would involve a redistribution of resources. By assuming the existence of institutional path dependence, these authors finally suggest that a fiscal equilibrium with low taxation and low spending in education persisted in the region until very recent decades, with only minor changes.

Further research has shown that the relatively low interest of Latin American governments in the promotion of public education prevailed during most of the 20th century. For instance, Lindert (2010) indicates that, in contrast with developed economies, Latin American governments have invested in education less than what would be expected given its GDP per capita. Moreover, this author stresses that most public expenditure was devoted to tertiary education, restricting thus the redistributive impact of education spending. Likewise, Frankema (2009) points out that the higher priority of tertiary education also holds when the region is compared with other developing economies. He also affirms that, whereas Latin America has undertaken significant progress in terms of primary education enrollment, the region's achievements are not outstanding by international standards and are negatively affected by the absence of quality increases.

Taking into account these antecedents, this paper aims at analyzing if educational spending in Bolivia, either fits well into this regional description up to present times or, by contrast, changed radically and took distance from the regional pattern after the 1952 Revolution. The former hypothesis would seem a priori more likely, given that some of the main determinants of education spending expansion –such as economic growth or

[1] See e.g. Acemoglu, Johnson and Robinson (2002) or or Engerman and Sokoloff (2012). For criticisms of this view, see, e.g. Coatsworth (2008).

political voice (Lindert, 2004; Espuelas 2012) - showed very bad records during several episodes after the revolution. In the same vein, on the basis of the economic literature which suggests a negative relationship between ethnic diversity and public spending,[2] or taking into account Dell's (2010) study for Peru, the Bolivian colonial legacy might be assumed to have restricted the expansion of education services towards the Bolivian indigenous population, a sector which constitutes a substantial share of total population -between 40 and 60%, according to the 2001 national census (INE, 2001).[3]

Nevertheless, it cannot be ignored that the 1952 Revolution represented a considerable shock in Bolivian history which fuelled some radical long-term redistributive changes (Grindle and Domingo, 2003; Klein, 2011: 209-222).[4] As for education policies, moreover, the reform that was applied in 1953-1955, which met considerable consensus, was intended to reflect "…the new correlation of economic and social forces arising from the revolution" (Contreras, 2003: 262). In relation to this, previous work (Peres-Cajías, 2013) has presented some evidence which suggests that these changes generated a substantial increase in social public spending from the 1950s onwards. In the same line, Klein (2011b) has stressed that these modifications in public policies are critical to understand the continuous political empowerment achieved by the indigenous population during the second half of the 20th century (Zavaleta Mercado, 2011; Calderón, 2010).[5] Additionally, previous researches have stressed that, during the last decades, and beyond the persistence of considerable inequalities, the Bolivian population has benefited from public education spending as an efficient instrument for social mobility (Andersen, 2003; PNUD, 2010: 58).

Therefore, the impact of the 1952 revolution on public education spending is far from obvious. On the basis of quantitative evidence previously presented (Peres-Cajías, 2013), this paper addresses this issue and offers for the first time a long-term and

[2] See Go and Lindert (2010) for an historical test of this hypothesis.
[3] See the INE webpage for a description of the different indicators used for the identification of the Bolivian indigenous population.
[4] FUNDACIÓN TIERRA (2007), for instance, has suggested that the 1953 Agrarian Reform allowed the recovery and total expulsion of former *terratenientes* in the west side of the country by the Aymara population –the most important indigenous group in that region.
[5] Undoubtedly, the most salient example of this progressive political empowerment is the arrival of Evo Morales to the Bolivian presidency in 2006, the first and the only indigenous Latin American president.

comparative analysis of Bolivian education spending.[6] To begin with, following the framework proposed by Booth (2007) and Frankema (2011), the paper stresses that, after the 1952 Revolution, the Bolivian Central Government moved from a "minimal state" fiscal equilibrium to a "benign state" one in which relatively low tax collection levels coexisted with substantial investments –by Latin American standards- in public education. Looking at the evolution of education spending per capita, however, it becomes clear that this paradoxical fiscal equilibrium did not necessarily grant the sustainability of educational expenses. Furthermore, following Lindert's (2010) suggestions, this paper shows that the post-revolutionary increase in education spending did not imply any significant change in the tax support given to primary education. By contrast, the relative importance of primary over tertiary education spending was not different from the rest of the region and, more strikingly, today is relatively low even by Latin American standards. Therefore, apart from its increase as a share of the GDP, the 1952 Revolution does not seem to have fuelled any significant differentiation of Bolivia from the rest of the region in terms of education spending.

Anyway, it could still be assumed that, despite these limitations, the increase in Bolivian education spending since the Revolution was enough to foster substantial modifications in educational outputs. Rather than measuring the profitability of public expenditure, in the last section of the paper I address this issue by analyzing if the increase in education spending was contemporaneous of any significant changes in several educational outputs. The analysis of the available "quantity indicators" seems to confirm the pessimistic assessment previously offered by other authors, such as Contreras (2003). And, in the case of "quality indicators", Bolivia was often in the lowest ranks of the region, which illustrates the limited impact of the public efforts in the educational area.

[6] Notice that previous analyses on the impact of the 1952 Revolution have focused mostly on education outputs, such as literacy or enrollment rates (Contreras, 1999, 2003).

1. The puzzle: the Bolivian paradoxical equilibrium between low taxation and human capital investment

During the last decades, public finances have increasingly been considered as an instrument to understand the evolution of the implicit fiscal pact between the State and society. This approach has been used by political scientists (Lieberman, 2002), economists focusing on the analysis of developing economies (Brautigam, Fjeldstad and Moore, 2008) or international organizations such as the World Bank. These have suggested, for example, that the size and composition of public finances reflect the institutional equilibrium achieved by each State, given the economic, political and social restrictions it must face (De Ferranti *et al.*, 2004; OECD, 2009; CEPAL 2010). Economic historians have also used this approach as an efficient tool to assess, for instance, the institutional framework established by European colonial powers both in South East Asia (Booth, 2007) and Sub-Saharan Africa (Frankema, 2011).

This section uses this approach to depict the plausible evolution of the Bolivian fiscal pact from the first decades of the 20th century onwards. My analysis is based on Frankema (2011), who identifies four different types of institutional equilibriums on the basis of the relationship between tax pressure and a (human and physical) capital expenditure ratio. According to this author, those countries where both tax collection and the fiscal priority of capital investment are small are in a "night-watchman" equilibrium -i.e. under a minimal State. The "extractive" scenario corresponds, in turn, to those cases where tax collection is high but is not reinvested in capital formation. If capital investment is high but tax collection is low, the equilibrium is characterized as a "benign State" one. Finally, a "developmental equilibrium" is reached when both tax collection and public capital formation are high.

In my case, I analyze the relationship between tax pressure levels[7] and the fiscal priority of human capital spending (namely education and health) exclusively, and consider

[7] Tax revenues represent the most relevant part of Latin American *current* revenues and, consequently, fairly reflect the evolution of overall public revenues throughout the period under study. Moreover, since taxes are a transfer of money from citizens with neither proportional nor instantaneous counterparts from the government (IMF, 2001) political scientists consider that the higher the government's dependence on tax revenues, the higher the incentives to negotiate and respond to the citizens' demands (Lieberman,

those four institutional equilibrium categories as implicit fiscal pacts. My analysis is limited to human capital investment, firstly, because the main interest of this chapter is education spending and, secondly, because (especially during the ISI period), public investment in physical capital was carried out not only by the Central Government (which is the object of this research) but also by public companies. In order to distinguish between those four different fiscal pacts, I assume that the minimum ratio required for a *potential* positive impact of State intervention in the economy is around 20% of GDP for tax pressure and 6% of GDP for human capital investment.[8]

Graph 1 compares the Bolivian experience throughout the 20th century with two of the most *developmental* States in Latin America (Chile and Uruguay; see Azar and Fleitas, 2012). As a reference, it also shows the evolution of France, Spain and the United States from 1960 onwards.[9] As might be expected, during the second half of the 20th century Latin American governments have had both lower revenue levels and less human capital spending than France and the US. Indeed, during most of the period under analysis, tax pressure levels and public expenditure in human capital in both Chile and Uruguay did not exceed 20% and 6% of GDP, respectively. By contrast, those levels were surpassed both in the US and France already in the 1960s.[10] Likewise, whereas tax pressure and public expenditure in human capital in Spain were fairly similar to those of Chile and Uruguay during the 1960s, Spanish indicators converged steadily with the US and French ratios thereafter.

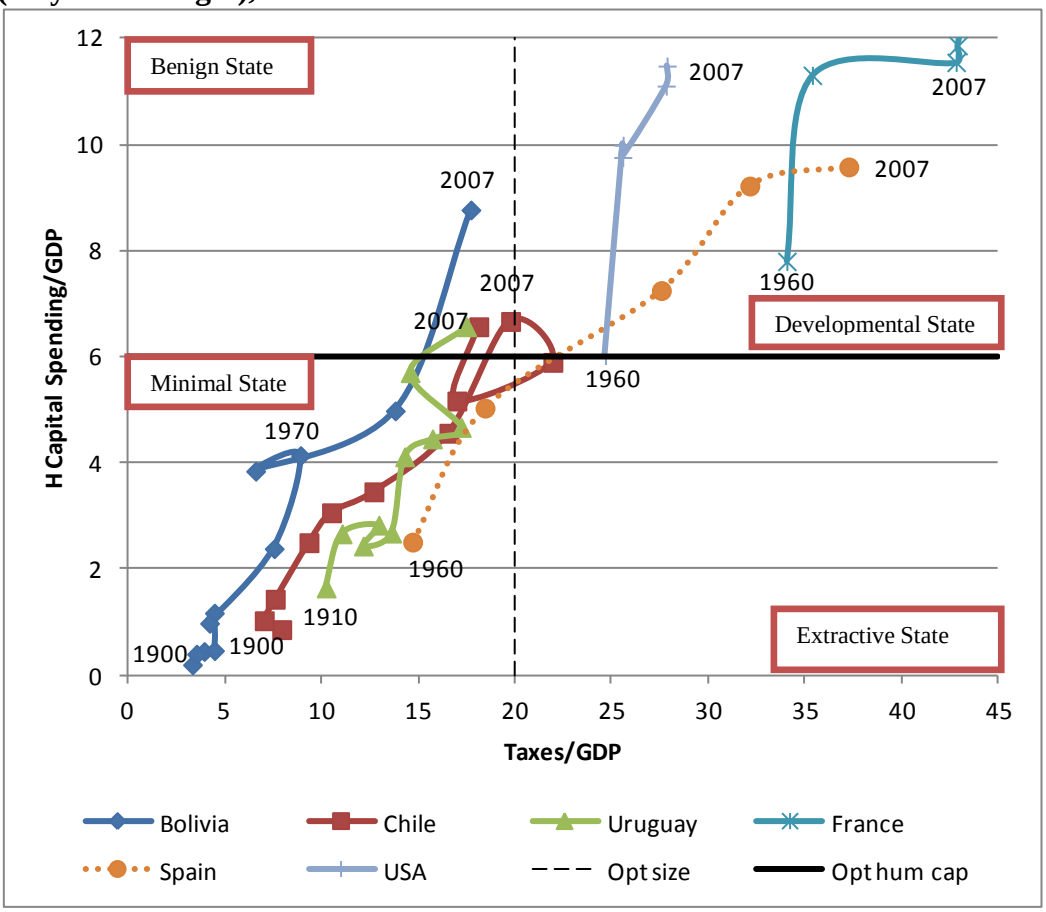
2002; Moore, 2007). Therefore, the study of the tax pressure may be used as an instrument to analyze the evolution of both the government size and the government's legitimacy in the public opinion.

[8] These are arbitrary figures, but they represent a good reference point of the experience of the most developed economies in the second half of the 20th century (Lindert, 2004).

[9] France and the United States have been chosen because they are representative examples of the so-called European and Anglo-Saxon Welfare States, respectively, and the Spanish case is introduced in the analysis as an example of a country that caught up recently with the European Welfare State (Lindert, 2004; Comín, 1996).

[10] From the 1960s to 2007, whereas the evolution of tax pressure diverged -it remained more or less constant in the US while it expanded in France- public expenditure in human capital reached levels above 10% of GDP in both countries.

Graph 1. Evolution of the fiscal pact in some Latin American and OECD countries (10-year averages), 1900-2007



Sources: a) *Bolivia*, from Peres-Cajias (2013); b) *Chile*: from 1900 to1989, Base de datos EH CLIO LAB, Iniciativa Científica Milenio Mideplan; from 1990 to 2007, ECLAC database: www.eclac.cl.; c) *Uruguay*: Azar *et al* (2009); d) OECD countries data come from Peter Lindert web page (http://lindert.econ.ucdavis.edu/), from Sergio Espuelas web page (https://sites.google.com/site/sergio1espuelas/) and from the OECD database (www.oecd.org).

In the case of Bolivia, both tax collection and human capital investment were particularly small until the first half of the 20th century. However, from the 1960s to the 1980s, the human capital ratio tended to converge with the Chilean and Uruguayan ones, despite the fact that tax pressure remained well below 10% of GDP. Later on, from the 1980s onwards, whereas Bolivian tax pressure levels have become similar to those of Chile and Uruguay, the ratio between human capital spending and GDP has approached the Spanish one. Hence, during the second half of the 20th century the Bolivian State has moved from a "minimal-State" equilibrium to a "benign-State" one in which human capital expenditure had a relatively high fiscal priority, at least by Latin American standards.

Tables 1 and 2 expand the previous comparison by incorporating other Latin American cases. To begin with, Table 1 shows the evolution of tax pressure in some of the most developed countries of the region, as well as in some of the poorest ones. The table confirms, once more, the small size of the Bolivian government and the persistence of a tax pressure gap with several countries of the region until very recent decades. Indeed, whereas tax revenues represented around 7% of GDP in Chile during the 1880s and 1890s, they amounted to ca. 3% of GDP in Bolivia, i.e. less than half the Chilean figure. During the first half of the 20th century, tax pressure in Bolivia reached a level similar to Colombia and Peru, but still well below the Chilean and Uruguayan figures.[11] The 1952 Revolution did not change this and, until the 1980s, Bolivian tax levels remained similar to those of Colombia and Guatemala, and much lower than those of Chile, Peru, Uruguay and even Brazil –a country with relatively low Central Government revenues due to its federal structure. It was not until the 1990s when Bolivian tax levels started to converge with the regional average.

Table 1. Latin American Central Governments' tax revenues as a share of GDP (%, 10 years average), 1882-2007

	Bolivia	Brazil	Chile	Colombia	Guatemala	Peru	Uruguay
1882-1889	3.14	N.a.	7.06	N.a.	N.a.	N.a.	N.a.
1890-1899	2.74	N.a.	6.96	N.a.	N.a.	N.a.	N.a.
1900-1909	3.30	8.89	7.92	5.04	N.a.	4.10	11.90
1910-1919	3.91	6.57	7.01	3.87	N.a.	3.89	10.22
1920-1929	3.51	5.37	7.58	3.69	N.a.	3.95	11.05
1930-1939	4.44	6.88	9.33	4.31	N.a.	5.10	12.94
1940-1949	4.44	8.46	10.50	4.29	6.58	6.91	12.14
1950-1959	4.19	10.17	12.69	6.72	7.74	7.59	13.61
1960-1969	7.53	12.46	16.57	6.85	7.40	10.82	14.28
1970-1979	8.89	18.34	19.76	8.14	8.50	14.09	15.72
1980-1989	6.57	17.69	21.95	7.45	7.26	12.68	17.21
1990-1999	13.79	18.96	16.98	8.18	9.40	12.82	14.57
2000-2007	17.71	22.36	18.12	11.76	11.81	13.37	17.49

Sources: a) *Bolivia*, Graph 1; b) other countries from 1900 to1989: *Brazil*: IBGE. Estadísticas Históricas do Século XX; *Chile*: Base de datos EH CLIO LAB, Iniciativa Científica Milenio Mideplan; *Colombia*: Kalmanovitz (2011); *Guatemala*: ICEFI (2007); *Peru*: Portocarrero, Beltrán and Romero P. (1992); *Uruguay*: Azar *et al.* (2009); c) other countries from 1990 to 2007 from ECLAC database: www.eclac.cl.
Notes: N.a.: Not available. Because of the lack of total tax collection from 1882 to 1899 and from 1936 to 1939, the Bolivian averages in the 1880s, the 1890s and the 1930s have been calculated by using total current revenue figures.

[11] Bolivian tax levels were similar to those of Brazil, one of the biggest economies in the region. However, Brazil is a federal country and, therefore, the underestimation of Brazilian total tax revenues – defined as tax collection of General Government- are higher than in the case of non-federal countries.

As for human capital spending, because of data restrictions the comparison considers just three other Latin American cases: Chile, Peru and Uruguay (Table 2).[12] The analysis shows that, until the first half of the 20th century, both education and health spending in Bolivia were lower than 1% of GDP, well below their level in the rest of countries. From the 1960s to the 1980s, whereas the relevance of health spending remained below 1% of GDP, Bolivian public spending in education increased substantially. Hence, in contrast with tax pressure levels, public spending in education as a share of the GDP was higher in Bolivia than in Uruguay already in the 1970s. This process continued thereafter, and the Bolivian education ratio became higher than in the rest of the sample during the 1990s. Actually, at the eve of the 21st century, the Bolivian ratio was twice as high as the Peruvian and Uruguayan ones.

Table 2. Latin American Central Governments' spending in education and health as a share of GDP (%, 10 years average), 1900-2007

	Bolivia		Chile		Peru		Uruguay	
	Education	Health	Education	Health	Education	Health	Education	Health
1900-1909	0.21	N.a.	0.86	N.a.	N.a.	N.a.	N.a.	N.a.
1910-1919	0.44	0.02	1.03	N.a.	N.a.	N.a.	1.09	0.56
1920-1929	0.40	0.02	1.36	N.a.	N.a.	N.a.	1.30	1.36
1930-1939	0.37	0.10	1.94	0.56	0.82	0.23	1.56	1.27
1940-1949	0.90	0.28	2.11	0.95	1.28	0.50	1.48	0.95
1950-1959	0.81	0.17	2.15	1.31	2.04	0.47	1.56	1.12
1960-1969	2.07	0.31	2.91	1.65	3.94	1.00	2.82	1.30
1970-1979	3.15	0.99	4.16	2.51	6.10	1.67	2.65	1.80
1980-1989	3.05	0.80	3.18	2.72	2.09	0.82	2.38	2.29
1990-1999	3.94	1.04	2.90	2.27	2.28	1.17	2.44	3.27
2000-2007	6.07	2.70	3.69	2.87	2.89	1.39	3.03	3.54

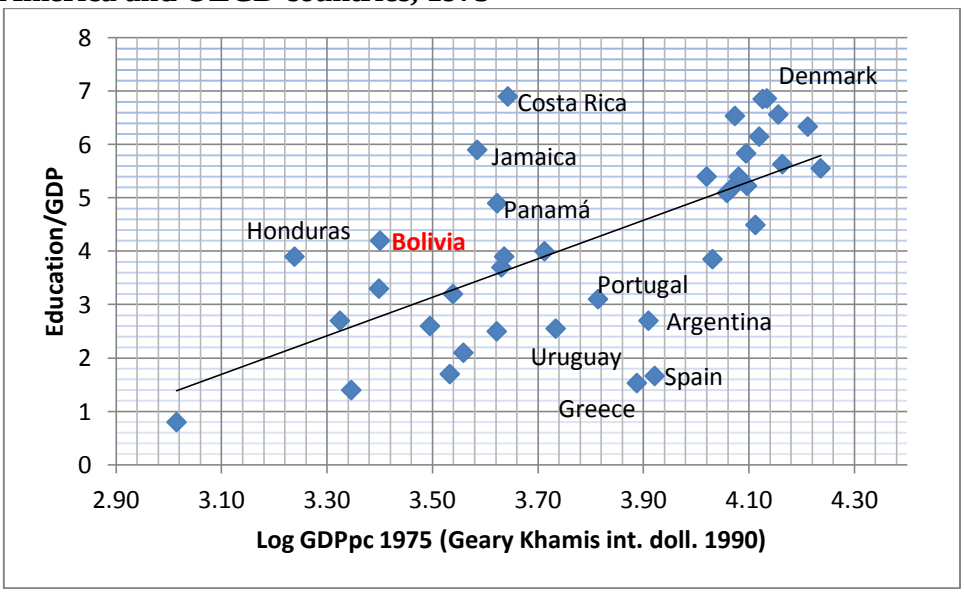
Sources: See Table 1.

Therefore, over the second half of the 20th century the ratio between Bolivian public spending in education and GDP has converged and then surpassed the equivalent figures in some of the most developmental countries of Latin America. The importance of Bolivian public spending in education is further illustrated by Graph 2 that, following

[12] Despite the limited coverage of the exercise, these countries may be considered as a good reference. On the one hand, Uruguay and Chile were among the earliest supporters of social public expenditure in Latin America (Azar and Fleitas, 2012). On the other hand, Peru shares with Bolivia some common historical features, such as its ethnic diversity. Argentina, Brazil and Mexico are not considered in the sample since, due to its federal nature, Central Government statistics may underestimated the size of human capital spending.

Lindert (2010), relates the ratio between education spending and GDP with the log of pc GDP in different Latin American and OECD countries. According to the graph (and in contrast with Lindert's original thesis),[13] Bolivian education spending by the 1970s was relatively high given the country's GDP per capita.[14]

Graph 2. Public spending in education as a share of GDP and GDP pc in Latin America and OECD countries, 1975



Sources: a) *GDP per capita*: New Madisson Project Database. b) *Public spending in education as a share of GDP*: for Bolivia and Uruguay, see Table 2; for the rest of Latin American countries: Frankema (2009: Table A3); for Australia, Germany, Sweden, Switzerland and US: Peter Lindert's webpage (http://lindert.econ.ucdavis.edu/); for Spain and Portugal: Sergio Espuelas' webpage (https://sites.google.com/site/sergio1espuelas/); for the rest of OECD countries: UNESCO Institute of Statistics webpage (http://www.uis.unesco.org/).

Actually, given the relative small investment in public education in the Mediterranean countries until the mid-1970s, Lindert's hypothesis would not be applicable only to Latin America. By contrast, the graph also shows that the high level of Bolivian education spending (relative to its pc GDP) has been shared by other poor Latin American countries, such as Honduras, which indicates that the Bolivian experience would not be necessarily a Latin American exception, and asks for further research on

[13] As was stated in the introduction, Lindert (2010) suggests that Latin American Governments have systematically invested in education much less than would a priori be expected given its level of economic development.

[14] In the same vein, Figure 5 in Lindert's paper (2010: 385) shows that, considering Latin American standards, the reading and math test scores achieved in Bolivia at the eve of the 21st century are not necessarily bad given the Bolivian per capita GDP.

the long-term efforts in human capital spending carried out by the poorest Latin American economies.[15]

Given this evidence and the fiscal vulnerability of the Bolivian government until, at least, the mid-1980s, the next sections offers different indicators which search to clarify to what extent Bolivia was an exceptional case in the Latin American context. This, in turn, would offer some insights on the main question of the paper: did public education in Bolivia reach a new role after the 1952 Revolution?

2. The evolution of public spending in education: was Bolivia a special case in the Latin American context?

The goal of this section is to offer a first assessment of the Bolivian pattern of public spending in education. More specifically, given the low level of Bolivian taxes until the 1980s, I analyze to what extent the Bolivian convergence in education spending that has been described in the previous section was affected by a limitation that can often be found in Latin America: the conflict between the presence of good policy objectives and the absence or instability of internal resources to achieve those objectives. According to some authors (Morales and Sachs, 1990; Dornbusch and Edwards, 1989; Weyland, 1998), this conflict may end up by affecting negatively in the long run previous public policy achievements. In this context, the following paragraphs analyze how the fiscal vulnerability of the Bolivian government affected the sustainability of education expenditure.

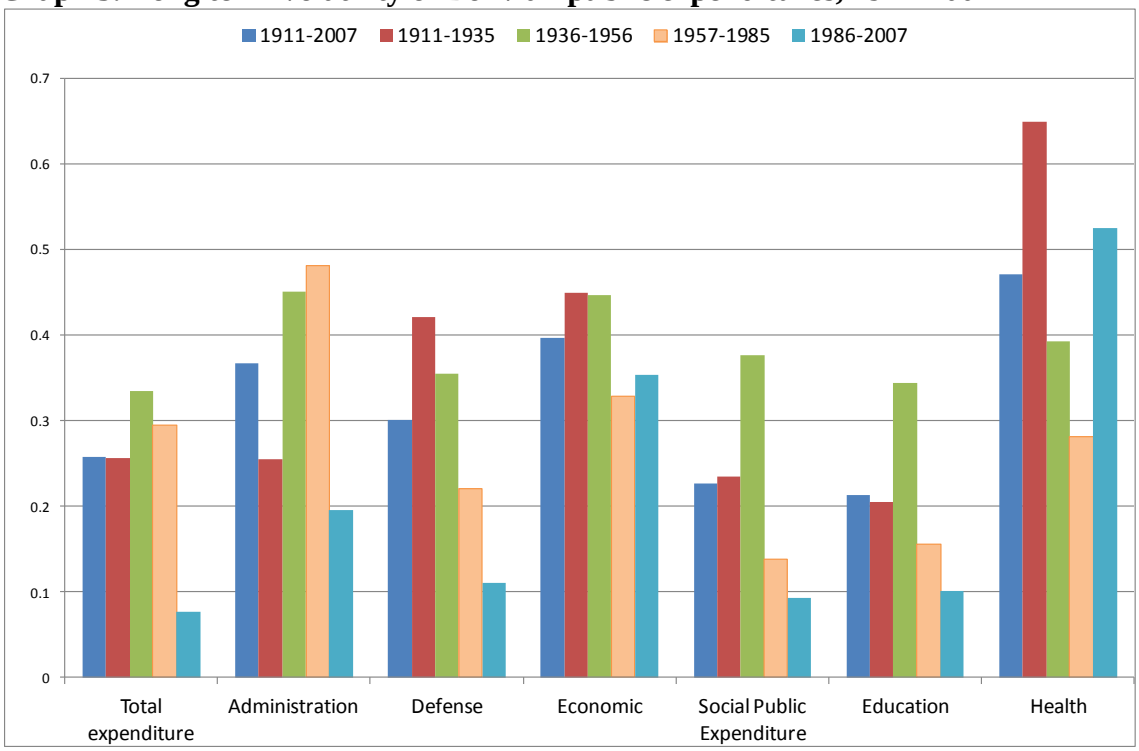
Graph 3 presents the long-term volatility of each category of Bolivian public spending, as well as two of the main sub-categories of social expenditure: education and health. The analysis follows the methodology proposed by Jacks, O'Rourke and Williamson (2011)[16] and covers the entire period of analysis (1911-2007), as well as at some

[15] In this context, Cuba would be an extreme case, because public spending in education as a share of the GDP has been systematically higher than 6% since the 1959 Revolution.

[16] See the notes to the graph. Similar results are obtained, with the variables expressed in real and log terms, by calculating the standard deviation of the cyclical component obtained through the application of the Hodrick-Prescott filter. The results are similar using either Lambda=6.25, as suggested by Ravn and Uhlig (2002), or Lambda=100, as suggested by Hodrick and Prescott (1997).

specific sub-periods.[17] Overall, the exercise provides three results which are more or less consistent over time: *a)* the volatility of each category of expenditure was rather high until the early 1980s; *b)* health spending has been the most volatile category throughout the entire period; *c)* education spending has always been among the less volatile expenditures. Hence, this would suggest that, in the long-term, education spending has been less affected than the rest of expenditures by the vulnerability of the Bolivian government's revenues.

Graph 3. Long term volatility of Bolivian public expenditures, 1911-2007



Sources: See Chapter 2.
Notes: Volatility has been calculated as the standard deviation of ln (X_t/X_{t-1}), being X expenditure in real terms; see Jacks, O'Rourke and Williamson (2011).

An alternative way to analyze this issue is to look at the effects of the public revenue cycles on the evolution of public expenditures. This analysis is presented in Table 3, which displays the annual average growth rates of public revenues and each category of public expenditure in those periods when *current* revenues rose or fell. Regarding the former ones, the table indicates that the jump in current revenues from 1904 to 1913 generated a more than proportional increase in the different categories of expenses, with the exception of defense. By contrast, during the 1922-1929 years, the expansion of

[17] The milestones of these periods are the end of the Chaco War (1935), the beginning of State's Capitalism (1956) and the beginning of the so-called neoliberal era (1986).

expenses was less than proportional than revenue growth. During the Chaco War (1932-1935) and after, while general administration spending grew less than current revenues, economic expenses grew at the same rate and social public expenditure at an even higher rate. From 1956 to 1978, once again general administration expenditures grew more slowly than current revenues, whereas economic and social public expenditure grew at the same rate and both education and health spending grew at higher rates. And, finally, whereas in 1986-99, all expenses –with the exception of defense- grew more than current revenues, the opposite effect took place from 2003 to 2007.

Table 3. Growth rates of Bolivian public revenues and expenditures in real terms, 1900-2007 (%)

	Periods of increase in current revenues							
	Total revenues	**Total expenditure**	**General administration**	**Defense**	**Economic**	**Social Public Expenditure**	**Education**	**Health**
1904-1913	5.07	6.29	7.55	2.65	5.46	15.36	15.36	(a)
1922-1929	5.96	3.53	2.67	5.66	3.89	4.28	3.94	1.81
1933-1941	9.72	2.34	8.70	-4.80	9.33	11.03	8.76	18.96
1956-1978	5.30	5.44	4.65	6.72	5.32	5.55	6.00	7.62
1986-1999	2.86	3.33	4.92	1.21	3.13	3.68	3.69	5.68
2003-2007	7.89	0.91	0.40	0.70	2.32	0.74	1.48	0.79
	Periods of decrease in current revenues							
1913-1922	-3.62	-1.76	-1.00	-1.45	-5.18	-2.63	-2.76	-1.53
1929-1933	-11.31	1.81	-12.90	14.59	-7.99	-10.45	-9.35	-1.57
1941-1956	-2.88	-2.46	-4.12	-5.13	-1.27	0.46	-0.02	-3.50
1978-1986[b]	-0.13	-0.96	-1.66	-1.49	-1.53	-0.61	-3.25	-9.43
1999-2003	-0.06	4.54	5.63	2.13	4.29	4.37	5.64	14.52

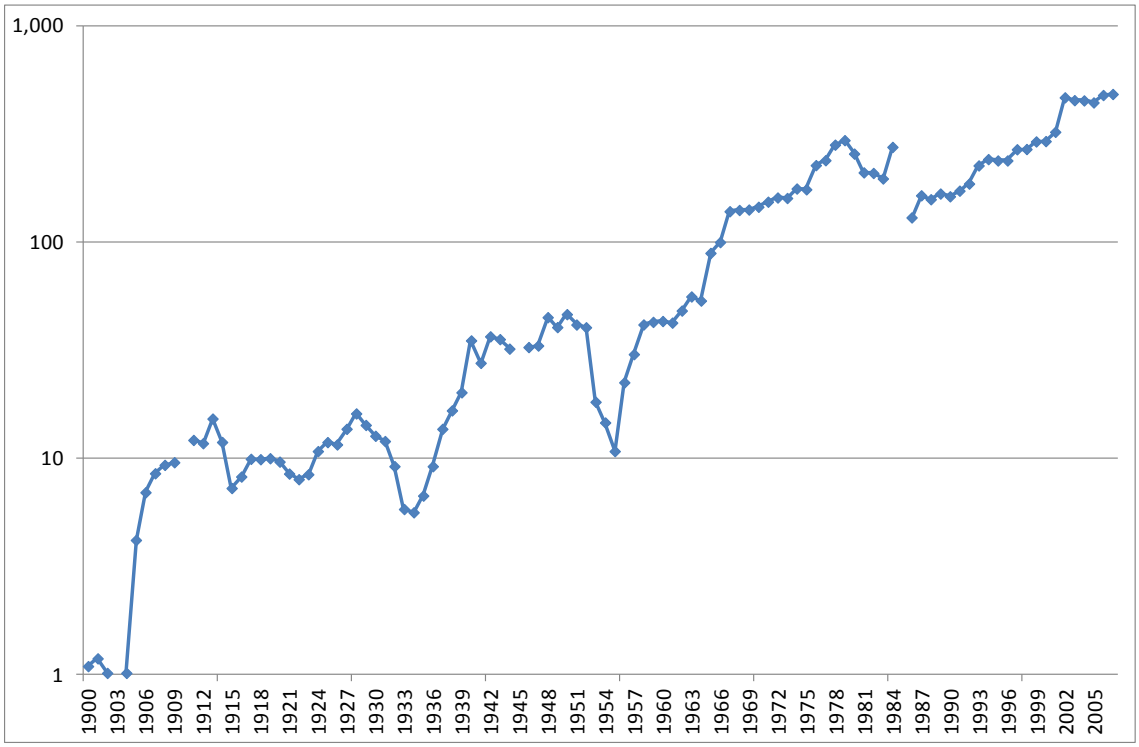
Sources: Own estimation (see text).
Notes: (a) disaggregated data for health expenditure are available just from 1911 onwards; (b) the public revenues cycle which began in 1978 finished in 1985, but the analysis has been extended to1986 because of the lack of detailed data for each category of expenditure in 1985.

What happened in those periods when current revenues decreased? During the unstable years of the First World War and the postwar years, the reduction of revenues was in line with a general reduction -at different rates- of all expenses. This was also the case during the post-Great Depression years –defense expenditures being the exception because of the Chaco War. The persistent reduction in real revenues that took place from the early 1940s to 1956 fuelled the reduction of general administration, defense and economic expenditure, but not that of social public expenditure. Later on, during the years of the external debt crisis, by contrast, education and health spending were among those expenditures which decreased more than current revenues. Finally, the

slight reduction in revenues of 1999-2003 did not generate a similar stagnation or decrease in any category of expenditures.

Therefore, focusing on the period after the 1952 Revolution, whereas education spending was particularly benefited from the expansion of public revenues from 1956 to 1978, it was also among those spending categories that were more affected by the subsequent public revenue crisis. The impact of these fluctuations can be observed in Graph 4, which shows the evolution of education spending per capita in real terms.

Graph 4. Bolivian Central Government's education spending per capita (Bs. 2000), 1900-2007



Sources: For expenditures, see Chapter3; for prices, see Chapter 2.

Graph 4 shows the considerable increase in real spending in education per capita at the eve of the 20th century, which was derived from the centralization of education and the liberal educational reform. According to Contreras (1999: 486-487), this process can be understood as the government elites' effort to change the main characteristics of the educational public system by taking advantage of ideas and methods developed in Europe.[18] In this context, the stability of education spending per capita from the early 1910s to the late 1920s can be interpreted as an indication of the stability of the new

[18] See also Cajías (2011) for an analysis of the main characteristics of this educational reform.

model of public education. However, beyond this political commitment with educational spending, the effects of both the Great Depression and the Chaco War on public revenues ended up affecting the evolution of education expenses per capita, which decreased substantially from 1930 to 1935.

Immediately after the war and until 1940, education spending grew spectacularly in per capita terms. In contrast with the previous experience, this increase was driven by the new role assigned by the Military-Socialist regimes to public education –the instrument to *build the Nation*-, as well as by the demands from indigenous and popular classes, which identified education as an efficient tool to better defend its long-term claims towards the Central State (Contreras, 1999: 488-489). However, in the aftermath of the 1952 Revolution, although these elements remained, education spending per capita decreased again until 1955, because of the macroeconomic disorders generated by the revolutionary process.

Thanks to the educational reform of 1953-1955 and the stabilization program of 1956, education spending increased steadily from 1957 to the late 1970s. Several determinants may explain this expansion. On the one hand, foreign aid, initially, and the steady growth of the Bolivian economy, thereafter, allowed the growth of government expenses. On the other hand, the increase in education spending was also a government response to the dramatic expansion of the Bolivian population during this period. In addition, from a political point of view, the growth in education spending until 1964 was closely related with the revolutionary goals and the willingness to expand educational services across the entire country (Dirección Nacional de Informaciones, 1962). The expansion went on during the military dictatorships, as a result of the military government's intentions to consolidate the so-called Military-Peasant pact[19] through the expansion of education services to the rural areas (Klein 2011: 222-228), while the widespread idea that more education investments were needed in order to foster human capital accumulation in the country also played a significant role (Ministerio de Educación, 1967: 14-22; PNUD, 2010: 106).

[19] This pact can be understood as an indirect consequence of the 1952 Revolution. It implied the political support of peasants to military governments in exchange of the maintenance of those changes brought by the Agrarian Reform.

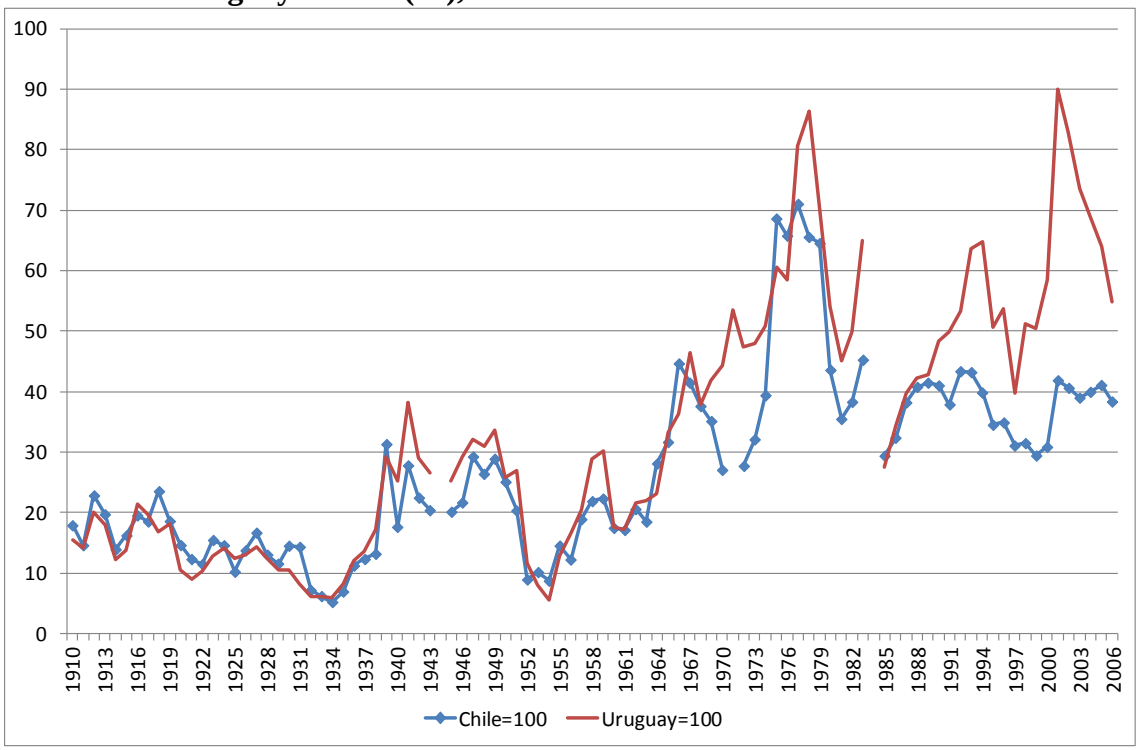
That long-term expansion was followed by a new crisis in education spending per capita during the early 1980s, provoked by the macroeconomic disorders of that period and made worse by the acceleration of demographic growth. The relevance of this crisis and the previous ones is not negligible. Indeed, Table 4 shows that, whereas the volatility of education spending in Bolivia was not significantly different from the Chilean or Uruguayan ones in some decades (1920s, 1960s, 1970s, 1990s), substantial differences are noticeable during the 1930s, 1950s and 1980s. These fluctuations seriously affected the convergence of Bolivian education spending per capita with these countries. More specifically, whereas education spending per capita in Bolivia quickly converged since the early 1960s with Chile and Uruguay up to 70% of the level of education spending per capita in those countries, it decreased to just 30% during the first half of the 1980s (Graph 5).

Table 4. Volatility of education spending in Latin America, 1910-2007

	Bolivia	Chile	Peru	Uruguay
1900-1950	0.34	0.15	0.19	0.13
1950-2007	0.21	0.18	0.43	0.16
1910-2007	0.21	0.17	0.39	0.15
1900-1909	0.70	0.12	N.a.	N.a.
1910-1919	0.23	0.15	N.a.	0.13
1920-1929	0.14	0.13	N.a.	0.14
1930-1939	0.31	0.23	0.15	0.10
1940-1949	0.19	0.14	0.20	0.13
1950-1959	0.41	0.23	0.12	0.14
1960-1969	0.17	0.08	0.26	0.26
1970-1979	0.11	0.33	0.43	0.13
1980-1989	0.17	0.13	1.00	0.11
1990-1999	0.07	0.04	0.13	0.15
2000-2007	0.14	0.05	0.05	0.09

Sources: See Table 2.
Notes: N.a.: Not available. Volatility has been calculated as in Graph 2.

Graph 5. Public spending in education per capita in Bolivia as a share of the Chilean and Uruguayan ones (%), 1911-2007



Sources: Own estimation (see text).
Notes: For education spending, see Table 2. These figures have been expressed in 1990 Geary Khamis international dollars and divided by total population. GDP and population series have been taken from the New Madisson Project Database.

Education spending increased more steadily from 1986 onwards. Initially, this was the consequence of macroeconomic stabilization and the educational reform of 1994. According to Contreras (1999: 491-493; 2003: 271-282) the goal of this reform was to expand education services both in quantity and quality across the country, in order to consolidate education as an efficient instrument for social mobility and economic growth.[20] This reform was contemporaneous to similar changes in neighboring countries and received strong support from international organizations such as the World Bank or the Interamerican Development Bank. Later on, Evo Morales' administration (2006 onwards) made a new educational reform and showed a particular interest in the expansion of educational services towards the most disadvantaged groups of the Bolivian population –see Paz Arauco *et al*., 2013. Overall, all these changes fuelled the expansion of education spending as a share of GDP up to very high levels, even by worldwide standards (Contreras, 1999: Table 2). However, in per capita terms, Bolivian education spending is still low compared with the Chilean or Uruguayan figures.

[20] See also Contreras and Talavera (2005).

Therefore, although the long-term volatility of education spending has been lower than in the case of other public expenses, this category of expenditure has clearly been affected by the fiscal fragility of the Bolivian government at least until the mid 1980s. Indeed, during those decades in which the main revenues of the Bolivian Central Government -external taxes, external borrowing or external donations- decreased, education spending also decreased substantially. Likewise, despite the considerable increase in education spending as a share of GDP after the 1950s, education spending per capita is still far away from the levels reached by some of the most developmental States in the region. Altogether, these elements suggest that the post-revolutionary Bolivian fiscal efforts in education spending were not necessarily outstanding by Latin American parameters. This idea is further explored in the next section by looking at the distribution of expenditure.

3. Was the distribution of education spending revolutionary?

Any analysis concerned with the long-term consequences of the 1952 Revolution on education spending must be able to answer one critical question: did the expansion of public expenditure benefit the poor? Whereas this question is commonly answered through incidence analysis, the lack of micro data restricts the use of this methodology in the Bolivian case until the mid-1990s. As a consequence, this section analyses the potential redistributive impact of the 1952 Revolution through several indicators, which were originally designed to provide indirect evidence about who benefited most from education spending.

To begin with, given that primary education tends to benefit a higher share of the population, the literature has suggested that the higher the support to primary education the higher the potential positive impact of education spending on the poor. A first indication of this potential bias is the tax support provided by the government to primary education in relation to the population's ability to pay. Lindert (2010: Table 2) has estimated this indicator for some Latin American countries from 1960 to 2002,

showing that they have invested less in primary education than countries with similar incomes in other world regions.[21]

In order to asses if the Bolivian case fits into this description, I have estimated the tax support ratio for primary education as follows: [22]

$$Tax\ support\ ratio\ for\ primary\ pupils = \frac{Subsidies/Attending\ student}{Income/Total\ population}$$

Table 5 shows the evolution of this ratio in Bolivia and other Latin American countries from 1950 onwards. The table indicates that, during most of the period under study, the support to primary education by the Bolivian government was similar to the rest of the region. In addition, and more surprisingly, the Bolivian tax support ratio fluctuated around the same level (13%) before and after the 1952 Revolution. The Bolivian ratio decreased substantially during the late 1980s, which reflects the negative impact of the external debt crisis on the sustainability of education expenditure. And, finally, the 2010 figure appears as exceptionally high, which would suggest that the efforts carried out by Morales' administration to expand educational services have effectively modified the amount of public money invested in primary education. Although this represents an important change, it is still soon to fairly evaluate its long-term implications.

Table 5. Primary school support ratios in Latin America (%), 1950-2010

	1950	1965	1970	1975	1980	1986	1990	1996	2000	2006	2010
Bolivia	13.03	9.95	11.57	11.14	13.33	6.05[a]	7.00[b]	12.49	12.34	13.66	20.82
Chile	6.09	5.77	N.a.	5.59*	10.93	12.97[c]	10.66	N.a.	13.67	10.56	14.77
Peru	5.50*	10.90	11.17	10.97	6.76*	2.74	N.a.	3.21*	6.93	7.13	8.47
Uruguay	N.a.	11.32	12.40	N.a.	7.89	3.77	6.67	6.72	7.21	8.71	N.a.

Sources: Own elaboration based on: a) *GDP per capita in national currency*: see Table 1. b) *Public spending in primary school education*: UNESCO Statistical Yearbooks of 1963, 1973, 1994 and 1998. Data for 2000 onwards were taken directly from UNESCO Institute of Statistics webpage (http://www.uis.unesco.org/).
Notes: N.a.: Not available. (*) Values may be underestimated either because they only consider data from the Ministry of Education or because "other expenditures" or "non-distributed expenditures" represented a substantial share of total expenditure. (a) In 1988; (b) in 1989; (c) in 1985.

[21] By suggesting that the rate of return of education investment has always been higher at the earlier levels of education throughout this period, Lindert (2010) stresses that lower investment in primary education has not been driven by demand-side factors but by a supply-side discrimination.
[22] Lindert uses adult (instead of total) population in the denominator. However, the trends are the same if total population is used instead (Lindert, 2010: 390).

As was pointed out in the introduction, another criticism to the allocation of education expenditure in Latin America stresses the existence of a systematical favoritism towards tertiary over primary education. Authors like Frankema (2009) or Lindert (2010) have used the following indicator to test this claim:

$$Primary\ tertiary\ double\ ratio = \frac{(Subsidy/student)\ in\ primary\ education}{(Subsidy/student)\ in\ tertiary\ education}$$

I have reconstructed this ratio for Bolivia, most Latin American countries and some European, Asian and African countries which may constitute a good reference from 1965 to 2007 (Table 6).[23] Lindert (2010: 390-395) suggest that the optimal level of this indicator would be at least 50%. Although very few countries reached that level in the mid-1960s, France or South Korea caught-up rapidly with this figure during the 1970s. Among developing economies, while some African countries, such as Botswana or Zambia, still have very low ratios, some Asian countries, such as Thailandia, have recently converged to that ideal level. The same applies in the Latin American case: whereas most countries were far away from the ideal value of 50% before the 1980s -being Honduras the only main exception- many of them (including some poor countries, like Guatemala) have reached it during the 2000s.

[23] Table 6 presents only partial evidence. The estimations for the full sample is available upon author's request. No data is presented from the mid 1980s to the late 1990s because UNESCO statistical yearbooks do not offer detailed information for tertiary education spending in Bolivia.

Table 6. Primary education support ratio over tertiary education support ratio in Latin America and other selected countries, 1965-2007

	1965	1970	1975	1980	2000	2007
France	10.82	19.12	19.79	34.39	59.42	50.72
United States	41.53(*)	63.66(*)	86.53(*)	62.15(*)	66.84	101.42
Korea, Republic of	16.93	27.04	24.77	54.23	220.05	188.20
Argentina	22.30	11.02	13.54	19.74	72.06	93.90
Bolivia	9.62	27.10	22.58	14.49	26.22	29.75
Brazil	0.22(a)	N.a.	18.07(*)	13.96(*)	19.25	58.34
Costa Rica	13.38	21.14	13.32	16.1(a)	N.a.	N.a.
El Salvador	5.59	4.63	8.56	8.31	96.18	57.96
Honduras	6.19	N.a.	10.97	66.65	N.a.	N.a.
Paraguay	7.00	7.43	11.97	N.a.	23.09	41.36
Uruguay	13.85	N.a.	N.a.	29.20	47.46	47.00
Venezuela	6.86	8.32	5.47(a)	5.76(a)	N.a.	N.a.

Sources: Own elaboration based on UNESCO Statistical Yearbooks of 1973 and 1980. Data for 2000 and 2007 were taken directly from UNESCO Institute of Statistics webpage (http://www.uis.unesco.org/).
Notes: N.a.: Not available. (a) Probably underestimated because the share of "other expenditures" or "non-distributed expenditures" was higher than 20% of total expenditure; (*) the original data adds in one single figure the expenditure made in both primary and secondary education. The 2000 figure in Jamaica, Mexico, Peru, Trinidad and Tobago and United States actually refers to 2001 and to 1999 in the case of Korea. The 2007 figure in Colombia and Thailand refers to 2008 and to 2006 in the case of Peru and Uruguay.

In the case of Bolivia, during the mid-1960s the priority of primary over tertiary education was similar to the Latin American average. Likewise, the increase in the ratio in the early 1970s suggests that the initial expansion of education spending under the military dictatorships tended to benefit primary education more than tertiary education. However, this change would be temporary since the ratio decreased again between 1975 and 1980. More strikingly, the low levels of the ratio in the 2000s indicate a relative lack of support to primary education that is particularly noticeable even by Latin American standards.

This last idea is further illustrated by two fiscal incidence analysis that were made during the "neoliberal" era and the years of Morales' administration (Breceda, Rigolini and Saavedra, 2009; Paz Arauco *et al.*, 2013). These works have proved that in-kind transfers in education have a great positive redistributive impact on the Bolivian poorest population. However, both studies indicate that this redistribution is generated by the revenue side –i.e. by the fact that the amount of services that the poorest families receive is several times higher than the amount of taxes that they pay. By contrast, both studies show that the allocation of education spending is fairly flat across quintiles or

deciles. Looking at Paz et al.'s (2013) results and according to Lustig, Pessino and Scott (2013), this characteristic would be explained by the high relative importance of tertiary education and its lower progressivity. Therefore, not by coincidence, both studies claim the need to foster pro-poor education spending in order to improve the redistributive impact of Bolivian public education expenditures.

The previous evidence would indicate that the 1952 Revolution did not have any long-term impact on the distribution of educational expenditure. The first indicator shows that there was no major change in the support ratio to primary education from 1950 to the mid 2000s. The second indicator suggests that, if there was a change in the prioritization of primary over tertiary education, this was hardly sustainable over time. Finally, even in the most recent years the relevance of tertiary over primary education spending is highly noticeable, and much higher than in several Latin American countries.[24] Therefore, whereas it is not possible to say that Bolivian public spending in education since 1952 has not benefitted the poorest, it cannot be stated either that it was particularly pro-poor.

4. Were the educational achievements revolutionary?

It could be argue that, whereas restricted, public investment in primary education from the 1950s onwards was enough to improve Bolivian educational outputs. This section does not measure the profitability of education spending, but analyses if the increase in education spending was contemporaneous to a similar increase in both quantity and quality indicators of educational output. To begin with, Table 7 shows the evolution of both the Bolivian literacy rate and the gross enrollment ratio in primary school throughout the 20th century. The table shows that no more than 20% of total population was able to write and read at the eve of the century. Although literacy rates increased thereafter, their growth rate was certainly low –around 1.1% per year, on average. Likewise, whereas literacy rates increased at a higher pace after the 1952 Revolution -2% per year, on average- a non negligible share of the Bolivian population was still unable to write and read at the eve of the 21st century. As a consequence of this

[24] See Contreras (1999, 2003) and Rodriguez (1998) in order to better understand the political economy factors which determine the allocation of a considerable share of expenditures in tertiary education.

restriction, the Morales' administration enacted the so-called "Yo si puedo" program, an aggressive alphabetization project exclusively oriented to the elderly. Hence, it was not until 2008 when the UNESCO could finally declare that Bolivia was a territory free of analphabetism (PNUD, 2010: 167).

Table 7. Literacy rates and gross enrollment ratio in primary schooling (%), 1900-2001

Literacy rate		Gross enrolment ratio in primary schooling	
1900	18.5		
1920	22.5		
1930	24.9	**1930/5**	25.8
1940	27.9	**1940/5**	35.7
1950	32.1	**1950/5**	47
1966	44.1	**1960**	67
1975	56	**1970**	68
1985	67.4	**1980**	84
1992	79.99	**1990**	95
2001	86.72	**2000**	115

Sources: Own elaboration based on: a) *Literacy rates*: from 1900 to 1985 obtained from Contreras (1999: Cuadro 1), from 1992 and 2001 obtained from the website of the Bolivian National Institute of Statistics (http://www.ine.gob.bo/indice/EstadisticaSocial); b) *Gross enrolment ratio*: Frankema (2009: 366-367).

Table 7 also presents Frankema's (2009) estimates of the evolution of the gross enrollment ratio in primary education. Beyond the low levels of the ratio in the mid-20th century, the table suggests that the growth rate of enrollment was similar before and after the 1952 Revolution, confirming thus one of the main claims by Contreras (2003: 264).[25] Likewise, it was not until the 1990s when Bolivia achieved a full primary school enrollment, with a substantial delay both by regional and international standards.[26]

As for the analysis of the quality of educational services, the Bolivian literature offers some partial evidence which suggests that no major change took place after the Revolution. For instance, Contreras (2003: 266) quotes the claims by Fernando Díez de Medina –Minister of Education at the time- which in 1958 regretted the restricted impact of the Revolution on a system in which pedagogical practices were still

[25] The growth rate estimated by Contreras is around 5.8%, which is much higher than that obtained using Frankema's estimates, which is around 3.3%.

[26] The only Latin American countries which evolved similarly to Bolivia were Guatemala and El Salvador. By contrast, countries like Zambia, Peru or Ecuador achieved full primary enrollment already in the 1970s (Frankema, 2009: Table 4).

dominated by archaic methods. In this regard, the curricula of 1948 survived in both primary and secondary education, at least, until the late 1960s (Ministerio de Educación, 1967). In the same vein, Contreras (2003: 270) quotes several studies which regretted the low productivity of educational expenditure as well as the considerable magnitude of dropout and repetition rates throughout the 1970s and 1980s.

The evolution of this last problem can be indirectly analyzed through the use of the methodology developed by Frankema (2008). Taking advantage of UNESCO statistical yearbooks, which presents the enrollment distribution per grade in both primary and secondary education, the author identifies the distribution of students enrolled by using the following formulas:

$$\frac{X_p}{X_p + X_s} * g_{pi}$$

$$\frac{X_s}{X_p + X_s} * g_{si}$$

Where, Xp and Xs refer to the number of students enrolled in primary and secondary, respectively, and gpi and gsi, refer to the percentage share of students enrolled in the ith grade of primary and secondary, respectively (Frankema, 2008: 440).

Following this methodology, I have estimated the evolution of the enrollment distribution during the twelve years of school in Bolivia from 1965 to 2005. As in the case of developing economies, my 1965 estimations show a distribution considerably skewed towards the first degrees of school –i.e. most of the students enrolled in primary and secondary education were concentrated in the first three grades. Other variables constant, this skewed distribution would be reflecting that a non-negligible share of Bolivian children "…was either repeating one or more years or dropping out before reaching the higher grades." By looking at the 1975 estimations and Frankema's Figure 1, repeating and drop out problems in Bolivia seem to have been more severe than in Ghana or Syria, or as bad as in Colombia. In the same line, whereas the skewness of the distribution tended to decrease over time, the 1998s estimations for Bolivia are similar to the figures reached in South Korea in the early 1970s.

Table 8. Distribution of grade enrollment in Bolivia in primary and secondary schooling by grade (%), 1965-2005

	1	2	3	4	5	6	7	8	9	10	11	12
1965	32.53	17.19	12.91	9.05	6.87	5.20	5.64	3.57	2.67	1.88	1.36	1.05
1975	23.52	15.68	13.07	9.58	8.71	6.10	6.10	4.36	4.64	3.61	2.58	2.06
1984	19.67	14.54	12.83	10.26	9.41	7.70	5.99	5.13	5.21	3.91	3.04	2.46
1998	13.79	12.11	11.42	10.44	9.55	8.70	7.39	6.27	6.46	5.25	4.39	3.71
2005	11.47	10.23	9.90	9.42	8.99	8.96	8.56	7.62	7.66	6.46	5.77	4.95

Sources: Own elaboration based on: from 1965 to 1984: UNESCO Statistical Yearbooks (1973, 1980, 197); from 1998 to 2007 from UNESCO Institute of Statistics webpage (http://www.uis.unesco.org/).

These distributional distortions would also reflect that children enrolled in primary education had a low probability to finish primary education and to graduate up to secondary education. The magnitude of this problem, which is certainly a current restriction in the Bolivian educational system (Contreras, 2003: 279) and particularly identifiable in the case of rural (Urquiola and Calderón, 2006) or poor families (PNUD, 2010: 169) can be measured by looking at the grade distribution ratio. This indicator has been estimated by Frankema (2008) and shows the probability of the children who enter to the school had to reach the sixth grade –i.e. the probability to finish primary. Table 8 presents these estimations for a selected sample of countries which share some common features with Bolivia: poor countries of delayed demographic transition (El Salvador, Honduras, Nicaragua); small countries in which education spending was high by Latin American standards (Costa Rica, Cuba, Panama, Jamaica); or small countries in which the indigenous population represents a non-negligible share of total population (Guatemala, Ecuador).

Table 8. Grade distribution ratio 6-1 (%), 1960-2005

	1960/1965	1970/1975	1980/1985	1990/1995	2000/2005
Bolivia	0.32	0.44	0.47	0.63	0.83
Costa Rica	0.41	0.68	0.85	0.79	0.9
Cuba	0.34	0.54	0.98	0.99	1
Ecuador	0.35	0.54	0.64	0.71	0.81
El Salvador	0.29	0.46	0.54	0.67	0.7
Guatemala	0.26	0.33	0.39		0.49
Honduras	0.2	0.33	0.39	0.56	0.61
Jamaica		0.69	0.92	0.96	0.94
Nicaragua	0.18	0.35	0.32	0.41	0.59
Panama	0.57	0.59	0.79	0.8	0.83

Sources: Frankema (2008: 445, 452).

This ratio shows again the restrictions of Bolivian educational outputs. During the early 1960s, the Bolivian indicator was not very different from other countries (with the exception of Panama). However, whereas countries like Cuba, Costa Rica, Jamaica and even Panama, made substantial progress until the 1980s, the Bolivian ratio did not improve. And, once more, it was not until recent years when the Bolivian indicator tended to converge to better records. Therefore, the analysis of both quality and quantity indicators suggests that education spending and educational achievements did not present any significant correlation from the 1952 Revolution onwards.

Conclusions

Taking advantage of the quantitative evidence presented in Chapter 1 and 2, this chapter has offered for the first time a long-term and comparative analysis of education spending in Bolivia. The chapter has shown that, whereas tax collection levels remained among the lowest in the region until the 1980s, education spending as a share of GDP converged to the levels of Chile and Uruguay -two of the most developmental States in Latin America- after the 1952 Revolution. This paradoxical fiscal equilibrium, however, did not imply a substantial modification of the quality and redistributive character of the Bolivian education system. Three main findings support this claim: public spending in education was hardly sustainable over time; the inexistence of a substantial support to primary education may have reduce the redistributive impact of education spending; and education outputs, either in quantity or quality terms, were often among the worse in the region.

Undoubtedly, some relevant questions require further research. For instance, it is still necessary to identify the main determinants of education spending as well as a plausible explanation of the structural limits which restricted the efficacy of public education expansion. Anyway, the particularities of the Bolivian case may give additional clues to understand the evolution of public education in Latin America throughout the 20th century. Likewise, the historical analysis of education spending may help to enrich the current debate in Bolivia, in a period in which a new educational reform is under discussion. In this line, two policy implications arise. On the one hand, beyond the police-makers' good desires, human capital spending may be hardly sustainable in the

long run unless tax bases are extended. On the other hand, as is suggested by the literature, there is still large room for more aggressive pro-poor educational policies.

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