



XI Congreso Internacional de la AEHE
4 y 5 de Septiembre 2014
Colegio Universitario de Estudios Financieros (CUNEF)
Madrid

Sesión: “El crecimiento económico en América Latina. Una perspectiva de largo plazo (s. XIX y XX)”

Título de la comunicación: Public Finances and Natural Resources in Bolivia, 1883-2010. Is there a fiscal curse?

Autor/es: José Alejandro Peres-Cajías

Filiación/es académica/s: Escuela de la Producción y la Competitividad, Universidad Católica Boliviana, San Pablo.

Dirección electrónica de contacto: jperes@mpd.ucb.edu.bo,
joseperescajias@gmail.com

Public Finances and Natural Resources in Bolivia, 1883-2010. Is there a fiscal curse?¹

José Alejandro Peres Cajías²

Abstract

Mining and oil exploitation have been the most dynamic sector of the Bolivian economy from independence onwards. This paper aims at analysing if this natural resources dependence has affected the long-term evolution (1883-2010) of Bolivian public finances through the so-called *rentier state* hypothesis (Ross, 1999). Two main conclusions arise from the analysis: *a*) the increase of natural resources revenues has not always been correlated with a decrease of the domestic tax effort; *b*) natural and non-natural resources revenues have allowed increasing human capital spending which, however, has not necessarily benefited the vast majorities of the country.

Introduction

The *rentier state* hypothesis (Ross, 1999) is one of the most fashionable explanations of the natural resource curse. This idea suggests that natural resource exploitation has two straightforward but contradictory effects on the fiscal capacity of natural resources-rich countries: it increases public revenues in the short-term but it also reduces the state's incentives to increase its tax base –i.e. states become revenue satisficers rather than revenue maximizers. It is also alleged that these short-term increases in public revenues attract political pressure from different interest groups which distort state's expenditures on their own benefit. Therefore, according to this hypothesis, natural resource exploitation generates short-term increases in public revenues which tends both to hinder the long-term fiscal sustainability of natural resources-rich countries and to benefit particular individuals or groups rather than the entire population.

¹ This research has benefited of financial support from the University of Barcelona through the APIF (2008-2012) fellowship program; from the Science and Innovation Ministry of Spain through the project ECO2009-13331-C02-02; from the Catalanian Research and Universities Grant Agency through the BE-DGR 2011 fellowship program. The author specially thanks Alfonso Herranz Loncán for his constant support and critical readings of previous drafts. The author also thanks Juan Flores, Alejandra Irigoin, Mar Rubio and Henry Willebald for their valuable comments to previous drafts. Usual disclaimer applies.

² Full-time profesor at “Escuela de la Producción y la Competitividad”, Universidad Católica Boliviana San Pablo. Contact mail: jperes@mpd.ucb.edu.bo; joseperescajias@gmail.com

Empirical research has proved some of the aforementioned ideas. On the one hand, Bornhorst, Gupta and Thornton (2009) and Thomas and Treviño (2013) identified a significant negative relationship between natural resources revenues and non-natural resources revenues, a finding that support the idea that natural resource-rich countries tend to reduce their domestic tax effort.³ On the other hand, Collier and Hoeffler (2005) found that a natural resources revenues increase have a significant negative effect on long-term economic growth. In line with Moore's (2007) proposal, Collier (2006) explains this finding by arguing that the higher the fiscal dependence on natural resources revenues, the lower the governance quality and, therefore, smaller the long-term economic potential of natural resource-rich countries.

However, the *rentier state* hypothesis has been also challenged. For instance, Hujo (2012: 6) recalls that some results of the natural resource curse literature are sensitive to the empirical methodology used and the periods chosen.⁴ So, by referring to different historical case-studies, she proposes that mineral-rich countries may effectively foster economic development by linking mineral revenues and both physical and human capital investment. In the same vein, different studies have identified the Chilean experience from 1880 to 1913 as a clear example in which the state used efficiently its natural resource revenues to foster economic growth (Cortez Conde, 2006; Gallo, 2008). Likewise, Bräutigam (2008) has proposed that indirect external taxes in Mauricio –which were importantly compounded by natural resources revenues- were beneficial both for state building and economic development throughout the 20th century.

Taking into account these critical observations to the *rentier state* hypothesis, this paper aims at contributing to the debate by analyzing the Bolivian experience from 1883 to 2010. This analysis may be instructive because of the extreme and constant dependence of the Bolivian economy on natural resources exploitation. Indeed, from independence (1825)

³ Bornhorst *et al.* (2009) worked with a panel data of 30 hydrocarbon producing countries from 1992 to 2005; Thomas and Treviño (2013) worked with a panel data of 20 African countries fiscally dependent on natural resources from 2000 to 2011.

⁴ See Stinjs (2005), Bunscheweiller (2008) and Haber and Menaldo (2011) for a discussion on this idea.

onwards, mining and hydrocarbon industries have not represented the biggest economic sector but certainly the most efficient of the Bolivian economy (Herranz and Peres-Cajías, 2013).⁵ Given this higher productivity (as well as the spatial concentration of the sector), it could be assumed that the Bolivian state was more tempted to collect money from these economic activities rather than to enforce taxes across the entire economy and population – i.e. to become a revenue satisficer rather than a revenue maximizer. However, the Bolivian experience also stands out as an interesting case because of the constant increase in the relative importance of social public spending within total expenditure from the late 1930s onwards (Peres-Cajías, 2014). Hence, despite a constant dependence on mining and hydrocarbon industries, it could be the case that the Bolivian state used its natural resources revenues for fostering human capital accumulation.⁶

These questions are explored through two different approaches. On the one hand, the paper examines the plausibility to define the Bolivian state as a revenue-satisficer by identifying when and why an increase on natural resources revenues led to a decrease of the domestic tax effort. On the other hand, the paper looks at the evolution *and composition* of human capital spending in order to identify the impact of natural resources revenues on human capital accumulation.⁷ Two main conclusions are obtained from these analyses: *a)* the increase of natural resources revenues has not always been correlated with a decrease of the domestic tax effort; *b)* natural and non-natural resources revenues have allowed increasing human capital spending which, however, has not necessarily benefited the vast majorities of the country.

⁵ The composition of the mining and hydrocarbon sector has considerably changed throughout time. From independence to the end of the 19th century silver exploitation represented at least three quarters of the sector and the remaining quarter was compound by other minerals such as copper, tin or gold. During the first half of the 20th century, tin exploitation became the main activity of the sector -70% on average- and the relative importance of silver turned similar to the rest of minerals. From the mid-1950s to the mid-1980s the relative importance of tin decreased because of the upsurge of oil and natural gas exploitation. Thereafter, the hydrocarbon sector replaced mining as the most important activity and, since the early 2000s, natural gas exploitation represents around half of the sector.

⁶ This could be the case since Peres-Cajías (2014) defines social public spending as the aggregation of education, health, welfare and other social public expenditures. Human capital spending is compound by education and health spending.

⁷ Both analyses contribute to two branches of the natural resource curse literature which previous research defined as scarcely explored: the relationship between natural and non-natural resources revenues (Thomas and Treviño, 2013: 3-4) and the relationship between natural resources revenues and social policy (Hujó, 2012: 7).

Therefore, the paper suggests that natural resources revenues do not hinder automatically the domestic tax effort of natural resources-rich countries. However, it also stresses that the usefulness of natural resources revenues as a developmental engine is related not only to the expansion of physical or human capital investment but to its effective allocation. The rest of the document is organized as follows. Next section stresses the fiscal singularities of the Bolivian experience and its relevance as a case-study. The relative importance of natural resources revenues is measured thereafter as well as its relationship with non-natural resources revenues. Then, the paper focuses in the long-term evolution of both human capital spending and human capital indicators such as literacy or primary enrollment. Some final conclusions are offered at the end of the document.

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; 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 levels⁸ and the fiscal priority of human capital spending (namely education and health) exclusively,⁹ and consider those four institutional equilibrium categories as implicit fiscal pacts. 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.¹⁰

Figure 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.¹¹ 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

⁸ Tax revenues represent the most relevant part of Latin American public 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, 2002; Moore, 2007). Therefore, the study of the tax pressure –the domestic tax effort- may be used as an instrument to analyze the evolution of both the government size and the government’s legitimacy in the public opinion.

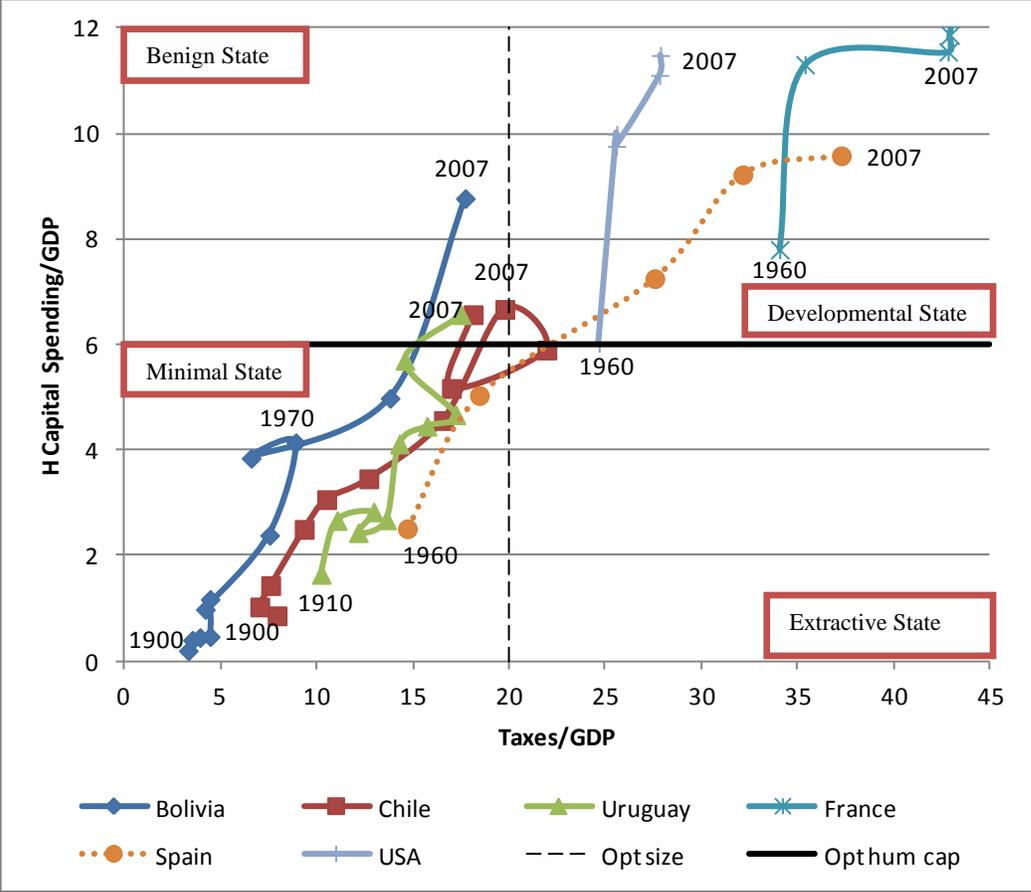
⁹ My analysis is limited to human capital investment because (especially during the ISI period), public investment in physical capital in Latin America was carried out not only by the central or general government (which is the object of this research) but also by state-owned companies.

¹⁰ 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).

¹¹ 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).

exceed 20% and 6% of GDP, respectively. By contrast, those levels were surpassed both in the US and France already in the 1960s.¹² 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.

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



Sources: a) *Bolivia*, Peres-Cajías (2014); b) *Chile*: from 1900 to 1989, 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/sergiolespuelas/>) and from the OECD database (www.oecd.org).

¹² 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.

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. Can this peculiar fiscal transition towards a benign-state be explained by the *rentier state* hypothesis? Was low-taxation the expression of a revenue-satisficer state? Or, by contrast, did the expansion of human capital spending allowed overcoming the natural resources curse?

Bolivian fiscal reliance: was there an offset between natural and non-natural resources revenues?

This section explores the plausibility of the *rentier state* hypothesis in the Bolivian case by analyzing the long-term interplay between natural and non-natural resources revenues.¹³ Following Haber and Menaldo (2011), the paper considers as natural resources revenues those taxes and royalties paid by either privately-owned or state-owned mining and hydrocarbon firms, as well as dividend payments or direct transfers paid to the government by state-owned firms; non-natural resources revenues are compound by the rest of public revenues. Likewise, following Bornhorst *et. al* (2009) and Thomas and Treviño (2013), the fiscal pressure generated by both kind of revenues is measured as:

¹³ From 1883 to 1989, public revenues were obtained from Peres-Cajías (2014) and refer to *total current* revenues of the Bolivian central government. The use of central government statistics is due to the lack of quantitative evidence on departamental (state) and local revenues. The representativeness of central government statistics of the overall evolution of Bolivian public revenues has been proved in Peres-Cajías (2014). In contrast to Peres-Cajías (2014), this paper starts in 1883 because of the inability to disaggregate revenues in 1882. From 1990 to 2010, public revenues were obtained from UDAPE’s website (www.udape.gob.bo); see Peres-Cajías (2014) for a discussion on the usefulness and shortcomings of this specific source. These revenues refer to *total revenues* of the Bolivian general government. This switch to general government statistics is explained by the availability of data and the need to account for the higher relevance of revenues both from municipalities (since 1995) and departamentos (since 2005).

$$\text{Natural Resources Fiscal Pressure}_t = \frac{NRrev_t}{NRgdp_t}$$

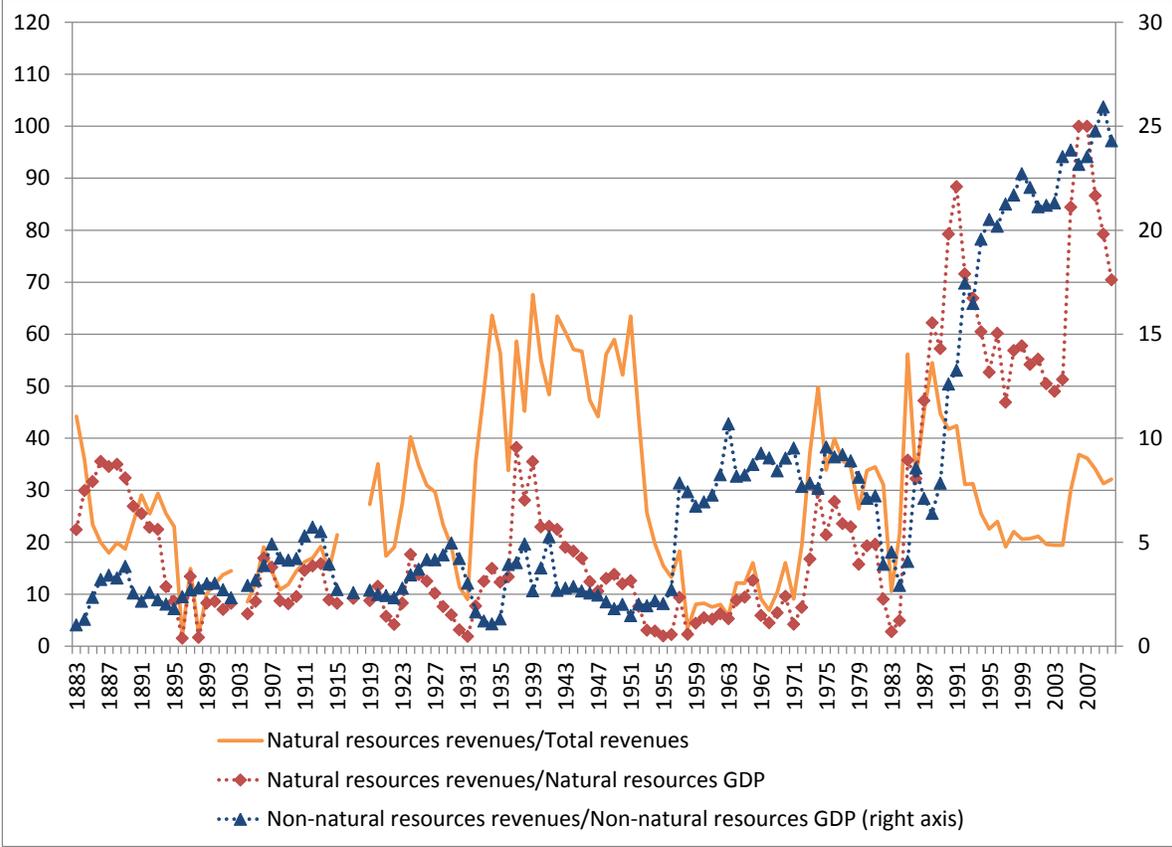
$$\text{Domestic Tax Effort}_t = \frac{NNrev_t}{NNgdp_t}$$

where $\frac{NRrev_t}{NRgdp_t}$ and $\frac{NNrev_t}{NNgdp_t}$ denote the ratios of natural and non-natural resources revenues to the natural and non-natural GDP at time t .¹⁴

Figure 2 shows that the relative importance of natural resources revenues within total revenues has considerably varied throughout time. Indeed, during the last quarter of the 19th century this ratio decreased from 40% to 10% of total revenues. The reversal occurred during the first third of the 20th century and natural resources revenues stabilized around 60% of total revenues from the early 1930s to the early 1950s. Thereafter, this ratio decreased sharply and accounted just for 10% of total revenues. The relative importance of natural resources revenues increased again in the early 1970s and, beyond some oscillations, accounted for 40% of total revenues until the early 1990s. During these years a new reduction took place which, once more, has been followed by a new increase since the mid-2000s.

¹⁴ It has been preferred to use the respective GDP rather than the aggregate GDP in order to discard any possible bias in the analysis. For instance, an increase on mining or hydrocarbon exploitation may increase the ratio on natural resources revenues to GDP as well as to reduce the ratio on non-natural resources revenues just because of the GDP increase and not necessarily because of a lower domestic tax effort (Bornhorst *et. al*: 2009: 443). Hence, the non natural resources GDP may constitute a closer measure of the domestic tax base (Thomas and Treviño, 2013: 11). From 1883 to 1950, GDP data has been obtained from Herranz and Peres-Cajías (2014); from 1950 onwards, GDP data has been obtained from ECLAC website (www.eclac.cl).

Figure 2. Natural and non-natural resources revenues in Bolivia, 1883-2010 (%)



Sources: See text.

Moreover, if we accept 20% as a fair threshold to define a country as fiscally dependent on natural resources revenues (Thomas and Treviño, 2013: 4-5), the new evidence stresses that the Bolivian fiscal dependence has not been constantly high. This is not an irrelevant finding since the experience of some Asian, African and Latin American oil producers suggests the opposite (see Haber and Menaldo, 2011). Likewise, the contrast between Figure 2 and previous evidence stresses that the Bolivian fiscal reliance has not been necessarily among the higher in Latin America throughout the entire period under analysis. For instance, from the mid-1950s to the early 1970s, the Bolivian ratio was similar to the Chilean one and five times lower than the Venezuelan one (Haber and Menaldo, 2011).

More striking, Figure 2 shows that a natural resources revenues increase has not been always followed by a decrease or even stagnation of non-natural resources revenues. Three main variables must be considered in order to understand this unstable pattern: the composition of Bolivian mining and oil industries, the evolution of commodity prices and

domestic political instability. During the last quarter of the 19th century, the evolution of natural resources revenues has been led by the initial stabilization and subsequent downward trend of the international price of silver. During the first third of the 20th century, the progress of natural resources revenues was related with the evolution of the international price of tin as well as to certain state efforts to increase the tax pressure on mining. The results of these efforts, however, were not sustainable across time and each increase of natural resources revenues was rapidly followed by a new decrease. This stresses that the state's ability to increase natural resources revenues must not be considered as an essential capacity of natural resources-rich countries but as the result of bargaining between different political actors which own different political strength. In effect, from the 1930s onwards, sharp increases in Bolivian natural resources revenues have not been only correlated with the evolution of international prices but also with the Bolivian state's ability to impose its fiscal interests over those of mining private-owners and the nationalization of the main mining and hydrocarbon companies. These increases of natural resources revenues offer, in turn, two different perspectives: they may have fostered rentier attitudes among the Bolivian population but they were also essential for the Bolivian state survival after fiscal traumatic episodes such as the Chaco War (1932-1935) or the external debt crisis (early 1980s).

As for the evolution of non-natural resources revenues, the new evidence stressed a fairly stagnated pattern during the last quarter of the 19th century. Whereas some increases took place in very specific periods, non-natural resources revenues oscillated around the same mean during the first half of the 20th century. This pattern must not been only related with the lack of political will to increase taxation but to some structural restrictions which constrained taxation to some specific economic activities and agents. During the second half of the 20th century, sharp increases in non-natural resources revenues took place after the macroeconomic crises of the early 1950s and early 1980s. These changes must be related with the trauma generated by the crises and the upsurge of a new political consent towards the need to increase the domestic tax effort. Despite this common pattern, the evolution of the domestic tax effort diverged after the initial jump which took place during

these two episodes: whereas it stagnated during the 1960s and 1970s, it continuously increased during the 1990s and 2000s.

The last process is not an irrelevant one since it suggests that the increase of natural resources revenues which took place during the late 1980s was accompanied by a political consensus directed to continuously improve the domestic tax effort. This represent an important history lesson to Bolivians since, as it was previously suggested, an extreme dependence on certain revenues have hindered the accomplishment of some of the most important policy priorities of the Bolivian government (Peres-Cajías, 2014). Next section goes further on this issue by analyzing one of the most important expenses of the Bolivian government since the late 1930s.

Escaping the curse through human capital spending?

Researchers focused in the evolution of developing countries' public finances have stressed that an unbalanced structure of public revenues –a dependence on certain revenues- is not bad as itself; instead, it may allow collecting the money necessary to invest in physical or human capital (Richardson and Hildreth, 1999; De Ferranti, Perry, Ferreira and Walton, 2003: 132-140). In the same vein, it has been argued that natural resources revenues should not be considered a curse but a blessing since it allows expanding the fiscal capacity of natural resources-rich countries (Hujo, 2012). Indeed, as has been stressed in the introduction, this strategy has allowed different countries escaping from the natural resource curse. Was Bolivia among this selected group of countries?

Table 1 starts answering this question by showing the evolution of Bolivian human capital spending in comparison with three other Latin American cases: Chile, Peru and Uruguay. 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 and well below the Chilean or Uruguayan ratios, Bolivian public spending in education increased substantially and became higher than the Uruguayan one

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 1. Latin American Central Governments' spending in education and health as a share of GDP (% , 10 years average), 1900-2010

	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
2000-2010	6.07	2.70	3.69	2.87	2.89	1.39	3.03	3.54

Sources: a) *Bolivia*: Peres-Cajías (2014).; b) rest of countries from 1900 to 1989: *Chile*: Base de datos EH CLIO LAB, Iniciativa Científica Milenio Mideplan; *Peru*: Portocarrero, Beltrán and Romero P. (1992); *Uruguay*: Azar *et al.* (2009); c) rest of countries from 1990 to 2010 from ECLAC database: www.eclac.cl.

Notes: N.a.: Not available.

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. Indeed, 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 (Peres-Cajías, 2014). 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 goals of the 1952 Revolution and the willingness to expand educational services across the entire country (Dirección Nacional de Informaciones, 1962). The expansion went on during the military dictatorships (1964-1982), as a result of the military government's

intentions to consolidate the so-called Military-Peasant pact¹⁵ 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).

This expansion was followed by a crisis in education spending during the early 1980s, provoked by the macroeconomic disorders of that period and made worse by the acceleration of demographic growth. Anyway, 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.¹⁶ 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).

These results must not be minimized but they do not necessarily mean that the Bolivian government was able to differentiate from a *rentier state* in which natural resources revenues are used to benefit a small group of individuals rather than the entire population. Indeed, the following indirect distributional analysis shows that the expansion of public education expenditure did not necessarily benefit the vast majorities of the country.¹⁷ To

¹⁵ 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 1953 Agrarian Reform.

¹⁶ See also Contreras and Talavera (2005).

¹⁷ Moreover, it must be noticed that education spending in Bolivia is still far away from Latin American leaders in per capita terms. Distributional analyses are commonly made through incidence analysis. However,

begin with, given that primary education tends to benefit a higher share of the population, the literature suggests that the higher the support to primary education, the higher the potential redistributive positive impact of education spending. 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.¹⁸

In order to assess if the Bolivian case fits into this description, I have estimated the tax support ratio for primary education as follows:¹⁹

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

Table 2 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 decreased during those years when natural resources revenues increased considerably (1970s and late 1980s). The 2010 figure appears as exceptionally high, which would suggest that the recent increase of natural resources revenues and the efforts carried out by Morales' administration (2006 onwards) 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 the long-term implications of this change (see below).

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 education spending through several indicators, which were originally designed to provide indirect evidence about who benefited most from education spending.

¹⁸ 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.

¹⁹ 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).

Table 2. 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 education expenditure. (a) In 1988; (b) in 1989; (c) in 1985.

Another criticism to the allocation of education expenditure in Latin America stresses the existence of a systematical favoritism towards tertiary over primary education –i.e. a favoritism towards a reduced share of the population. Authors like Frankema (2009) or Lindert (2010) have used the following indicator to test this claim:

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

I have reconstructed this ratio for Bolivia, most Latin American countries and some other countries which may constitute a good reference from 1965 to 2007 (Table 3).²⁰ 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.

²⁰ 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 3. 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
Thailand	5.14	3.75	11.51	18.96	49.44	93.09
Botswana	N.a.	N.a.	1.38	N.a.	N.a.	4.92
Zambia	N.a.	N.a.	5.59	N.a.	4.36	N.a.
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
Chile	3.30	N.a.	8.55(a)	10.13	74.41	103.90
Colombia	3.09(a)	3.99(a)	19.56(a)	11.58	40.10	47.61
Costa Rica	13.38	21.14	13.32	16.1(a)	N.a.	N.a.
Cuba	N.a.	N.a.	N.a.	37.37(a)	29.80	117.51
Dominican Rep	2.11	6.12	8.89(a)	5.96(b)	N.a.	N.a.
Ecuador	2.21	17.41	22.86	22.62(a)	N.a.	N.a.
El Salvador	5.59	4.63	8.56	8.31	96.18	57.96
Guatemala	9.13	13.11	9.41	12.12(a)	N.a.	54.24
Haiti	6.00	N.a.	3.27	N.a.	N.a.	N.a.
Honduras	6.19	N.a.	10.97	66.65	N.a.	N.a.
Jamaica	2.85(a)	9.08(b)	N.a.	5.10	18.97	N.a.
Mexico	6.13(a)	12.51(b)	15.56(b)	9.04(b)	37.78	35.78
Nicaragua	13.17	18.39	20.65	30.13	N.a.	N.a.
Panama	20.21	12.29(a)	23.02(a)	39.22	43.92	N.a.
Paraguay	7.00	7.43	11.97	N.a.	23.09	41.36
Peru	11.94(a)	109.17(b)	148.58(b)	139.65(a)	32.95	66.32
Puerto Rico	24.63(*)	39(*)	54.7(*)	N.a.	N.a.	N.a.
Trinidad and Tobago	N.a.	3.97	5.06	13.02	18.01	N.a.
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 education expenditure; (b) the original source indicates that expenditure in either first or third education was underestimated; (*) 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. Thereafter, the increase in the ratio in the early 1970s suggests that the initial expansion of natural resources revenues 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 has been also stressed by two fiscal incidence analysis which were carried using fiscal data from 2004 and 2009 (Breceda, Rigolini and Saavedra, 2009; Paz Arauco *et al.*, 2013).²¹ 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 spending 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.

Summing up, 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.²² Therefore, this would indicate that, despite its constant increase

²¹ Notice that fiscal pressure on oil and mining activities was particularly high in both years.

²² 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.

during the second half of the 20th century, education spending did not suffer any substantial change directed to benefit the vast majorities of the country.²³

The lack of an explicit commitment towards primary education would help to understand the country's delay in terms of full literacy and full primary school enrollment. In relation to this, Table 4 shows that no more than 20% of total population was able to write and read at the eve of the 20th 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 during the second half of the 20th century -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 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 4. 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).

²³ Notice, however, that the limited evidence previously presented prevents to say that Bolivian public spending in education since the early 1950s *has only* benefited a reduced elite.

Table 4 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 early 1950s. Thus, it was not until the 1990s when Bolivia achieved a full primary school enrollment, with a substantial delay both by regional and international standards.²⁴

Meager education outcomes have not been restricted to quantitative but also to qualitative indicators. This 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, X_p and X_s refer to the number of students enrolled in primary and secondary, respectively, and g_{pi} and g_{si}, 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 2005.²⁵ 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

²⁴ 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).

²⁵ These results are available upon author's request.

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.

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. This ratio shows again the restrictions of Bolivian educational outputs. During the early 1960s, the Bolivian indicator was not very different from other Latin American 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 during the second half of the 20th century.

Conclusions

Mining and oil exploitation have been the most dynamic sector of the Bolivian economy from independence onwards. This paper have analysed if this natural resources dependence has affected the long-term evolution (1883-2010) of Bolivian public finances through the so-called *rentier state* hypothesis (Ross, 1999). Two main conclusions arise from the analysis: *a*) the increase of natural resources revenues has not always been correlated with a decrease of the domestic tax effort; *b*) natural and non-natural resources revenues have allowed increasing human capital spending which, however, has not necessarily benefited the vast majorities of the country. Therefore, if history may offer policy lessons, it stands

out that natural resource dependence do not necessarily hinder the domestic effort of natural resources-rich countries. However, it also suggests that the usefulness of natural resources revenues as a developmental engine is related not only to the expansion of “good spending categories” but to its effective allocation.

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