The Effects of Corporate Tax Rates on Government Spending on Health and Education: Comparing Bolivia and Paraguay

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1. Introduction:

Throughout history, different movements from all sides of the political spectrum have repeatedly disagreed on the role of taxation as a driver of economic development. Some critics of orthodox political economy, ranging from Keynes (1937) to Piketty (2015), have recognized the role of taxes as an instrument for a more equal distribution of income, and have long defended that they have a positive impact on a society's aggregate demand and economic growth. Conversely, libertarian economists and proponents of the Austrian School of Economics have oftentimes expressed doubts regarding the positive effect of high taxes, which they generally consider an obstacle for entrepreneurship and growth (Von Mises, 1980).

Such disagreements have generated stark political debates on the optimality and desirability of different taxes, with corporate taxes often being brought to the center of attention. In the United States, for example, President Biden has recently proposed the increase of corporate tax rates from 21% to 28% (Tax Foundation, 2022). In the United Kingdom, on the other hand, corporate tax rates have been drastically reduced from 52% to 35% by Prime Minister Thatcher, as part of a larger effort to diminish the country's tax burden (Forbes, 2017). In developing countries, this debate is of even greater relevance, since they are particularly vulnerable to a 'race to the bottom', a phenomenon through which different jurisdictions compete for lower taxes in an attempt to attract investments from the Global North (Abbas & Klemm, 2013).

Latin America offers a particularly interesting political and economic landscape to analyze the effects of divergent corporate tax rates. After going through a process of democratization in the 1980s, Latin American economic policies became much more transparent and subject to popular and domestic pressures (Weyland, 2004). Throughout the 1990s, most countries in the region attempted to open up their economies through liberal economic policies, thus drastically lowering corporate taxe rates in conformity with the prescriptions of the Washington Consensus (North and Clark, 2018). A decade later, however, a trend known as the 'Pink Tide' came upon the region, whereby various leftist leaders were elected all throughout the continent, in what many have called a "post-neoliberal" period (Ruckert & MacDonald, 2017). Many of these new governments revoked the liberal policies put in place by their predecessors, often increasing corporate taxes in an attempt to finance and strengthen welfare programs. This scenario provides a fertile field for the investigation of the effects of corporate tax rates on government spending, since it offers a wide range of

cases in which different fiscal policies were used with different effects on government tax collection and expenditures.

In this research, I carry out a cross-country comparison of Bolivia and Paraguay, examining the two countries' social, economic and fiscal policies between 2006 and 2014 in order to answer the following research question: How have corporate tax policies affected government spending on health and education in Latin America? The question will be answered qualitatively and quantitatively, by measuring the effects of the countries' divergent corporate tax rates, as well as examining political and economic factors that explain Bolivia's and Paraguay's levels of government spending on health and education.

Globalization and freer flows of capital have fostered increased tax competition around the world, with multinational corporations often being in the spotlight for taking advantage of tax-friendly jurisdictions to avoid taxes. This has prompted increased efforts towards international tax cooperation and justice, with constant international and domestic debates regarding the optimal tax rate to adopt (Tanzi, 2005). Debates on this issue tend to be approached through a purely economic lens, however, often neglecting and overlooking the social effects of different tax rates. Given this scenario, I intend to shed light on the social and human dimensions of corporate taxation, examining how different types of corporate tax rates can have a real impact on investments in welfare and social security, and contributing to the literature on corporate fiscal governance, welfare and development in Latin America.

2. Literature Review

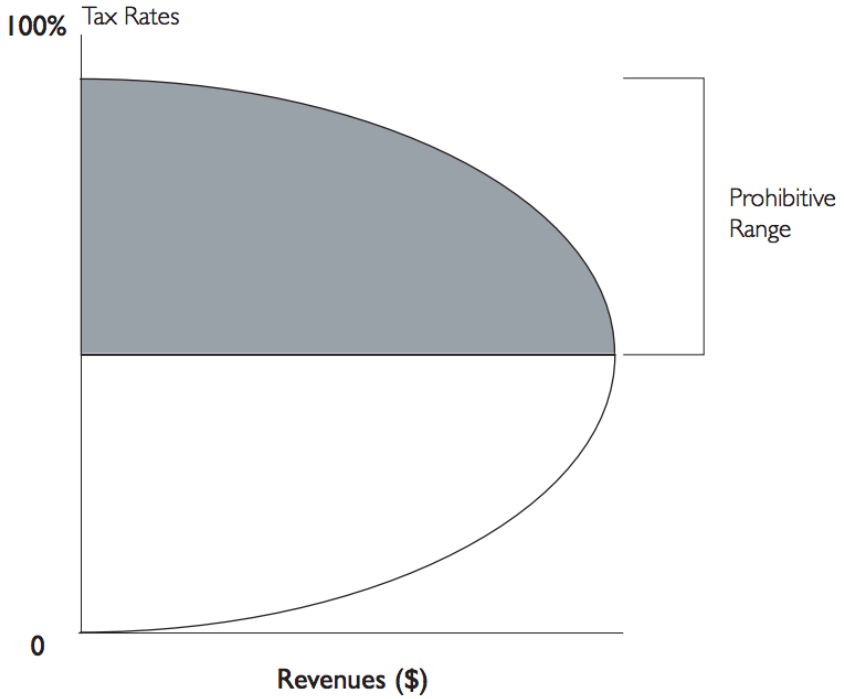
2.1 The Effect of Tax Rates on Tax Revenue

In the past, much has been written and researched on the effects of different degrees of taxation on the public coffers, and on how such revenues are later spent and allocated by the State. As early as 1751, Italian economist Galiani (1751) already warned against excessive increases in tax rates, arguing that such a policy would not yield higher revenue to the state. Only a year later, Hume (1752) made similar remarks in his essay *Of Taxes,* in which he states that "exorbitant taxes (...) destroy industry" (p. 118). It was not until the 1970s, however, that the study of such relationship gained momentum in the United States, after economist Arthur Laffer sketched a curve plotting tax rates and government revenue on a napkin to members of the Ford administration, thus introducing the concept that later became known as the "Laffer curve" (Wanniski, 1978).

The Laffer curve represents taxable income elasticity by plotting government revenue on one axis and tax rate on the other axis. According to Laffer (2004), the only two tax rates at which the government will obtain no revenue are 0% and 100%; at the former rate, there is no taxable income, while at the latter tax rate, all production is halted and discouraged, given that no profit can be made. The Laffer curve thus assumes that as tax rates move away from the two extremes and towards the center, government revenues will progressively increase until an optimal tax rate is reached, at which point revenues are maximized. The area between the optimal tax rate and a tax rate of 100% is called the "prohibitive range". Tax rates within that range are particularly undesirable and very responsive to tax cuts, since they reduce both government revenue and production rates, thus having negative welfare effects (Laffer, 2004). Though the concept has been widely accepted among economists, no consensus has been reached regarding the exact shape of the curve or the exact optimal tax rate that generates the maximum tax revenue, since those may depend on the openness of an economy, its size, its natural resource endowments, among others (Trabandt & Uhlig, 2012; Laffer, Moore & Williams, 2011).

Figure 1:

Laffer curve



Note: Figure extracted from Laffer (2004).

Ever since the popularization of the Laffer curve, many scholars have attempted to identify the optimal tax rate in different types of jurisdictions. Brill and Hassett (2007), for example, have applied the Laffer curve to members of the Organization for Economic Cooperation and Development (OECD), concluding that by 2005, a tax rate of 26% maximized government revenue among those nations. Conversely, when applying the Laffer curve to the Eurozone, Espanhol (2014) demonstrates that optimal tax rates ranged from as low as 20.99% in Cyprus to 36.86% in Germany. The study also shows that corporate tax rates in Greece, Portugal, Spain and Slovenia are in the prohibitive range, meaning that there is an overtaxation of corporate income in those peripheral economies of the Eurozone.

Literature applying the Laffer curve to the developing world is still very scarce, nevertheless, and it is often concerned with the optimal tax rate for economic growth rather than the maximization of government revenue, reflecting the great academic concern for the purely economic effects of taxation, in detriment of the social and welfare effects. Ji, Ye and Zhang (2013) apply the Laffer curve to China and conclude that the optimal enterprise tax rate in the country is 21.82%. Conversely, studies investigating the optimal tax burden for

economic growth have proposed a taxation of 27.69% of the gross domestic product in Ghana (Ofori-Abebrese & Baidoo, 2021) and of 17.6% in Georgia (Kbiladze, 2015).

One of the most important determinants of optimal tax rate is the elasticity of demand and supply of the goods or services produced (Miravete, Seim & Thurk, 2018). When comparing the two largest economies in Africa, for instance, Saibu (2015) concludes that South Africa's optimal tax burden is 15% of GDP, while Nigeria's is 30% of GDP. The article discusses how the Nigerian economy is largely reliant on its oil and gas industries - two sectors of low demand and supply elasticity - and hence, can be taxed at higher levels without such significant decreases in productivity (Lin & Jia, 2019).

Besides that, a series of other economic, social and political factors can have a significant impact on government tax revenue. Scholars have consistently emphasized that role of rule of law and control of corruption as determinants of levels of government revenue from taxes. (Asmah, Kwaw & Titriku, 2020; Ajaz & Ahmad, 2010; Arif & Rawat, 2011; Chaudhry & Munir, 2010). Furthermore, multiple scholars have warned of tax evasion as an important obstacle for the collection of taxes, especially in developing countries, leading to an erosion of the tax base and the collection of suboptimal tax revenues (Gang, Sanyal & Goswami, 1998; Takats & Papps, 2008).

2.2 The Effect of Tax Revenues on Government Spending

In addition, the relationship between government revenue and government spending is rather complex, and no scholarly consensus has been reached regarding the effect the two variables have on each other. In the 1970s and 1980s, the tax-and-spend and the spend-and-tax hypotheses began to gain momentum among economists. The former, argued by Friedman (1978), stated that increases in government revenues led to an increase in public spending, while the latter, defended by Peacock and Wiseman (1979), argued the opposite effect between the two variables. The fiscal synchronization hypothesis, brought forward by Meltzer and Richard (1981), argues that there is bi-directional causality between the two variables. Scholars have also obtained divergent results across different government levels; Miller and Russek (1990), for example, find that there is a bi-directional causality between government spending and tax revenues at the federal, state and local levels, while Ram (1988) observes an effect from revenues to expenditure at the federal level, and from expenditure to revenues at the state and local levels.

More recently, far-reaching studies have been carried out, taking into consideration multiple samples of state budgets; Payne (1998), for instance, has gathered data from all American states, while Chang, Liu and Caudill (2002) have investigated Japan, South Korea,

Taiwan, the United Kingdom, and the United States. Both articles have found significant evidence for the tax-and-spend theory. Similarly, studies investigating developing countries have often concluded that tax revenues positively impact government spending; Narayan and Narayan (2006) find such evidence in El Salvador, Venezuela, Chile, Haiti and Mauritius, while similar conclusions are drawn about Turkey (Darrat, 1998) and Sri Lanka (Maitra, 2011), making the tax-and-spend hypothesis the best supported one in most recent literature, at least for developing economies.

In this research, I investigate the effect of corporate tax rates on government expenditure on health and education. With regards to expenditures on health, studies on Africa have shown that the major determinant of expenditure is the percentage of the population aged over 65 (Gbesemete & Gerdtham, 1992). Unsurprisingly, Samadi and Rad's (2013) study on Central Asian nations emphasize the percentage of the population under 15 years old as negatively correlated with government expenditure on health. The most holistic study carried out on this topic, by Ke, Saksena and Holly (2011), studies 143 countries, and find that state's fiscal capacity is also positively correlated to higher health expenditures, thus partially corroborating the tax-and-spend hypothesis, and concluding that states with higher fiscal space spend more on health.

Government expenditure on education seems to have similar determinants. Busemeyer's study (2006) on the OCDE demonstrates that the share of the young population is positively correlated with higher public spending on education. Grob and Walter (2007)'s study on Swiss cantons and Chatterji, Mohan and Dastidar's (2014) research on Indian states reach the same findings.

There is a general scarcity, however, in literature on the determinants of government expenditures on health or on education in Latin America. Martin-Mayoral and Sastre (2017) investigate the determinants of social spending as a whole in the region, showing that a higher portion of the population aged over 65 has a strong positive effect on government expenditures on health, but a negative one on expenditures on education. Their study also shows that right-wing governments have had lower levels of social spending than left-wing ones; and that authoritarian regimes have achieved higher levels of social spending than democracies, since they are held less electorally accountable to the population (Min, 2018).

It is clear that the determinants of social spending - whether on health or on education - are rather similar across different regions, and recurrent in the scholarly debate. Besides the economic and fiscal factors, which I will attempt to analyze through my quantitative models, three other factors have a significant effect on government expenditures in Latin America 1)

Demographic pyramid, 2) Level of Democratization, and 3) Government ideology. I will attempt to examine renowned reports on each of these three factors in order to assess the impact each of them has on government spending on health and education.

2.3 Theoretical Framework and Contributions

This thesis will build on the assumptions of the Laffer curve and the tax-and-spend hypothesis to investigate the effect of corporate tax rates on public health and education expenditures in Latin America. The vast majority of applications of the Laffer curve to middle-income developing states suggest tax rates between 15% and 30% as maximizers of government tax revenue (Laffer, 2004; Ji, Ye & Zhang, 2013; Espanhol, 2014). Therefore, it can be assumed that corporate tax rates above or below this range lead to lower tax bases and suboptimal levels of government revenues in Latin America. In addition, based on the tax-and-spend hypothesis, discussed previously, I expect that higher government tax revenues will lead to higher levels of government spending. My paper will therefore test two hypotheses:

H1: Governments with a corporate tax rate between 15% and 30% will achieve higher levels of corporate tax revenue than governments with corporate tax rates outside this range.

H2: Higher levels of government revenue will lead to greater government expenditures on education and health.

This research represents an attempt to contribute to the existing literature on the effects of different fiscal strategies on government expenditures on social welfare, a topic of great relevance for economic and social policymakers across the region, and that can have significant implications for the continent's fiscal and economic policies, as well as for their prospects of human capital and development.

3. Methodological Approach

3.1 Conceptualization and Operationalization

In order to carry out my research, the conceptualization of a number of terms is in order. Firstly, corporate tax is defined as a tax levied on the income and capital of any corporation or similar entity, in accordance with the OECD's (2022) definition. In order to operationalize this variable, I will use statutory corporate tax rates, which is the rate imposed by law on taxable income within a certain bracket. Though in many countries, statutory tax rates may change depending on the income made by the enterprise, that is not the case in the two countries I am investigating, which apply the same rate on taxable income of all enterprises (KPMG, 2014; Deloitte, 2016). The data on statutory tax rates is drawn from the Tax Foundation, which is a renowned think tank specialized in researching fiscal policies around the world (Tax Foundationb, 2022).

Moreover, corporate tax revenue is defined as the funds collected from corporate taxes by the state. Government expenditure on education is conceptualized as the public funds allotted by the government to educational activities. Government expenditure on health is conceptualized as the public funds designated by the government to all types of healthcare and health promoting activities. In this thesis, both corporate tax revenues and government expenditures will be operationalized as percentages of GDP. For corporate tax revenues, I use OECD indicators: "tax revenues on income, profits, and capital gains of corporates" (OECD, 2022). I then calculate the percentage of the GDP accordingly. For government expenditures on health and education, I use data from the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) on public spending on education and health as a percentage of GDP (CEPAL, 2022).

3.2 Case selection

In this research, I will follow a Most Similar Systems Design (MSSD). MSSD entails selecting two cases that are as similar as possible in most features - such as culture, history, economy, size - but that differ in the one key aspect that is being investigated. The similarities serve as controlling variables and contribute to isolating the independent variable and establishing if it is the cause of the dependent variable (Halperin & Heath, 2017).

The present study focuses on government expenditure on social welfare and investigates the effects of corporate fiscal policies in Latin America. I aimed at finding two Latin American nations that had similar economic, social and historic characteristics, but considerably different corporate fiscal policies. I have chosen Bolivia and Paraguay, since the former has a corporate tax rate of 25%, considerably higher than the 10% tax rate levied on

enterprises in the latter. Furthermore, Bolivia's corporate tax rate is between 15% and 30%, the range in which most optimal tax rates lay according to most applications of the Laffer curve to middle income countries; Paraguay's corporate tax rate is outside such a range by 5 percentage. In addition, Paraguay and Bolivia share a series of characteristics; they are both middle-income countries, of similar area, population and with comparable GDP per capita levels. Moreover, they are both land-locked and Spanish-speaking nations in South America, with a shared a past of Spanish colonization, and having attained independence less than fifteen years apart from each other, making them two appropriate cases to investigate through MSSD.

3.3 Methodology:

I will use both qualitative and quantitative methods in order to establish a causal relationship between corporate tax rates and government revenues, and between government revenues and government expenditures. I will carry out t-tests to quantitatively compare the means of government revenue and government expenditures of Paraguay and Bolivia, and establish if there is a significant difference between the two. The period between 2006 and 2014 will be investigated, since Paraguay's tax reform lowered corporate tax rates to the current level in 2005, and hence effects of this policy would begin to be perceived from the subsequent year. Moreover, data from after 2014 will not be analyzed, since the Brazilian economic recession started in that year, and it had a considerable negative economic impact on Mercosur countries, such as Paraguay, but not on other countries in the region, like Bolivia, thus potentially skewing the results (Marçal et al., 2015) Moreover, my unit of analysis is the central executive government, and hence, levels of revenue or spending from regional and local levels will not be analyzed.

Furthermore, I will conduct a small-N comparative approach to take into consideration the political, social and economic factors that reinforce or debilitate the effects of corporate tax rates on government expenditures on the two countries. By using MSSD, and investigating two countries that share so many similarities, a small-N comparative approach allows me to gain in-depth insight into their differences (Della Porta, 2008). I will do this by qualitatively analyzing reports by financial and state institutions in order to assess the real impact of the countries' fiscal systems on government revenues and expenditures. This will allow me to investigate variables that, according to the literature, can impact this study's dependent variable, thus discovering what role different factors play in increasing or decreasing government expenditures on health and education in the two countries analyzed.

4. Results and Analysis:

4.1 Results

The first model carried out is Welch's t-test that compares the means of corporate tax revenues as a percentage of GDP in Bolivia and Paraguay from 2006 to 2014 to test whether or not there is a significant difference between the two. A Welch's t-test was used since the data of corporate tax revenue from Bolivia and Paraguay have unequal variances. Table 1 presents the results of the Welch's t-test. Before carrying out the test, the assumption of normality was tested through the Shapiro-Wilk test for each set of data, which indicated that the scores were all normally distributed. W(9) = 0.937, p=0.457; W(9) = 0.886, p =0.181.

Table 1:

Sample Descriptives using Welch's T-test for Equality of Means

	Paraguay		Bolivia			
	M	SD	M	SD	t-test	df
Corporate Tax income revenue (% of GDP)	2.233	0.378	4.445	0.880	-6.928***	10 858

***p < 0.001

4.2 Data analysis

The results of Welch's t-test show that there is a significant difference, t(10858) = -6.928 between the average corporate tax income revenue (% of GDP) of Bolivia (M= 4.445; SD = 0.880) and Paraguay (M=2.233; SD = 0.378). from 2006 to 2014. This is an indication that Bolivia has consistently attained significantly higher levels of corporate tax revenue during the time period investigated, and that its tax rate of 25% on corporate income is more effective in raising corporate tax income revenue than Paraguay's tax rate of 10%. Despite having higher levels of corporate tax revenue, Bolivia also presents a higher standard deviation, and thus its revenues are less consistent and more volatile when compared to its neighbor.

My hypothesis states that the revenue maximizing corporate rate in developing countries is between 15% and 30% (Kbiladze, 2015; Lin & Jia, 2019; Ofori-Abebrese & Baidoo, 2021; Saibu, 2015). The results thus substantiate that Paraguay's tax rate of 10% is excessively low, and yields significantly lower levels of state revenue when compared to Bolivia's. Moreover, Paraguay's mean corporate tax revenue between 2006 and 2014 is

equivalent to 2,233% of the country's GDP; the figure is considerably lower than the average of OECD countries in 2007 (3.6%), 2011 (2.9%), or 2014 (2.8%) (OECD, 2017). This is an indication that Paraguay's below-average corporate tax rate is suboptimal, leading to an under-taxing of the country's corporate profits, and to the collection of considerably low corporate tax revenues when compared to developed nations. On the other hand, Bolivia's mean corporate tax revenue (4.445% of the GDP) is significantly higher than the OECD average, thus showing that its corporate tax rate maximizes its corporate tax revenues, even when compared to developed states.

4.3 Sources of Corporate Tax Revenue by Sector

As mentioned in the literature review, numerous variables can affect the levels of government revenue attained by the state, and dissecting the different sectors of each country's economy is a valuable way to gain insight on the factors that can explain or skew my model's results. One important aspect in establishing the optimal tax rate in a country is the elasticity of supply and demand of the goods or services provided by the companies taxed (Miravete, Seim & Thurk, 2018). The production of goods and services with low supply and demand elasticities are more likely to bear higher tax rates, while those with high supply and demand elasticity are more likely to be scared off by high taxes, either moving to tax-friendly jurisdictions or ceasing altogether (Miravete, Seim & Thurk, 2018).

A report from the Bolivian Ministry of Economic Affairs and Finances from 2015 outlines the economic sectors that contributed the most to Bolivian tax revenues in previous years (Ministerio de Economía y Finanzas, 2015). As shown in the report, between 2006 and 2014, the oil and gas industries - grouped together - have consistently been either the first or second largest contributing sector to the total corporate income tax revenue in Bolivia. The Bolivian industries of oil and gas are evidently dependent on oil and gas reserves in the country's territory and have highly inelastic supply and demand (Krichene, 2002). This indicates that a large portion of the funds obtained through corporate taxation come from the oil and gas sector, which is reliant to Bolivia's resource endowment, and at its peak in 2006, accounted for more than one fourth of the total corporate tax income revenue collected by the Bolivian state.

Table 2:

Percentages of Corporate Tax (IEU) revenues deriving from the oil and gas industries in Bolivia

Year	Percentage of Corporate Tax (IEU) revenues deriving from the oil and gas industries in Bolivia.
2006	25.6
2007	18.1
2008	27.1
2009	22
2010	14.9
2011	14.1
2012	13.8
2013	13.7
2014	19.6

Note: Data extracted from Ministerio de Economía y Finanzas (2015)

Paraguay 's economy, on the other hand, lacks natural resources with low supply and demand elasticities. Its primary sector is composed mostly of agriculture and manufactured products, both of which have high supply elasticity (Rao, 1988); in 2015, agriculture accounted on average for 11.4% of Paraguay's GDP, while manufactured products represented 8.4% of it (Oficina Económica y Comercial de España en Asunción, 2019). One sector of the Paraguayan economy that does have considerably low supply and demand elasticity is the energy sector (Lijesen, 2007), which, on average, represented 8.1% of the country's GDP in 2015, being generated through the country's hydroelectric Itaipú and Yacyretá dams. The dams, however, are owned by the Paraguayan government, and thus their profits are not part of Paraguay's tax collections, falling outside the scope of this research (Tratado Entre el Brasil y Paraguay, 1973; Tratado de Yacyretá, 1974). This provides strong evidence that Bolivia's endowments of gas and oil reserves play an essential role in increasing the country's corporate tax collections, which is a potential explanation for its higher revenues when compared to Paraguay. The high supply elasticity of the Paraguayan

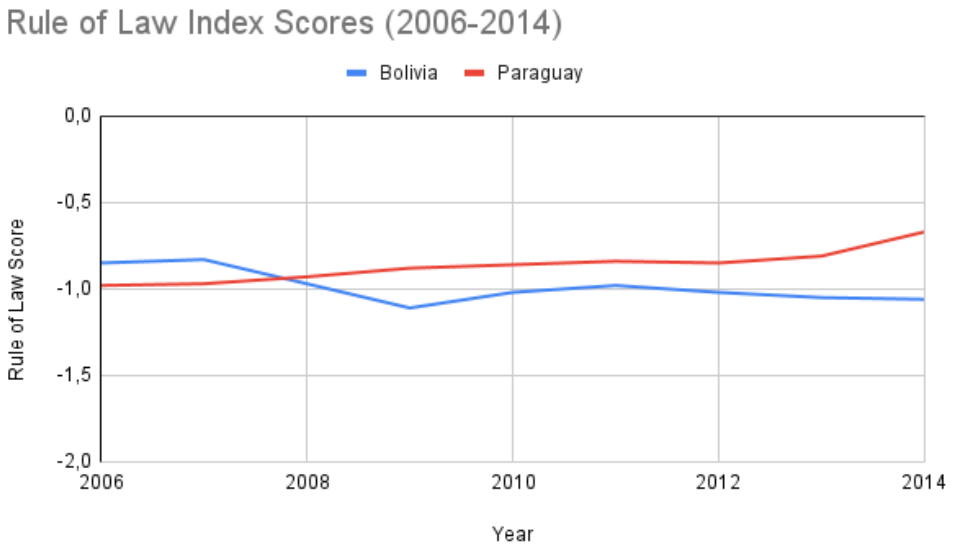
productive economic sectors - except for the electricity sector, which is exempt from taxes - creates less incentive to invest and produce those goods and services in Paraguay, thus indicating that its low corporate tax revenues may not be entirely due to below-average tax rates, but could be partially determined by the country's own resource endowments. If the profits of the Itaipú, and Yacyretá dams were subject to Paraguay's corporate tax rates, maybe there would be a slimmer difference between the corporate tax revenues collected by the two countries.

4.4 Rule of Law and Control of Corruption

According to the literature, rule of law and control of corruption are other factors that could potentially explain Paraguay's low levels of corporate tax revenues, since they both impact the government's capacity to collect the due taxes, prevent evasion and punish evaders (Ajaz & Ahmad, 2010). The Worldwide Governance Indicators, provided by the World Bank (2022), scores countries yearly on the two indicators discussed: rule of law and control of corruption. The ranking goes from -2.5 (less effective) to 2.5 (more effective), and presents mixed results on the performance of both countries' governments. The countries' scores in both indexes are shown in Graphs 1 and 2.

Graph 1:

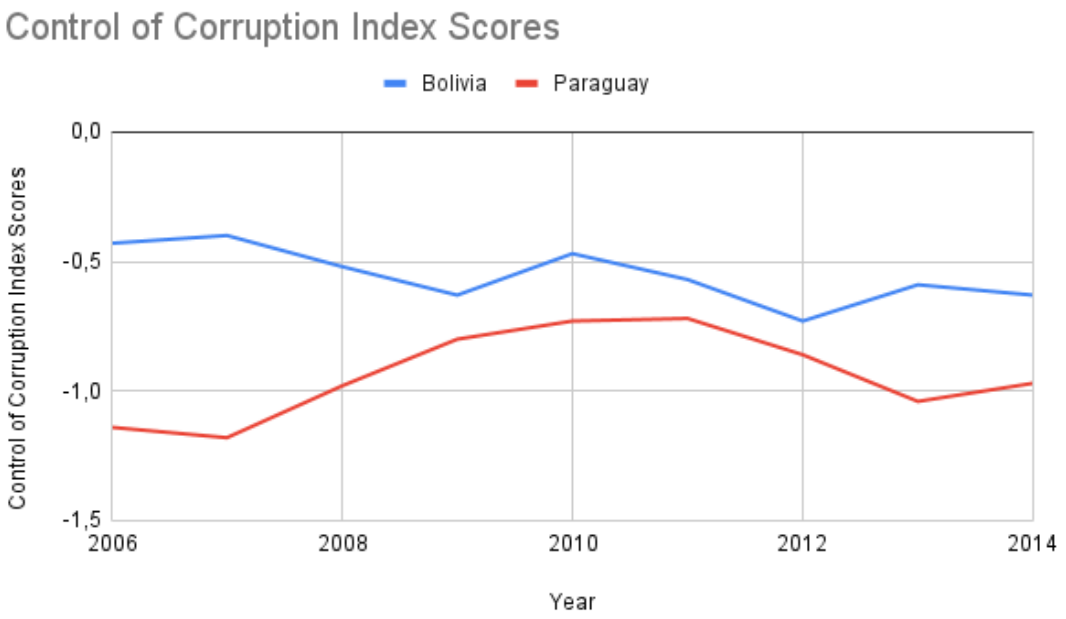
Rule of Law Scores in Bolivia and Paraguay between 2006 and 2014.



Note: Data extracted from World Bank (2022)

Graph 2:

Control of Corruption Index Scores in Bolivia and Paraguay between 2006 and 2014.



Note: Data extracted from World Bank (2022)

As can be observed through the graphs, Bolivia scored higher than Paraguay until 2007, when it had a sharp decline; from 2007 until 2014, Paraguay scored slightly higher than its neighbor. This indicates that both countries had fairly similar levels of rule of law, meaning that this variable does not greatly impact the countries' levels of tax revenues, and does not explain the different results between the two countries. When it comes to control of corruption, on the other hand, Paraguay has scored significantly lower than Bolivia all throughout the period investigated, demonstrating that Paraguay's poor control of corruption is a variable that could partly explain its low levels of corporate tax revenue, given that the relationship between corruption and halted revenues has been extensively demonstrated in literature (Ajaz & Ahmad, 2010; Arif & Rawat, 2011).

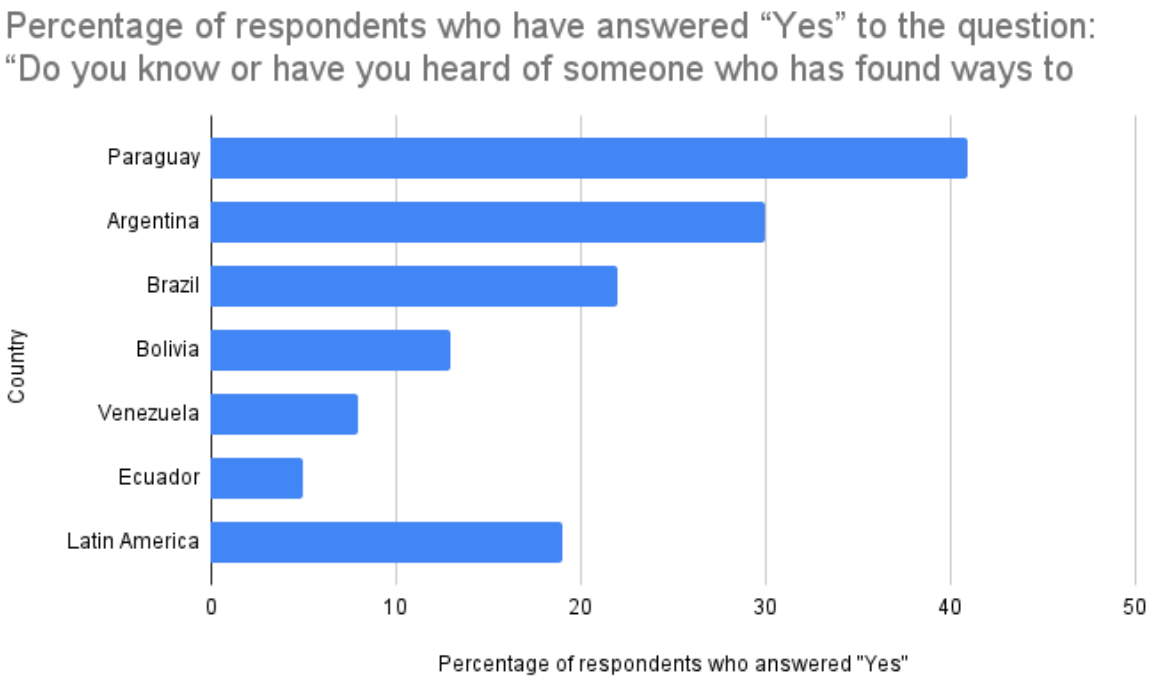
4.5 Tax evasion and avoidance

According to reports and studies of financial institutions, non government organizations (NGOs) and centers of research, Paraguay's levels of tax evasion and tax avoidance are considerably higher than Bolivia's, which may account for Paraguay's below-average corporate tax revenues. One report by the NGO Centro de Documentación y

Estudios (2011) (in English: Center of Documentation and Studies), financed by the European Union and Oxfam, draws attention to Paraguay's fiscal culture, stemming from a history of right-wing and economically liberal governments, that encourages and underlooks practices of tax evasion and tax avoidance, making it a country with above-average levels of tax evasion in the region. Though figures on tax evasion are difficult to obtain due to the phenomenon's inherently clandestine nature, Graph 3 contains responses from a survey made by the Latinobarometer (2010), and indicates that 41% of Paraguayns have witnessed or known of someone who has avoided or evaded taxes, against only 13% of Bolivians, and much above the Latin American average of 19%. This exceptionally high indicator of tax evasion can partially explain Paraguay's below average levels of tax revenue when compared to Bolivia.

Graph 3:

Percentage of respondents who have answered "Yes" to the question: "Do you know or have you heard of someone who has found ways to pay less taxes than he or she was required to pay?"



Note: Graph extracted from Latinobarometer (2010)

4.5 Effects of Corporate Tax Revenues on Government expenditure on health and education:

Model 2 tests whether there is a significant difference between Bolivia and Paraguay's levels of government spending on health, while Model 3 tests the difference between government spending on education. Table 3 shows the results of both models. Before carrying out the test, the assumption of normality was assessed through the Shapiro-Wilk test, which indicated that all scores were normally distributed. For the data on expenditures on education: W(9) = 0.935, p=0.530; W(9) = 0.904, p=0.273. For the data on expenditures on health: W(9) = 0.926, p=0.440; W(9) = 0.936, p = 0.545.

Table 3

Sample Descriptives using T-test for Equality of Means

	Paraguay		Bolivia			
	M	SD	M	SD	t-test	df
Government expenditure on health (% of GDP)	1.413	0.381	1.418	0.063	-0.031	11 663
Government expenditure on education (% of GDP)	2.903	0.225	5.568	0.582	-12.803***	16

***p < 0.001

As shown by the results, there is no statistically significant difference, t(11663) = -0.031, between the means of Bolivia's (M=1.418; SD=0.063) and Paraguay's (M=1.413; SD=0.381) expenditures on health. In fact, the two countries' means are fairly similar, although Bolivia's standard deviation is lower, indicating that it has had more consistent levels of expenditure on health during the period studied, while Paraguay's levels of spending have been more volatile. When it comes to government expenditure on education, on the other hand, there is a significant difference between the two countries' means, t(16) = -12.803, demonstrating that Bolivia (M=5.568; SD = 0.582) has spent significantly more on education than the Paraguay (M=2.903; SD=0.225) during the period studied. In this context,

however, Bolivia's standard deviation is higher than Paraguay's, showing that the former has had more volatile levels of spending than the latter. These results support my second hypothesis with regards to expenditure on education, but not with regards to expenditure on health. My hypothesis is thus only partly supported by the results, showing that higher corporate tax revenues do lead to higher government expenditure on education, but not on health.

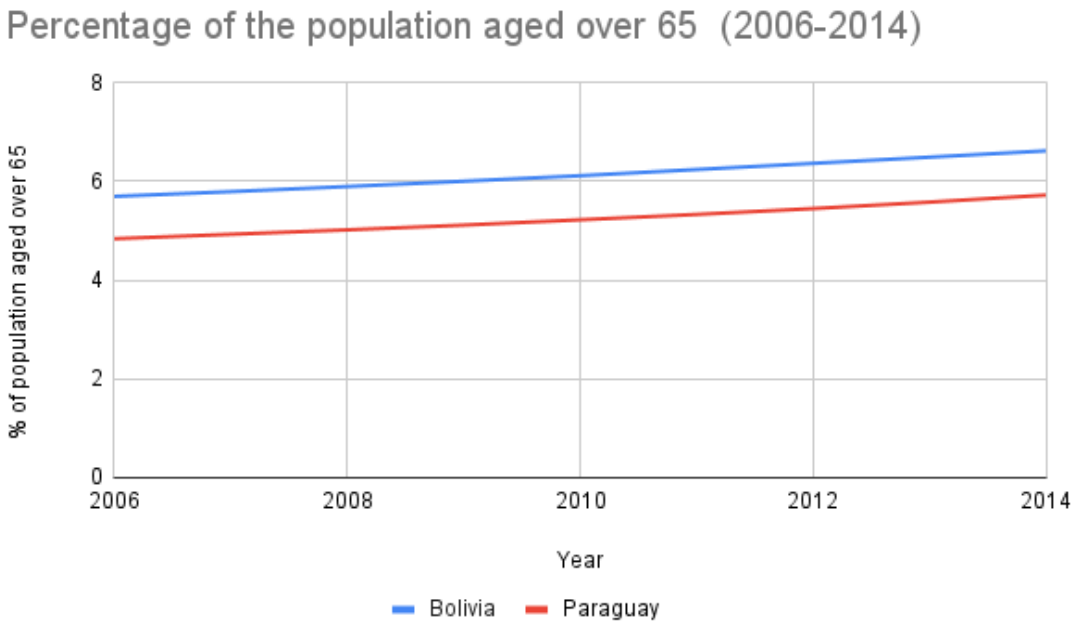
As mentioned above, however, a number of factors - besides the levels of tax revenue - can impact government expenditure on health and education. Based on the literature, I have previously selected the three most important determinants of government expenditure outside the realm of economics: 1) Demographic pyramid, 2) Level of Democratization, 3) Government ideology. In order to measure the impact of these three factors on the allocation of funds to health and education, I will analyze official reports, documents and political manifestos.

4.6 Demographic Pyramid

Much of the literature on social spending emphasizes the role of demographic variables in determining the allocation of funds to health or education (Gbesemete & Gerdtham, 1992; Busemeyer 2006). As many academics have demonstrated empirically and theoretically, older societies will allocate more resources to health, while younger societies will allocate more resources to education. It is expected, therefore, that the percentage of a state's population aged under 15 will be positively correlated with spending on education, while the percentage of population aged over 65 will be positively correlated with spending on health. By analyzing Paraguay and Bolivia's demographic properties, it is possible to gain insight on the impact of such factors on the countries' levels of social spending. Graphs 4 and 5 present Paraguay and Bolivia's percentages of elderly and young populations respectively.

Graph 4:

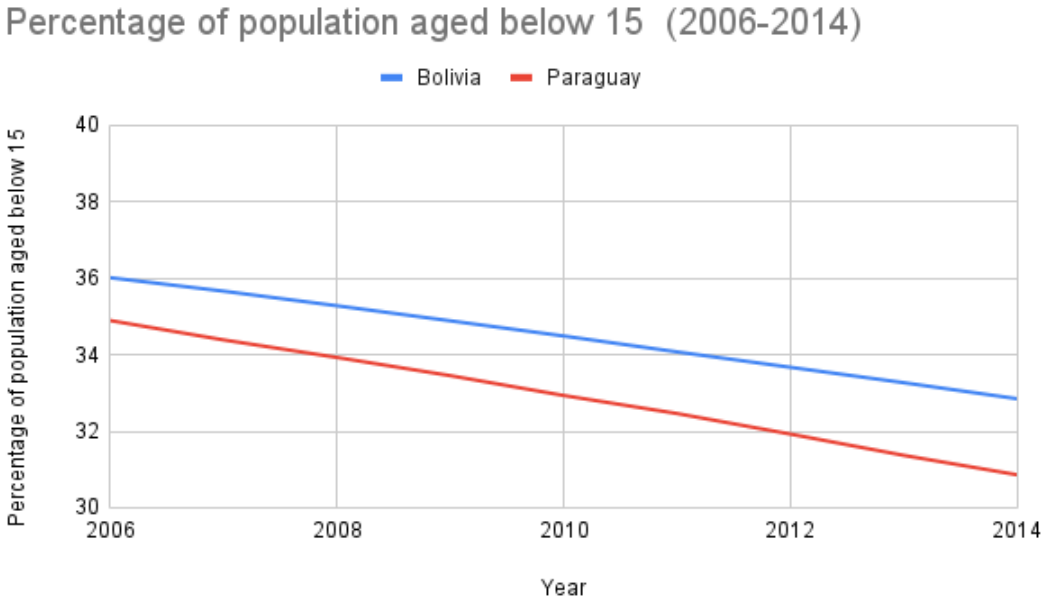
Percentage of population aged over 65 in Bolivia and Paraguay between 2006 and 2014.



Note: Data extracted from World Bankb (2002)

Graph 5:

Percentage of the population aged below 15 in Bolivia and Paraguay between 2006 and 2014.



Note: Data extracted from World Bankc (2002)

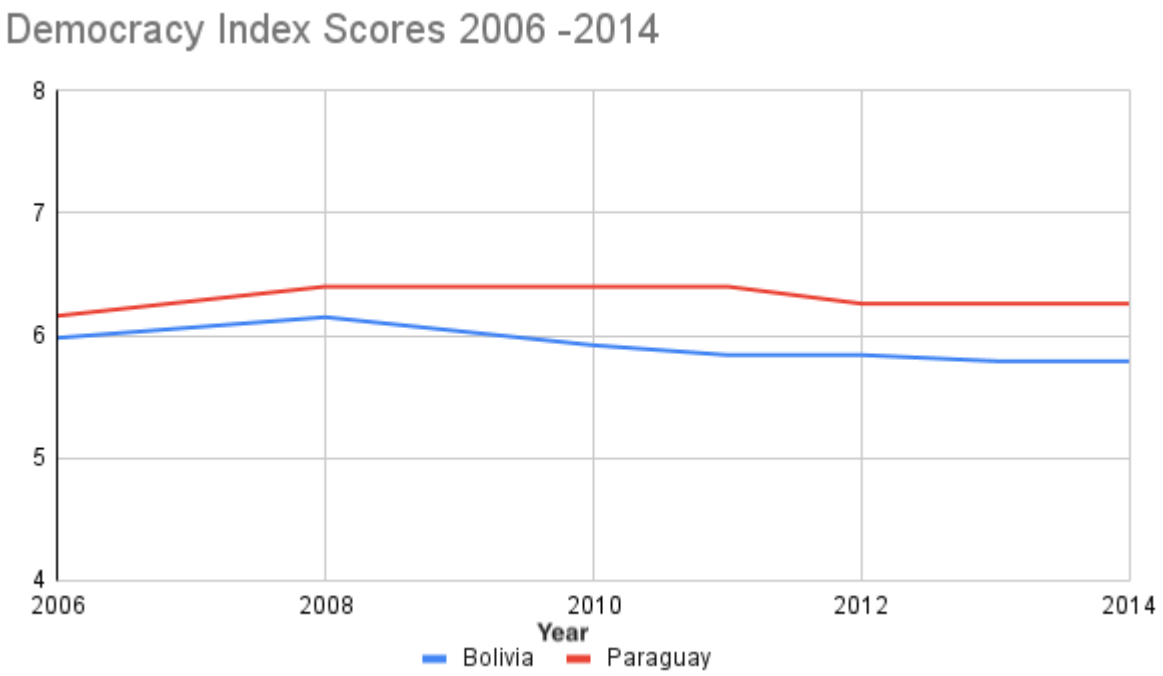
Compared to Paraguay, Bolivia presents both a higher percentage of the population at the bottom and at the top of the demographic pyramid, as can be seen in the graphs. This is unusual, since states that have a large percentage of younger people tend to also have low percentages of elderly people and vice-versa. Though the differences between the two countries are not too big, they still seem to be consistent throughout the years, and thus, are not negligible. With a higher percentage of both elderly and young populations, the Bolivian state has an incentive to allocate more resources than Paraguay to both health and education, which is not seen in practice; the Bolivian government does have higher expenditures on education, but its expenditures on health are comparable to those of its neighboring country. Thus, demographic factors can only explain the discrepancy between the countries' spending levels on education, but not the congruence between their levels of spending on health.

4.7 Level of Democratization

Many scholars have argued that in non-democratic regimes, higher government revenues do not always translate into higher levels of social spending, since there is lower electoral accountability from the government towards its people, and the voting coalition tends to be smaller and not include the poorer sectors of society (Martin-Mayoral & Sastre, 2017; Min, 2008). Therefore, it is expected that if Paraguay and Bolivia presented significant differences in terms of democratization, or if either of them underwent drastic changes in their degree of democratization between 2006 and 2014, that could explain their divergent levels of spending on education and health. In order to assess democratization, I examine the countries' scores from The Economist's Democracy (Economist Intelligence Unit, 2022), which since 2008, scores countries annually from 0 (least democratic) to 10 (most democratic) on their democratic and electoral performance. Bolivia's and Paraguay's scores in the Index are displayed in Graph 6.

Graph 6:

Democracy Index Scores in Bolivia and Paraguay between 2006 and 2014



As shown in the graph, throughout the years investigated, Paraguay has consistently presented better levels of democracy than Bolivia, though there is not a big discrepancy between the two. Both countries also present very stable scores, with no sudden increases or decreases. Paraguay is listed as a flawed democracy, while Bolivia's score on the Index fluctuates from 5,79 to 5,98, thus categorizing it as a hybrid regime, and not a democracy. Despite this classification, however, Bolivia is still far from falling into the "Authoritarian" category, which encompasses states with scores below 3,99, and thus, it would not undergo the severe deficits of accountability that are observable in autocratic regimes according to the literature (Min, 2008). In fact, according to the same index, Bolivia's electoral process and pluralism score was between 7 and 8,33 for the period studied, while Paraguay's score stagnated at 8,33 during the whole period. These high scores indicate that both Paraguay and Bolivia have functioning electoral systems, and that levels of electoral accountability are comparable between the two states. Finally, given that Bolivia and Paraguay have equally strong electoral processes systems on average, it cannot be inferred that electoral accountability explains their divergent levels of government spending on education and health. Furthermore, Bolivia presents slightly lower levels of democratization, and it is the one that spends the most on health and education, contrary to what is argued by most of the

literature on the topic; thus, it is unlikely that the countries' expenditures on education and health can be explained by democratization levels.

4.8 Government ideology

Government ideology is also a key factor in determining levels of spending on education and health around the world. As demonstrated by many scholars (Ha, 2015: Martin-Mayoral & Sastre, 2017), left-wing governments tend to adopt expansionary economic policies and allocate more resources to welfare programmes, while right-wing governments tend to be more fiscally conservative and promote cuts on social security. It would therefore be expected that left-wing governments spend more on education and health than right-wing governments.

Between 2006 and 2014, Bolivia was ruled by the Movement for Socialism-Political Instrument for the Sovereignty of the Peoples (MAS-IPSP), with Evo Morales as President during the entire period. Morales was one of the most important figures of Latin American socialism in the 2000s, being one of the most prominent representatives of the Pink Tide in the region. His government was economically expansionist and greatly prioritized social security and welfare programmes, establishing important reforms, especially in education, in the late 2000s (Webber, 2011). During the same period, Paraguay had four different Presidents, each from a different political party; one of them - Federico Lugo - belonged to a leftist party, but had little legislative support, and was eventually impeached in 2012. The other three presidents: Nicanor Duarte, Federico Franco, and Horacio Cartes, can all be considered right-wing leaders. Table 4 shows the different political ideologies of the Bolivian and Paraguayan governments according to the Political Institutions database, made available by the International Development Bank (2020).

Table 4:

Political ideologies of the Bolivian and Paraguayan governments between 2006 and 2014.

Year	Political Ideology - Bolivian Government	Political Ideology - Paraguayan Government
2006	Left	Right
2007	Left	Right
2008	Left	Right
2009	Left	Left
2010	Left	Left

2011	Left	Left
2012	Left	Left
2013	Left	Right
2014	Left	Right

Note: Data extracted from the International Development Bank (2020)

As it can be evidenced from the table, the Bolivian government has belonged to the left of the political spectrum every year between 2006 and 2014, while the Paraguayan government was a left-wing one from 2009 to 2012, and a right-wing one all other years in that period. This difference in government ideology can explain Bolivia's higher levels of spending on education when compared to Paraguay, but it would fail to explain the comparable levels of spending on health between the two countries.

When taking a closer look into the political landscapes of each state, evidence indicates that education was, indeed, one of the most important priorities of Morales' presidency. His project "Yo sí puedo" - carried out in partnership with the governments of Cuba and Venezuela - allocated extensive resources to education, with the objective of increasing literacy rates across the country, with particular focus given to children in rural areas. The project also aimed at increasing literacy in indigenous languages, such as *aymara* and *quechua*, making it one of the most important and symbolic projects developed by the Morales administration. A report by the Bolivian Ministry of Communication of 2012 outlines "Morales' main achievements" calls the programme "historic" and draws attention to the international recognition it received, after UNESCO praised its results and declared Bolivia a state "free of illiteracy" (Ministerio de la Comunicación de Bolivia, 2012). The same manifesto does not mention any projects to increase healthcare, indicating that education has been a greater political priority than health during the period studied. There were considerable health projects enacted during the Morales administration, such as the creation of the *Sistema Unico de Salud*, a unified national healthcare system or *Telesalud* (De Almeida Costa et al., 2013), a project to allow for online doctor visits to citizens in remote areas; however, these projects were put in practice after 2014, and are therefore not useful for the purpose of this thesis.

5. Conclusion and Discussion:

Through this research, I have shown the ways in which corporate tax rates can impact levels of government spending on health and education in Latin America. To do so, I adopted

MSSD and selected two countries in the region with very similar characteristics, but that had drastically divergent corporate tax rates: Paraguay and Bolivia. I then proceeded by comparing the means of government revenues and government expenditures on health and education in those two countries through a t-test, while qualitatively examining the political, economic and social attributes of each state in order to gain more insight on other variables and factors that can help to explain and elucidate the t-test's results. The first hypothesis of my research is the following:

H1: H1: Governments with a corporate tax rate between 15% and 30% will achieve higher levels of corporate tax revenue than governments with corporate tax rates outside this range.

This hypothesis is supported by the results of the research. Model 1 demonstrates that there is a highly significant difference between the levels of revenue attained by each state, thus providing strong evidence that their divergent rates of corporate taxation play an important role in determining the levels of corporate tax revenue collected by the government.

In addition, the qualitative analysis conducted on the states' levels of government efficiency show that there is no considerable discrepancy between Bolivia and Paraguay in terms of rule of law, showing that this factor cannot explain the discrepancy between the countries' corporate tax rate revenues. Moreover, some evidence shows that Paraguay has higher levels of tax evasion and avoidance and corruption, which could explain its low levels of tax revenues; however, the data used to quantify tax evasion and corruption are rather imprecise and indirect. Given that both phenomena are inherently unregistered, they are exceptionally difficult to measure, making it impossible to assess the exact effect they can have on the collection of corporate taxes, and how much it could skew the results. In addition, very little research has been carried out on tax evasion and corruption in Latin America, and almost no data is available on the issue. For this reason, further research is necessary to determine the levels of tax evasion and avoidance in Latin American countries more precisely, and to estimate the role of tax evasion and corruption in reducing tax revenues in the region.

Lastly, through the examination of the different sectors that make up the Bolivian and Paraguayan economy, it can be concluded that much of the economic activity in Bolivia and a very considerable percentage of its corporate tax revenues stem from the country's oil and gas industries, thus granting it a great advantage in comparison with Paraguay, which does not cannot such industries due to a lack of gas and oil reserves. Paraguay's electricity sector,

which also stems from natural endowments and could be comparable to Bolivia's oil and gas industries, is fully owned by the state, and its profits are not taxed through Paraguay's corporate tax legislation, thus falling beyond the scope of this research.

Therefore, based on the research results, there is strong evidence suggesting that Paraguay has attained low levels of corporate tax revenue by virtue of its below-average corporate tax rates. Though it is possible that Bolivia's revenues are driven up by its resource endowments, it is unfeasible to compare such revenues with those obtained by resource endowments of Paraguay, given that they are not subject to the same type of taxation in the two countries. And though it is possible that Paraguay's revenues are driven down by widespread tax evasion and avoidance in the country, data on that is still very scarce, and hence it is impossible to affirm with certainty to what extent it skews the research results.

The second hypothesis of my research is:

H2: Higher levels of government revenue will lead to greater public spending on education and health.

This hypothesis was only partly supported by my results. The t-test carried out showed that there was a significant difference between Bolivia and Paraguay's expenditures on education, but not between their expenditures on health. Demographic factors, or levels of democratization were examined, and were unable to explain the discrepancy in spending only in one sector, but not in the other. When taking a closer look at the political and social landscapes of the two countries, it becomes clear that Bolivian President Evo Morales had educational projects as a political priority, namely the "Yo sí Puedo" project, and because of this, higher resources were allocated to the education sector rather than the health sector, while the Paraguayan government was ideologically conservative and less prone to expenditures on social welfare altogether. This shows that the allocation and distribution of funds to either education or health does not follow naturally from higher government revenues, but depends to a very large extent on political choices and priorities.

Finally, the results of my research demonstrate that corporate tax rates between 15% and 30% do lead to higher corporate tax revenues, but that higher corporate tax revenues do not always lead to higher expenditure on health or on education. The results suggest that political will is a necessary condition for the allocation of funds to either the health or the education sector. My research is limited, however, given that very little literature is available on many political and economic factors that impact levels of tax revenue in Latin America, such as tax avoidance or corruption, thus creating a dependence on imprecise or proxy sources. Though I attempted to qualitatively analyze variables that could have an effect on

expenditures on health and education based on the literature written on the matter, I recognize that many other variables that could also impact the dependent variable are not discussed in this research, which undermines my analysis and discussion of the results.

Furthermore, given that a wide array of political, social and economic factors play a crucial role in determining government expenditures on health and education, and because those factors differ so much across countries, my research's results have low external validity, and cannot be easily applied outside of Latin America, and should be applied with caution even Latin American countries other than Paraguay and Bolivia. The research's internal validity, however, is rather high, since the political, social and economic landscapes of Bolivia and Paraguay were examined and analyzed in depth, and the conclusions drawn were largely specific to the contexts of the two countries.

Despite these findings, further research on the effects of taxation policies in Latin America is necessary, perhaps examining a larger sample of countries in order to attain results with greater external validity. Further research on the reasons for the political prioritization of health instead of education or vice versa is also important in order to understand the political reasoning that determines the allocation of resources in social spending. Moreover, my research has focused solely on the central executive power as a unit of analysis, but future literature should investigate if similar patterns can be observed at the regional and local levels. Lastly, research should not stop only at the expenditure of funds on health and education; the actual quality of education and health should also be investigated, in order to gain insight on the effectiveness of social spending on human development and standards of living, and to understand the role that government expenditures on welfare can have on building and guiding Latin America's path towards development.

Appendix 1:

Syntax of the Data in Tables 3

```
GET
  FILE='\\VUW\Personal$\Homes\24\s2476215\My Documents\THESIS REAL_1.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
T-TEST GROUPS=country(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=education_spending
  /ES DISPLAY(TRUE)
  /CRITERIA=CI(.95).
```

Appendix 2:

Syntax of the T-test carried out in Table 3:

```
T-TEST GROUPS=country(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=education_spending
  /ES DISPLAY(TRUE)
  /CRITERIA=CI(.95).
```

Appendix 3:

Syntax of the Shapiro-Wilk Normality test carried out for the t-test in Table 3

```
EXAMINE VARIABLES=Paraguay_education Bolivia_education
  /PLOT BOXPLOT HISTOGRAM NPPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
```

Appendix 4:

Syntax of the T-test carried out in Table 1:

```
DATASET ACTIVATE DataSet11.

DATASET ACTIVATE DataSet11.
DATASET CLOSE DataSet10.
T-TEST GROUPS=country(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=Revenues
  /ES DISPLAY(TRUE)
  /CRITERIA=CI(.95).
```

Appendix 5:

Syntax of the Shapiro-Wilk Normality test carried out for the t-test in Table 1

```
ASSUMPTIONS SYNTAX:
EXAMINE VARIABLES=paraguay_revenues Bolivia_revenues
  /PLOT BOXPLOT HISTOGRAM NPPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
```

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