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## **PREFACE**

By taking a gap-year after high-school graduation, the opportunity arose that enabled me to discover parts of a remarkable continent. The experience began once my foot set its first steps on South-American soil and a deep impact remained ever since. If there must be one country that sums it all up, it has to be Bolivia. Never have I seen a country so diverse in nature while inhabited by the most friendly and sincere individuals. They do not have much on their hands but seem to proliferate in happiness. Now, the opportunity arises to delve deep into the underlying causes of poverty and inequality in Bolivia, a country that deserves to thrive.

## **ABSTRACT**

Bolivia has a failed past in terms of generating prosperity through resource abundances. The country held enormous reserves of silver, tin, and natural gas, and is now in possession of half of the world's supply of lithium, necessary in the fabrication of rechargeable batteries. The assumption is that the world will turn to electric vehicles in the near future, a shift that will increase the demand for Bolivian lithium dramatically. The phenomenon that a country rich in resources suffers from economic distress is called the resource curse. This thesis attempts to delve deep into the underlying causes of past examples of the resource curse in Bolivia, to determine whether there are similarities that can serve as recommendations to the present. Political stability is a prerequisite to avoid the curse, as well as macro-economic policy and diversification in the economic sphere. Bolivia is holding one of the treasures of the 21<sup>st</sup> century and needs to create the optimum circumstances in which they can extract, produce, and export their lithium in sustainable conditions for sustainable profit.

## TABLE OF CONTENTS

<b>INTRODUCTION.....</b>	<b>5</b>
<b>THE RESOURCE CURSE THEORY.....</b>	<b>6</b>
<b>VALE UN POTOSÍ.....</b>	<b>11</b>
<b>THE AGE OF TIN.....</b>	<b>12</b>
<b>AS FLUID AS GAS.....</b>	<b>18</b>
<b>THE GOLD OF THE 21<sup>ST</sup> CENTURY.....</b>	<b>21</b>
<b>ANALYSIS AND RECOMMENDATIONS.....</b>	<b>29</b>
<b>CONCLUSION.....</b>	<b>32</b>
<b>BIBLIOGRAPHY.....</b>	<b>34</b>

## INTRODUCTION

Bolivia has a long history in the possession and extraction of valuable resources. The Spanish expression *vale un Potosí* (“to be of great value”) relates to the silver mines in the city of Potosí, once richer than London and Paris combined. Whereas the tin and gas boom in the 20<sup>th</sup> century could have theoretically turned Bolivia into one of the wealthiest nations of South-America, in reality, the continent’s poorest country (Worldbank,2014) has turned neither of its resource abundances in sustainable economic growth. The land-locked country is confronted with poverty and inequality, a legacy of past misfortune, but there is reason for optimism. A new era arises, a new opportunity for Bolivia to break with its past. The Southern region, the Salar the Uyuni, famous for its salt flats, bears over half of the world’s supply of lithium, an essential element in the fabrication of rechargeable batteries. Until recent years, its use was limited to mobile phone and lap-top, but as demand for environmental friendly (electric) vehicles increased, so did the interest in lithium. It is no wonder that Bolivia is dubbed ‘*the Saudi Arabia of the 21<sup>st</sup> century*’ (Romero, 2009)’, but it must now live up to the expectations.

Whereas the disappearance of silver (-rents) is explained through Spanish imperialism, the inability to turn tin and gas revenue into sustainable development is more difficult to understand. A key term in this research is the resource curse theory. It is a counterintuitive phenomenon that links resource abundance with weak economic performance and development. Auty, and Sachs and Warner are the main contributors to the theory and will be discussed in the first chapter. This chapter will provide an introduction to the resource curse theory and will state its three main causes. The research will continue to focus on previous examples of the resource curse in Bolivia, starting with a silver abundance in the 16<sup>th</sup> century. Since the silver era does not show many similarities to the current situation, it will only be discussed briefly. The tin and subsequent natural gas era, however, are very relevant for this research. The three main causes discussed in the resource curse chapter will be the common thread in attempts to look for similarities that can provide lessons to the present: lithium. This will be discussed extensively in terms of history, demand, structure of ownership, infrastructure, cooperation, and economic risk. Last, an analysis and recommendations to Bolivia will be provided. An analytical approach on constants of past experiences will provide for relevant research. The research question is: Can lessons be derived from past experiences with the resource curse in Bolivia that are applicable to avoid the curse today with regard to

lithium extraction? The objective is to provide generic recommendations on dealing with the lithium abundance by deriving lessons from past failure.

### **THE RESOURCE CURSE THEORY**

“The new evidence suggests that not only may resource-rich countries fail to benefit from a favourable endowment, they may actually perform worse than less well-endowed countries. This counter-intuitive outcome is the basis of the resource curse thesis (p. 1).”

With those words did British economist Richard M. Auty became the founding father of the resource curse theory. His book *Sustaining development in mineral economies: the resource curse thesis* (1993), describes the relationship between resource abundance and economic stagnation on which every development economist in the late 20<sup>th</sup> century would disagree. Even though the book was initially received with disbelief, the resource curse theory still holds twenty years after, and is now widely accepted as a recurrent phenomenon. The resource curse, dubbed the paradox of plenty, refers to a situation in countries or regions with an abundance in non-renewable natural resources such as precious metals, minerals, and fuels which subsequently fail to convert into accelerated development and economic growth. In his book, Auty makes case-study comparisons on mineral economies in the developing world such as Chile, Peru, Bolivia, Jamaica, Zambia, and Papua New Guinea, and draws conclusions from their respective (poorer) developmental paths compared to the developing world as a whole. He assesses macro-economic contributions vis-a-vis political changes, and micro-economic policy failure due to poor export-diversification.

The Dutch Disease, a term coined by *The Economist* (1977), is another explanation for poor development in resource abundant countries. The name relates to the decline of the Dutch manufacturing sector as a result of the export of natural gas, due to an appreciation of the real exchange rate. Similar to the resource curse theory, the Dutch Disease could relate to every non-renewable natural resource. Given that a country is rich in such a resource, it is likely that a sudden increase in revenue and foreign investment will contribute to a relative appreciation of the real exchange rate of a currency. The competitive position to other trading countries will decrease simply because it is more expensive to buy products in the resource-rich country. In a later stage in this paper, the Dutch Disease will be related to Bolivia, focussing on past examples.

In one of the most influential articles written on the topic, Corden (1984) poses alternative economic measures that could prevent the manufacturing sector from lagging. He focuses on the effective allocation of tax-revenues from the booming sector. In his opinion, the extra generation of tax-income should be distributed to the lagging industry in subsidies. Generating extra income for the lagging industry (often manufacturing) can counter the currency appreciation so the lagging industry does not lose its competitiveness in the global market. A different stance is taken by Krugman (1987). He argues that when the comparative advantage of a country shifts from one industry to the other, there is a simple, pragmatic solution. He argues that the focus of the economy should gently shift in order to take full benefit of this new comparative advantage. It does not take into account, however, the concerns that when the natural resource is depleted all other sectors might have lost their competitiveness.

The resource curse and Dutch Disease theory both attempt to explain the factors that drive weak economic performance in resource abundant countries. Whereas the Dutch Disease phenomenon focuses on the economic side, the resource curse theory relates to mostly political factors. The latter captures the initial focus, after all, economic policy is the result of political discussion. Underlying patterns in the political sphere will be discussed in relation to the resource curse. A framework shall be used throughout this paper, involving multiple dimensions from both sides. The first variables focus on ownership structure and state institutions, and later, market instability shall stand central to discussion.

### *Ownership structure*

The structure of ownership over natural resources might put the cause and solution to the resource curse in a different perspective. As Andersen and Meza (2001) point out: “One of the most fundamental conditions for the efficient operation of markets is the existence of well-defined, exclusive, secure, transferable, and enforceable property rights over all resources (p. 6)”. The shift to state-owned resources stems from the period 1960-1990, during which neoliberal policies and developmental theorists promoted nationalizations, and reduced dependency. Central control over resources, however, was not the usual in the Bolivia’s rich history of resources. The control over tin and gas in Bolivia was in the hands of rich aristocrats and foreign investors, partly because Bolivia was not very involved in the neoliberal movement. Luong and Weinthal (2006) consider the relationship between the structure of ownership of mineral wealth and poor economic and political development. Resource abundance and its accompanying profits are often linked to short-sightedness among public or private actors. Ross (1999) describes this behaviour as a ‘get-rich-quick mentality among businessmen and a boom-and-bust psychology among policymakers (309).’ Robinson et al. (2006) expand on irrational decision made by political actors when they are confronted with a sudden increase in revenue. Rapid depletion of the natural resources is a recurrent phenomenon and a threat to sustainable development. The authors state that cognitive limitations can be avoided if the resource-rich industry is privatized and a state of oligopoly in the industry is realized. The consequence is that the rents of mineral wealth are not directly available to the government but instead are spread out over a longer period in the form of taxes. Under the right circumstances it is reinvested in social programs and can attribute to sustainable development. The emphasis on strong (state-) institutions, as a necessary condition for sustainable development, however, is innate to any ownership structure.



## *State Institutions*

The quality of state institutions is a precondition for sustainable development in mineral rich countries. Mehlum and Torvik (2006) acknowledge the importance and state that ‘the combination of grabber friendly institutions and resource abundance produces a growth trap. Producer friendly institutions, however, help countries to take full advantage of their natural resource abundance (p. 17).’ Political actors tend to maximize short-term profit to retain their position. The drift to perform above the country’s capabilities causes inefficiencies in the extraction and production process. Often the country does not have the technological background required to deal with the resource, with as result that only the raw product can be exported. This was the case in the Bolivian tin-era. Long-term sustainable income and development is prevented through an electoral agenda bounded to short-term profit maximization. The theory of structured contingency by Terry Lynn Karl (2006) provides that ‘even in the midst of tremendous uncertainty provoked by a regime transition, where constraints appear to be most relaxed and where a wide range of outcomes appears to be possible, the decisions made by various actors respond to and are conditioned by the types of socio-economic structures and political institutions already present (p. 1).’ Still, the discussion is open what effect mineral wealth has on institutions. Whereas Mehlum and Torvik, and Karl refer to the quality of state institutions as static, Isham et al. (2005) take a different stance. They argue that quality is a variable and that cognitive limitations have to be taken into account when a country is confronted with mineral wealth. Corruption and nepotism are mentioned as outcomes of the research.

### *Market instability*

Even if the requirements in the political sphere are met, the resource curse might still develop. Retarded economic progress can, as might seem obvious, also be attributed to economic reasons. The Dutch Disease effects have been briefly discussed but another theory, the dependency theory (Singer, 1949; Prebisch, 1950; Frank, 1967) has led many countries into the depths of the resource curse. Economic dependence on a single resource impedes development for which three factors are responsible (Ross, 1999). First, countries that relied solely on the export of primary commodities faced a decline in terms of trade, increasing the gap between them and industrialized, wealthy states (Singer, 1950). Second, any fluctuation on the commodity market is potentially devastating for single-resource dependent countries (Sachs and Warner, 1995). Third, the economic linkage between resource and non-resource sectors is often poor. This is especially important if the ownership structure of the resource involves foreign investors. Capital flight is an often occurring phenomenon while the mineral rents should have actually been reinvested in the economy (Hirschman, 1958).

## VALE UN POTOSÍ

Resource wealth has been common to Bolivia through the ages and early examples cannot remain unmentioned. The large-scale exploitation of valuables started in the sixteenth century. During this era, Spanish colonial rule conquered large parts of South-America. The conquest of Peru in 1532 by Pizarro marked the beginning of resource theft the likes of which had never been witnessed in history (Gabai, 1997). It did not last long until the Spanish colonizers had made their way to Bolivia where they found a silver supply that according to a myth was enough to build a bridge between Bolivia and Spain.

The place they stumbled upon was Potosí, and the Cerro Rico (which translates into Rich Hill), held all the silver-treasure (Ayres et al., 1998). Unskilled workers were imported from the rural areas of Peru to work in the mines. The height and difficult circumstances of the Cerro Rico required labor from the region as only locals were suited to the harsh conditions. Potosí grew to become one of the largest and wealthiest cities in the world and financed the colonial expansion of the Spanish monarchy. The Cerro Rico was the means to Spanish colonial ends with its nearly inexhaustible supply of silver, and would later (when colonial rule was over) also prove important in tin exploitation.

Spanish colonial rule and the silver extraction did not bring prosperity to Bolivia or the Potosí region, instead it left a society torn apart by greed on a seemingly worthless mountain. Silver extraction is still the most common industry in the region, but it shall never become the prosperous area it once was. Even though the returns of silver were non-existent, or even worsened the situation, the Bolivian silver era can hardly be attributed to the current resource curse theory. The power exerted on Bolivia in the sixteenth century were beyond control of their government and thus, do not allow relevant comparison to the current situation.

## THE AGE OF TIN

The rise of the tin industry was the consecutive phase of mineral extraction in Bolivia. The Bolivian economy had always predominantly centred on the profits derived from the mining industry, and the beginning of the nineteenth century was no exception. Although the Cerro Rico did not produce the same quantities of silver as it did in the sixteenth century the industry continued undisturbed. In this era, tin was regarded as a by-product that was not of great value, nor was it of significant quality. The dramatic drop in silver prices in 1890 marked the transition in Bolivian mineral extraction, moving the focus away from silver to tin. But the expansion of tin production in Bolivia in 1890 was not only the result of a sharp decline in silver prices, but rather, tin grew to strategic importance due to a series of historical events decades before. These events need attention as they represent the true significance of tin mining and its forthcoming profits, and are useful to assess the nature of the industry in relation to the resource curse. A few crucial turning points will be highlighted, divided in sections that cover specific periods.

### *1850-1890*

Mining for tin in Bolivia traces back until the seventeenth century but never had a large effect on the economy until roughly 1850. The introduction of the tin can increased interest in Bolivian tin and as slowly the vast quantity available was discovered by foreign investors. The only problem of Bolivian tin was its quality. The moderate popularity with which the metal was received abroad was because the techniques used in Bolivia were outdated and decreased the quality of the tin, compared to more advanced techniques by European smelters. The underlying cause can be attributed to the furnace in use but unfortunately, alternative furnaces required large quantities of coal, which was not available in Bolivia. As a result, the interest in Bolivian refined tin decreased and only allowed for the export of its ores<sup>1</sup> (Contreras, 1993).

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<sup>1</sup> An ore is the primary source of any valuable metal. It refers to the rock in which minerals with important elements such as metals are present to the sufficient degree that it is economically extractable

Great Britain was the largest importer of Bolivian tin in the 1860s. Refining and smelting plants in Cornwall (Britain's most southern province) and Liverpool were responsible for the majority of tin production at the time due to their high-quality refining techniques. The production of tin was a lucrative business, and their interest in the Bolivian tin market grew steadily. It was only a matter of time before British smelters started to interfere in the Bolivian market to increase their share. Representatives of the Cornish refining plant were sent to Oruro, the Bolivian city where most of the ore extraction took place, to transfer knowledge about the best techniques. This event marked the beginning of foreign-based, monopolistic control over the Bolivian tin market, even though it was only on a small scale. A consequence of this transformation was that, in practice, only the highest quality ores were shipped to Great Britain, leaving the ores of slightly less quality as waste. As economic interests in the Bolivian tin industry increased, long-term views on sustainable extraction were diminished (Hillman, 1984).

Several factors were accountable for a gradual decline in the tin market and the deterioration of the British dominance over the Bolivian tin market during the period spanning the late 1860s and 1880s. From British perspective, conflicting organizations in Cornwall resulted in an increased competitive nature of the market and tin prices dropped as a result of new suppliers from Australia and Malaya<sup>2</sup>. In Bolivia, the War of the Pacific required shifting priorities. While the industry experienced two decades of low intensity, different choices could have repositioned Bolivia in the market. Despite the knowledge that it accumulated and the situational preview of monopolistic rule over the industry, Bolivia did not respond while it could have foreseen a pattern. The country could have, for instance, nationalized the tin industry.

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<sup>2</sup> Malaya, under British control until 1948, refers to the most southern provinces of Myanmar and Thailand, as well as Singapore

## 1890 - 1929

The real boom of the Bolivian tin industry started in the 1890s, mainly initiated by the opening of the railroad between Oruro and Antofagasta (Chile) in 1892. The constraining conditions under which pack-animals were deployed to transfer the ore were replaced by a practical system of transport. More railroads built in the first half of the 1910s by the Liberal Party provided Bolivia with an advanced infrastructure network suited to meet the demands of the tin industry (Contreras, 1993). Ayub and Hashimoto (1985) point out that by 1924, Bolivia was responsible for 25.1% of the global production of tin.

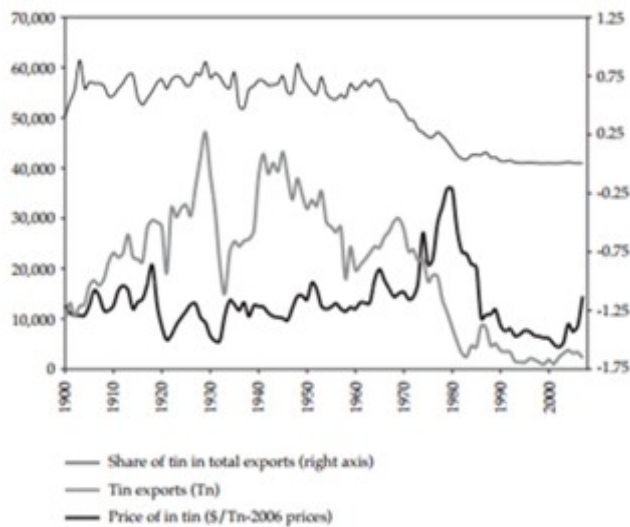


Figure 1. Source: Bojanic, 2009: 173.

that cannot compete with empty hands. The winners, in this case, were three 'tin barons' whom were able to withstand the crisis and came out stronger (Hillman, 1988).

Corresponding to the figure on the left, it was during this time that Bolivia was at the height of its tin production. But unfortunately, this could not last forever. The expansion of the market was very rapid but its downfall during the Great Depression was as quick. Prices plummeted and foreign demand was at an all-time low. As with every major economic setback, the largest companies within a particular industry leave those

*1929-1952*

The three 'tin barons' were the leading figures in the Bolivian tin industry after the Great Depression. The first and foremost 'tin baron' was Simón Patiño whose Patiño Mines and Enterprises was responsible for 60% of Bolivian tin production in 1929 (Hillman, 1988). The second was the German Mauricio Hochschild, an ore-dealer who arrived in Bolivia in 1921. By 1929 he controlled 80% of the tin export of small miners. He was the main opponent of Patiño, whom represented the large miners. The third actor was the Aramayo group, led by politically active Victor Carlos Aramayo. His organization had formerly been active in the silver production and enjoyed a strategic advantage in the mining sector. These three actors changed the structure of the industry to an oligopoly. They already possessed a large share of the industry in the booming years of the late 1920s and the crisis provided the opportunity to take control of some of the small to medium sized mining companies. These companies were barely able to survive under the harsh economic conditions that were present. The nationalizations in 1952 initiated by Paz Estenssoro brought an end to the oligopoly (Nash, 1972). Estenssoro ran for president in 1951 and combined the three tin-companies in a state-owned enterprise COMIBOL (Corporación Minero de Bolivia), the same company that is responsible for the extraction of lithium today.

Some parallels can be made between the silver and the tin era with regard to the resource curse. Confusing mineral wealth with actual economic prosperity is a grave mistake as reality painfully pointed out. The structure of ownership in both eras was unfavourable for the country itself. That does not imply, however, that private ownership of the resources will automatically result in negative economic performance. There is sufficient reason to believe that the state can benefit of its resource wealth, given that state institutions are capable to deal with foreign investors. It is difficult to predict the behaviour of people when they are given responsibility over a vast amount of resources. It can make them wealthy, but unfortunately short-term profits are preferred over long-term sustainable income. This is very evident in the case of the tin. Early examples of myopia among foreign investors started when the Cornish smelters demanded higher quality ores, leaving the rest astray, and neither did the 'tin barons' seem overly concerned about the future of the mines, nor about the economic future of Bolivia. It is the same short-sightedness that allowed for this in the first place. The government of Bolivia was unable to respond adequately to the growing demand for tin. Early appreciation of its position could have resulted in nationalizations of the mines which could have prevented foreign dominance over the industry. Influence in the political sphere by the 'tin barons' contributed to favourable conditions under which the mining companies could operate.



Patiño gained political influence as a result of mining loans to the state during the Chaco War<sup>3</sup> to prevent future royalty payments (Hillman, 1988: 88) and another £600,000 in 1924 to the Saavedra administration to control future taxes (Contreras, 1990: 270). Carlos Victor Aramayo acclaimed the position of minister of finance in 1934 (Hilton, 1947: 3). The newspaper *La Razón* was also under ownership of Aramayo, and as one of the leading newspapers in the country, it was able to exert pressure on some political figures that contradicted tin companies' interests (Soruco and Pinto, 2009: 94). It became evident in the late 1930s that the tin barons were prepared to use force when they were confronted with opposing policies. During these years, the new Busch administration decided to levy heavier taxes on the tin industry. After failed attempts of tin-sponsored rebellion the new president Busch committed suicide, apparently collapsing under the pressure exerted on him by the tin companies (Knudson, 1973). *The Evening Independent* of July 21, 1941<sup>4</sup> reported that accusations of *La Razón* led to the arrest of Paz Estenssoro, the president whom in 1952 nationalized the tin mining industry and responsible for unwanted policy the decade before (Nash, 1972). Political involvement by the tin barons considerably reduced the taxes levied, and besides, the taxes did not contribute to overall Bolivian well-being. Oscar Granados (2014) argues that even though tax levels increased significantly after the nationalizations: 'the government did not use it for social projects but on growing bureaucracy (p. 56)'.

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3 The war between Bolivia and Paraguay (1932-1935) over control of the northern part of the Gran Chaco region. This region was believed to be rich in oil.

4 <https://news.google.com/newspapers?nid=950&dat=19410721&id=Lb9RAAAAIBAJ&sjid=C1UDAAAIBAJ&pg=3863,5048581&hl=en>

## AS FLUID AS GAS

The economy of Bolivia in previous chapters can be summarized as a single commodity-export based system exploited by foreign investors for their own benefit. The exploitation of large natural gas fields in the eastern Chaco region is the next chapter in economic reliance on one product. While the tin market collapsed in 1985 the transition to natural gas was almost as fluent as it was from silver to tin. It was however long before this year that the initial accomplishments were made in the solidification of the industry. The first accounts on the oil and gas reserves in the Chaco region date back to the period that tin became Bolivia's main exporting commodity. Manuel Cuellar stumbled upon petroleum in 1896 and founded Bolivia's first oil company, which he later sold to Standard Oil in 1921 (Gordon and Luoma, 2008: 82). The US-based company controlled the oil supply for fifteen years when it was interrupted by the Chaco War. This event was significant as it gave rise to the nationalization of the oil and gas fields in 1936. The state-owned company YPF (Yacimientos Petrolíferos Fiscales Bolivianos) was established, and Bolivia was the first Latin-American country to nationalize their oil industry. Many decades filled with uncertainty and diverging political goals interrupted the industry and prevented it from flourishing.

The Bolivian dream of a state-owned company picking the fruits of resource wealth was realized and initially lived up to the expectation of its citizens. Oil and gas revenues surpassed those of Standard Oil fivefold in the following decade and by 1954 it fully met domestic demand (Gordon and Luoma, 2008: 83). During this time the tin mining industry had been nationalized by president Estenssoro but paradoxically, one year later he reversed the structure of the oil and gas industry to give incentive to private foreign investment and control. The introduction of the Davenport Code in 1955 meant the increase in foreign direct investment. The reason behind the new legislation was the growing demand for investment unmet by Bolivian financial means (Velasquez-Donaldson, 2007: 10). Gulf was quickest to react and controlled the largest share of the Bolivian hydrocarbon sector in the 1960s. YPF by this time was an impoverished company barely able to survive, and only 20 to 30 percent of the total revenue of Gulf was pocketed as taxes to the state (Anderson and Meza, 2001).

A series of nationalizations, capitalizations, liberalizations, and re-nationalizations took place in the decades leading up to 2005. During this year, Evo Morales, the current president of Bolivia, re-nationalized the industry to the point it is today. The structure of the hydrocarbon sector was even more prone to change than was the tin industry years before. Table 1 illustrates the events that shaped the oil and gas industry environment in Bolivia. It is obvious that the volatile nature of the industry did not have great beneficiary effects to its revenue, neither did it provide for long-term perspectives.

**Legislation changes in the Bolivian natural gas industry 1921-present**

YEAR	LEGISLATURE / EVENT	PARTIES INVOLVED	NATURE OF EVENT
1921		Standard Oil	Foreign control over oil/gas reserves
1937	Chaco War	YPFB	Nationalization and creation of YPF
1955	Davenport Code	Gulf	Opening for foreign investment
1969	Ovando presidency	Government	Re-nationalization of hydrocarbon sector
1972	General Law of Hydrocarbons	YPFB	Foreign investment opportunity - 50% revenue to Bolivia
1985	Decapitalization of YPFB	YPFB	65% of YPFB revenue to national treasury
1994	Law 1194	Capitalization of YPFB	Break-up of YPFB which now only functioned as regulator of the sector
1996	Law 1689	Capitalization of YPFB	which vastly incentived transnational organizations into Bolivia
2005	Hydrocarbon Law 3058	Nationalization	Reverse Law 1194

Table 1. Source: Andersen and Meza, 2001; Kaup, 2010.

The figure on the left emphasizes the tremendous growth that the industry witnessed after 1999. The sudden increase in both production and export was due to the change of exporting partner. Not only was Bolivia a single commodity exporter, its exports relied on only one country: Argentina. When Argentina discovered large gas fields of their own, they ended their cooperation with Bolivia in 1999. Fortunately, Brazil stepped in at this time after negotiations that had been going from 1991 to take over Bolivian gas exports (Lay, Thiele, and Wiebelt, 2008).

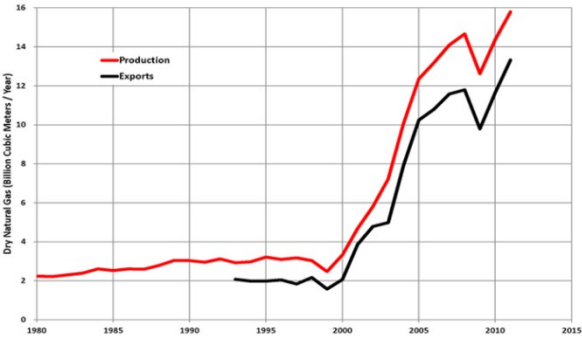


Figure2<sup>5</sup>

5 <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=3&pid=3&aid=1>

However the industry is at relative ease since Hydrocarbon Law 3058 had passed, it is still useful to assess the period before in relation to the resource curse. Several errors in years leading up to 2005 resulted in only minor growth to the Bolivian economy. The shifts in ownership structure and the accompanying legislation confuse many. Succeeding almost every election was a change in policy. There was no evidence for any unified direction that should have shaped the path of the industry. In the time that YPFB could operate without competition, the results were clearly in favour of Bolivia. It is very unfortunate, therefore, that the investments by the state were considered too little. The market was opened to foreign investment, but as in the tin era, this was of little benefit to sustainable income. Two factors are worth revisiting with regard to the resource curse. First, even though profits were derived through taxation, there is a loss of revenue compared to state-owned alternatives. Second, the foreign companies are bound to a limited time-frame resulting in myopic behaviour and abandonment of long-term ideals.

## THE GOLD OF THE 21<sup>ST</sup> CENTURY

A treasure is hidden underneath the surface of Bolivia's 10.000 km<sup>2</sup> salt-flats. In the south of South-America's second poorest country lies the key to decreasing a worldwide problem, the incentive for many multinationals to strengthen their Bolivian ties and most importantly, the resource that can help Bolivia's economy thrive. Lithium, a metal dubbed 'the Gold of the 21<sup>st</sup> century (Hollender and Schulz, 2010)', is used for many purposes but one is of vital importance for its profitability. Lithium is the main source in rechargeable batteries, used in cell-phones, lap-tops, and, potentially and theoretically the most important: electric vehicles. The region in which the lithium is found is called the Salar de Uyuni, which covers the Southern region of Bolivia and is said to contain half of the world's reserve of this precious metal. Bolivia is not, however, the only country in possession of lithium. To a lesser extent lithium is also found in neighbouring regions in Argentina and Chile, and in the United States, China and Brazil.

World War II was the first large event during which lithium was used, it was necessary for the production of nuclear fusion weapons. This trend continued until the Cold War ended and at the start of the 1990s demand for lithium sharply declined. The market for lithium by the time was dominated by a select amount of suppliers (Ober, 1994). Lithium supplies in Argentina were controlled by a company from the United States, and Chile was responsible for its own lithium production. During this time, prices remained constant, but in the wake of the Asian Financial Crisis of 1998 lithium prices dropped by half. This was partly due to the introduction of the Chilean company SQM (Sociedad Química y Minera de Chile) in the lithium industry. The company was able to accumulate a large market share through competitive pricing (Ebensperger et al., 2005). Its uses at the end of the 20<sup>th</sup> century included manufacturing glass, the pharmaceutical industry, air-conditioning and chemical processes. The demand for lithium quickly accumulated when rechargeable batteries required its use and rose to become one of the most desired metals in the world.

Lithium in Bolivia was discovered in 1976 and first reported in a Geological Survey conducted by the United States (Vine, 1976). As the significance of the metal was not yet appreciated by that time, only minor response followed. Corporate attention accumulated quickly when technical devices were introduced that gained increased interest by the general public. Early attempts to extract lithium from the brines date back to 1990 when Lithium Corporation America (currently Food Machinery Corporations) signed a contract with president Jaime Paz Zamora. The attempts were not fruitful, they were instantly blocked by a protest of concerned miners who went under the name of Federacion Campesino Uyuni. As the movement was convinced that the profits belonged to the people of Bolivia, its leader Francisco Quisbert was successful in denying the company access to the Salar the Uyuni and eventually, Lithium Corporation America relocated to Argentina (Evans, 2008). This act is symbolic for the involvement of the Bolivians, and for Evo Morales' current policy.

Even though the American company was expelled and the political sphere as well as the general public was aware of the potential profits from lithium, Bolivia did not rush to start exploitation. The worldwide spread of mobile phone and lap-tops required a growth in lithium production, but at that time, SQM, a Chilean company that was originally concerned with the nitrate industry, was the only company to respond to the growing demand. The company began producing lithium in 1997 which they extracted from brines in the Salar de Atacama, a region in the northern part of Chile. It was an opportunity they will not regret, according to their website the company made over \$2 billion in sales ever since, and has commercial offices in twenty countries<sup>6</sup>.

The table below depicts the lithium reserves in the world according to the United States Geological Survey 2006<sup>7</sup>. The actual reserves (left empty) are the resources of the reserve base which could be economically extracted and produced at the time of Determination. As we can see from the table, Chile is the only country that has complete access to its lithium and is Bolivia's largest competitor.

### *Demand*

According to the 2015 United States Geological Survey (USGS, 2015) demand for lithium sharply increased in 2014. Whereas the demand in 2013 reached 30,000 ton, 2014 demand

6 <http://www.sqm.com/en-us/acercadesqm/informacioncorporativa/historia.aspx>

7 <http://minerals.usgs.gov/minerals/pubs/commodity/lithium/lithimcs06.pdf>

<b>World Mine Production, Reserves, and Reserve Base:</b>				
	<b>Mine production</b>		<b>Reserves<sup>2</sup></b>	<b>Reserve base<sup>2</sup></b>
	<b>2004</b>	<b>2005<sup>a</sup></b>		
United States	W	W	38,000	410,000
Argentina <sup>b</sup>	1,970	2,000	NA	NA
Australia <sup>c</sup>	3,930	4,000	160,000	260,000
Bolivia	—	—	—	5,400,000
Brazil	242	240	190,000	910,000
Canada	707	700	180,000	360,000
Chile	7,990	8,000	3,000,000	3,000,000
China	2,630	2,700	540,000	1,100,000
Portugal	320	320	NA	NA
Russia	2,200	2,200	NA	NA
Zimbabwe	240	240	23,000	27,000
World total (rounded)	<sup>2</sup> 20,200	<sup>3</sup> 20,400	<sup>4</sup> 4,100,000	<sup>4</sup> 11,000,000

rose by 10% to 33,000. Moreover, they state that prices remained more or less the same. Table 2 summarizes three articles written on the projection of future lithium consumption. Whereas the research conducted by McNulty and Khaykin predicts the consumption of lithium by 2020, the other two have calculated the accumulated lithium demand for the years given. The projections are followed by the cumulative compound annual growth rate, based on the excerpt by the USGS.

<b>AUTHOR</b>	<b>YEAR</b>	<b>PROJECTED LITHIUM CONSUMPTION</b>	<b>CUMULATIVE COMPOUND ANNUAL GROWTH RATE</b>
McNulty and Khaykin (2009)	2020	37.700	2,24
Angerer et al. (2009)	2008-2050	178.000-590.000	4,79-8,34
Gruber et al. (2011)	2010-2100	12.000.000-20.000.000	7,18-7,83

Table 2

The research is based on the assumption that lithium-ion batteries will become the standard in electric vehicles, thus expecting that electric vehicles will become the regular mode of transportation. Predictions, however, concerning the demand for lithium, like any prediction, will remain speculative<sup>8</sup>.

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<sup>8</sup> The authors agree that lithium might be replaced in batteries as technology advances. This concern is shared throughout this thesis. Nevertheless, sheer possibility does not cancel the purpose of writing.

### *Structure of ownership*

Evo Morales' protectionist policy, after the nationalization of the hydrocarbon sector in 2005, continued with nationalizing Bolivia's resource rich Salar de Uyuni. The area has been under state control since 2008, and January 2010 marked the beginning of Bolivia's active involvement in lithium extraction. This coincided with the start of the second term of the president, which he inaugurated with the words: "We need partners, not patrons". His intentions were revealed to the Bolivian public whom were more than pleased to see that Quisbert's efforts had not been fruitless. His statement aimed at the international community ensured that attempts by foreign companies to invest in the sector were considered futile.

As noted, the country that possesses most of the world's lithium is Bolivia, and together with its neighbouring regions in Chile and Argentina the South-American countries make up for roughly 85% of the global lithium supply. While some are not overtly worried about the hegemonic dominance over one of our times' most valuable resources due to its recycling properties (Gruber, 2011), others have openly expressed their concerns. Tahil (2007) states: "*If the world was to exchange oil for Li-ion based battery propulsion, South America would become the new Middle East. Bolivia would become far more of a focus of world attention than Saudi Arabia ever was (p. 4).*" Yet, from both perspectives, the role of South-America as the potential global supplier of lithium is factual. Several websites report about the possibility of forming an OPEC-like cartel in the lithium industry. It is said that Argentina has proposed this plan in 2011 and is seriously considering its formation<sup>9</sup>. Cooperation between the countries improves the institutional structure of the industry thus decrease chances to the resource curse. If a supervisory body is installed that accounts for the mining departments of each country respectively, its regulatory properties might nullify cognitive limitations.

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<sup>9</sup> <http://www.mining.com/argentina-considers-opec-like-deal-for-lithium/>



## *Infrastructure*

The extraction of lithium requires a solid network of infrastructure that links the rural area of Uyuni to the rest of Bolivia. Research shows that infrastructure is of vital importance to the profitability of source wealth (Auty, 2007; O'lear, 2007). Bolivia is, in terms of infrastructure, not yet ready to start large-scale extraction processes. Infrastructure projects such as IIRSA and national initiatives should enhance the landlocked country's roads, water supply and telecommunication, but are not yet focused on the southern region of Bolivia. This will pose an enormous problem in the coming years, if commercial production of lithium lifts off. Promises by the Bolivian minister of infrastructure to invest heavily in the area have not been delivered, and foreign investment is rejected. The urge of keeping lithium production a national matter exceeds the urge of quick responses to recurrent issues. A history with delayed infrastructure projects (Yanez-Pagans and Machicado-Salas, 2014) reflects the inefficiencies that hold Bolivia back. The same kind of inefficiency is seen in water management throughout the quickly urbanizing country (Maxwell, 2013). A recent study concludes that the supply of water in the Salar de Uyuni falls short to supply the lithium industry. The largest river in the region, the San Geronimo, currently irrigates the quinoa crop industry. This industry might face abandonment in favour of the lithium industry (Aguilar-Fernandez, 2009). The energy grid, too, needs attention. The lithium extraction process will require a lot of energy still unavailable in the Salar de Uyuni. If basic infrastructure is not in the right condition, it shall be difficult to create the right circumstances to make lithium profitable. While Bolivia already made its first efforts to start extraction, Stiglitz (2007) is discouraging. He argues that if the conditions, both institutionally and in terms of infrastructure, are not right, the country does best in leaving the valuable resource untouched.

## *Cooperation*

The first effort to produce lithium was realized in 2012 by a pilot-plant set up by Corporación Minera de Bolivia (COMIBOL). It is a small plant that offers the possibility to experiment with the extraction of lithium. Whereas the plant was finished successfully the complexity of the environment in the Salar de Uyuni had been underestimated. Heavy rainfall and lower rates of evaporation compared to other lithium producing sites negatively affected the process (Anderson, 2011). Cooperation between Bolivia and the Netherlands since 2013 involving the technical university from Delft and three Dutch companies ensures that technical know-how is transferred to Bolivian scholars<sup>10</sup>. The partnership does not involve Dutch investments, however, it is considered development aid from Dutch perspective<sup>11</sup>.

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<http://www.rijksoverheid.nl/nieuws/2013/09/26/samenwerking-nederland-en-bolivia-op-het-gebied-van-lithium.html>

11 <http://dewerelddraaitdoor.vara.nl/media/300524>

*Economic risk*

The Bolivian economy, characterized by its single commodity-export, is very sensitive to price shocks in the booming industry. Its reliance on one resource, first tin, later oil, and later gas, is vulnerable to what we call Dutch Disease effects (nothing to do with the development aid by the Netherlands). As pointed out in the first chapter, the Dutch Disease phenomenon occurs when a large inflow of investment destabilizes the local currency with an appreciation of the real exchange rate. While one would suspect that Bolivia’s extensive history of foreign control over resources and accompanying investments would have provoked an appreciation at any point in history, the country was only once subject to the phenomenon. Even though hyperinflation reached unprecedented levels in Bolivia in the period 1982-1985, it was not the direct result of investments, nor did it have anything to do with the collapse of the tin market. Rather, it was the result of intense political instability and social unrest (Sachs, 1986).

The second half of the 1990s was the first time Bolivia had to deal with the Dutch Disease. There are a series of events that cannot be seen separate from each other. Passing Law 1689 in 1996 was the starting point leading up to real exchange rate appreciation. The period in which the law passed was marked by liberalizations and promoted foreign investments into the hydrocarbon sector. Law 1689 stated that gas extraction from proven, known reserves was subject to higher taxation than extraction from newly found gas reserves (Velazquez-Donaldson, 2007). This led to a wave of investments by foreign companies in exploration, development, and extraction amounting to \$3,435 billion and an increase in known gas reserves from 200 million barrels in 1997 to over 950 million barrels in 2003 (Kaup, 2010: 128). In addition, Bolivia had to deal with the aftermath of its failing tin sector,

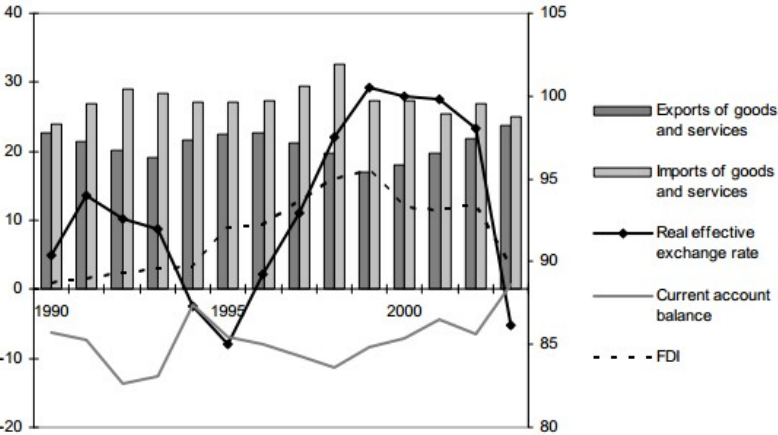


Figure 3

the macroeconomic adjustments following hyperinflation in the 1980s, and the loss of Argentina as its sole exporting partner. Figure 3 (Lay and Wiebelt, 2008) clearly shows the correlation between these factors.

The stabilization that started roughly around 1999 was mainly due to the shift in exporting partners from Argentina to Brazil, which is graphically depicted as the increase in exports. Even though the situation stabilized quite quickly and was the result of unlucky policy making, Bolivia needs to be alert for signs indicating Dutch Disease effects. In an economy that relies heavily on only one exporting commodity, dangers are but a small step around the corner.

## ANALYSIS AND RECOMMENDATIONS

A long history of mineral wealth, theft, mismanagement, corruption, and above all, economic impoverishment has delayed the development of Bolivia. Seldom has a country be blessed with an amount of natural treasures the likes have been seen in Bolivia. Diverging from silver, sufficient to build a bridge from the Bolivia to Spain, to tin, oil, gas, and now lithium, it challenges reason to understand why Bolivia is still South-America's poorest country. As counterintuitive as it may seem, so is the principle of the resource curse. Many scholars and academics have written on the topic and the unanimous conclusion holds that mineral wealth tends to result in economic distress. Fortunately, it does not do so unconditionally. There are countries that have both mineral wealth, as well as sustained economic growth. Lawson-Remer and Greenstein (2012) mention Chile, Botswana, Canada, and Norway as the 'lucky few' whom have succeeded in avoiding the resource curse. Transparency, accountability, and cooperation are listed as the most important factors contributing to economic growth. These examples give reason to believe that the resource curse is avoidable. Whereas some authors prefer to recommend economic directions, others argue that political security needs to be established before economic policy can be implemented. Davis et al. (2003) point out that it would be senseless to instigate economic reforms when the government lacks accountability and transparency. The emphasis of dealing with mineral wealth should be on political factors first and economic policy later.

The state of the current politics in Bolivia is among the most stable in the history of the country. The election in 2005 (and re-election in 2010) of the immensely popular Evo Morales brought economic progress (Farthing and Kohl, 2014) and political stability. Webber (2011) states that the *'level of institutional consolidation of political power within the apparatuses of the state is unprecedented in recent Bolivian history (p. 6).'* This is in sharp contrast with former years, where ambiguous policies by rapidly shifting governments impeded progress and was the cause of conflict. According to Michael Ross (2003), there is a direct link between resource abundance and social unrest. His research among mainly African countries concluded that the likelihood of conflict was significantly higher in countries with resource abundance, and even higher in countries that were dependent on the resource. Ross recommends investing resource wealth in education, health, and poverty reduction. Those social services increase the standard of living so that the population collectively feels to benefit from the resource revenue. Bolivia has experience with resource related unrest. The gas war in October 2003 was a response to government's economic policies, but also to issues

such as corruption and military violence. The roots of the conflict, however, could trace back longer. Perreault (2006) argues that the dissatisfaction among Bolivians could have been embedded in their system as a result of former experiences with the resource curse.

Social unrest can be caused by political instability and poor quality of state institutions. State institutions are responsible for the taxation and distribution of resource revenues. In both the tin- and gas-era, mineral rents disappeared in the coffers of politicians and investors. The institutions were incapable of dealing with the large economic interests that were involved in the mining sector, and fell prey to corruption. The structure of ownership is closely interlinked to this phenomenon. The large difference between the current lithium abundance and the situation in the 20<sup>th</sup> century is the nationalization of lithium extraction and production. Earlier examples have proved that nationalizing resources had a positive influence on the Bolivian economy (hydrocarbon sector in 1936 and 2005). Besides, there is less room for recklessness and short-sightedness as there is no external actor concerned. Last, it provides the opportunity for long-term perspectives and sustainable extraction and development. Lawson-Remer (2012) captures the intrinsic qualities state institutions must oblige to. Transparency in terms of the *'broad disclosure of information about revenues, expenditures, and other aspects of government and business operations(p. 2)'* translates into accountability, which requires the integrity of state institutions (Ross, 2003). Forming a supranational organization that is responsible for the extraction and production of lithium with for example Chile and Argentina will decrease the possibility of corruption more. The construction of such an organization would be economically feasible, as expertise from the countries could assist Bolivia in its first years, and as OPEC, arrangements about export quantities will increase revenue, decrease competition, and promote sustainable extraction.


Predictions about, and recommendations to the political realms of Bolivia are more subject to change than are recommendations to the economic side. Bolivian politics has been very insecure and rapidly changing in the past, but the past decade under the presidency of Evo Morales gives hope. Economic recommendations, however, are not a matter of hope. Even though nobody can predict the future of lithium-prices, the optimum conditions can be established through which price fluctuations do not severely affect the Bolivian economy. Three issues require attention. First, as a single-commodity exporter, any market fluctuation on the commodity market is potentially devastating (Sachs and Warner, 1995). Diversification is the proposed solution (Collier, 2000) and the international community should assist in the process. Recent experiences have led to believe that Morales is averse of foreign influence, but he might have to revise his opinion slightly. Collier argues that aid programs to diversify an economy can succeed, only if the country has a sufficient absorptive capacity for aid. Rejection of all foreign influence is on the long-term not beneficial for Bolivia. Second, countries that relied solely on the export of primary commodities faced a deterioration of terms of trade, increasing the gap between them and industrialized, rich states (Singer, 1950). Third, the economic linkages between resource and non-resource sectors are often poor. This is especially important if the ownership structure of the resource involves foreign investors. Capital flight is often the result of this structure whereas the mineral rents should have actually been reinvested in the economy (Hirschman, 1958).

## CONCLUSION

*“Resources are not, they become (p. 814).”*

Erich Zimmerman (1951) probably did not take into account the resource curse (which by then was not formulated as such), but he captures the essence of resource abundance. Through the course of this paper we have learnt that resources are not, and neither will, become (profitable) on their own without the right set of circumstances. Only a few cases through history report economic progress as a result of resource wealth. The factors that shape the right environment, both economic and political, are hard to grasp and are situation-specific. The literature on the resource curse is vast and the discussion on avoiding the curse has been deliberately divergent. The truth is that there is no common body of knowledge, no quick-fix solution to the problem that has impoverished nations. Every case of the resource curse should be looked at through a specific lens in order to provide a tailor-made set of ideas. What we looked through was a historical lens, one that focused on past experiences Bolivia had with the resource curse. Through this lens the hopes were to identify commonalities in the resource abundant periods that could assist in present decision making. Considering the abundance of lithium in the Salar the Uyuni, the choice is up to Bolivia whether they will live up to expectations of the outside world. The first conclusion that can be drawn is that Bolivia is not rushing to extract the metal. Experiences with foreign investors who did not respect long-term goals in favour of short-term profit are still fresh memories. The current status of nature in Bolivia is completely different (Vidal, 2011). The Law of the Rights of Mother Earth passed in 2010 symbolizing the value it has to Morales and his people. Treating nature with dignity is the first step to sustainable development of the resource, and the nationalization of the mining sector ensures its preservation.

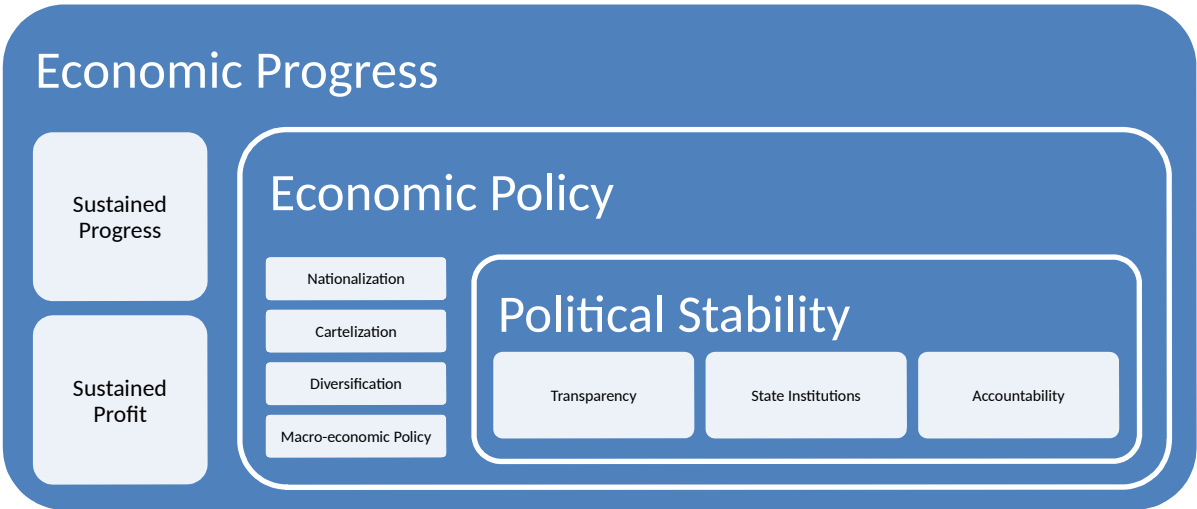
The figure on the right represents the triad relationship between factors that had the largest effect on the resource curse. We have to understand that the three are inevitably related and cannot be considered separate paradigms. Economic progress is closely intertwined with political stability exemplified by coups and revolts when inflation is high and morale is low. Yet, political stability is achieved through long-term formulation of economic policy. Volatile government such as during the gas and oil





period restrain economic growth. Last, it is the right economic policy that ensures economic progress. The three are not separable but stability in one of the factors leads to stability in the others.

The diagram below shows the parameters that will avoid the resource curse. The identification of a hierarchical order is suited to the Bolivian case. President Evo Morales, now in his third term, ensured political stability in Bolivia. Transparency, accountability, and the high-quality state institutions are characteristics that will prove most effective in dealing with the curse. The nationalized structure of ownership over the lithium prevents ‘tin-baron’-situations. He could go as far as to form a cartel with Argentina and Chile, two countries that have experience with lithium extraction and production. The emphasis should be on diversifying the single-commodity exporting economy, one of the commonalities through the past centuries of Bolivian resource curse history. One way to achieve this is to accept aid by the international community. Distrusting capitalist countries is a characteristic of Morales that he might have to abandon in avoiding the resource curse. Restrained investments in the economy of Bolivia by countries other than those preferred by Morales might be a key in developing economic progress. Infrastructure should be high on the agenda, and initial revenue from lithium should be directed towards improved energy, water, and road networks. In a later stage, Humphreys *et al.* (2007) provide that mineral wealth should be re-invested in a diversified, sustainable economy. Oil, lithium, or any valuable mineral is non-renewable, and can therefore not be seen as profit in itself, rather, it must promote and sustain the rest of the economy. It is a long way to go for Bolivia, but if they succeed, lithium will be the key to a prosperous Bolivia.



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