

An Assessment of the Environmental and Social Impacts of Chinese Trade and FDI in Bolivia

WORKING GROUP ON DEVELOPMENT AND ENVIRONMENT IN THE AMERICAS

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China has become an important partner for Bolivia, both diplomatically and economically. These two aspects of the relationship overlap frequently, as China and Bolivia have signed over 400 cooperation, aid, and loan agreements. In terms of investment, China has been a small but fast-growing partner, currently active in Bolivia's mining sector and set to be Bolivia's main partner in developing its lithium reserves. Bolivia's exports to China have been concentrated in minerals, while imports have been concentrated in manufactured capital and consumer goods. Despite high prices for metals Bolivia has experienced a significant trade deficit with China. Because of their high concentration in the mining sector, exports to China have put pressure on Bolivia's water supplies.

After exploring the relationship on an aggregate level, this paper turns to case study evidence in the tin mining sector, with the participation of the Chinese firm Jungie Mining. Our research reveals that Chinese tin mining is associated with water pollution and conflicts over water use. Moreover, the case of Jungie indicates that there is a lack of capacity and/or willingness to enforce and upgrade existing environmental laws on the part of the Bolivian government.

Despite the fact that Jungie Mining is in an early stage, the firm's activities have already been suspended due to water pollution in surrounding communities and it has already clashed with local communities over water rights. This is exacerbated by the lack of action on the part of the Bolivian government, which allowed the firm to operate for four years without obtaining an environmental license, and has set a troublesome example by delaying construction of pollution remediation

infrastructure in publicly run mining operations. Equally concerning is the new Law on Mining and Metallurgy, which explicitly gives mining priority use of water. This new law also gives the Mining Ministry authority to issue environmental licenses, and is seen as opening potentially serious conflicts of interest.

The social aspects of our case study are more positive. Jungie has actively engaged in community consultation processes and has respected their outcomes. This has ensured that ore processing facilities are located in communities that want them and away from those that do not. In addition, the firm is operating through a joint venture with a local cooperative. Such an arrangement could bring new technology to the cooperative sector and ensure that the local population benefits from mining.

Bolivia's relationship with China is set to deepen through the development of local lithium reserves. This prospect brings great opportunities for the national economy, but our case study on tin highlights areas of deep concern. To address these areas and prevent their repetition in future lithium projects, we recommend:

- Strengthening the enforcement of environmental regulations in all contexts, including international investments and publicly-run projects,
- Foster transparency in public concessions contracts,
- Revisiting the Law on Mining and Metallurgy, to ensure that communities and small farms have access to sufficient water for their survival and to avoid regulatory capture in the issuing of environmental licenses,
- Supplementing the accumulating international reserves with a stabilization fund or sovereign wealth fund, if the appropriate institutional structures can be established.

1. Introduction

China's recent impressive economic growth has had important effects on international trade flows, in terms of both prices and volumes. China is a major exporter of goods (with 11.2% of total world exports), the second largest destination of FDI (with 9% of total inflows), and the third most important foreign investor (with 6% of total flows) (ECLAC, 2012). In addition, according to ECLAC (2012), China's demand for minerals and raw materials in general has important impacts on international commodity prices. Thus, China will certainly impact the future of international trade flows for Latin America. It has already directed increasing FDI flows to this region in the last few years.

However there is more than just economics in the relationship between China and Latin America; there are also environmental and social issues related with this economic link. Empirical studies about this connection for the Chinese trade and FDI are still scarce. It is important to analyze this topic for the Bolivian case, given its particular environmental and economic characteristics. Certainly, during recent decades the Bolivian economy has shown an impressive record of GDP growth, but the country still faces serious environmental and social problems.

The aim of the present study is to analyze the main trends of trade and FDI flows between China and Bolivia, determining their environmental and social impacts. Thus, the study is divided in three parts. The first section briefly describes the trends of Chinese FDI to Latin America. Part 2 is devoted to analyzing the relationship between Bolivia and China considering the different financial linkages they have to each other, namely loans, donations, and FDI, among others. Section 3 develops the context of the case studies, presenting an overview of the mining sector in Bolivia. Part 4 is the methodological section where two case studies from the mining sector in Bolivia with Chinese participation are evaluated and policy implications are presented. Conclusions are at the end.

2. Chinese Trade and Investment Participation in Latin America

During the last three decades, China has become a strategic international trade partner, having considerably increased its relations with several regions, including Latin America and the Caribbean (LAC) with which China has consolidated businesses links through bilateral agreements characterized by unbalanced commerce between exports and imports (Bittencourt, 2012). According to Balderrama and Martinez (2010), since the 1970s China begins to face the difficult task of investing outside its borders. Chinese FDI in LAC increased from \$200 million USD in 1975, to \$916 million USD at the start of 2000 and to \$50 billion USD by the end of the decade (Balderrama and Martinez, 2010; Nacht, 2013).

However, China is not only deepening its relationship with LAC through the market mechanisms of trade, loans, and investment, but also through cooperation. China has a solid development strategy characterized by multi-polarism, multilateralism, non-interference, soft power, pragmatism, collaboration, and persuasion.

It has already been established that during the 2000s, the investment relations of Asian countries in LAC prioritize the extractive sector in its investments (petroleum, gas, mining), and to a lesser extent other productive sectors. It is a relationship characterized not only by partnership but also, in most cases, by competition in the international markets of goods and services (Correa and Gonzales, 2006). In general, Chinese FDI continues to support the production of primary commodities in the economy (returning to the model of exporting of natural resources) of LAC, mainly due to the high profitability of raw materials extraction, with environmental and social impacts which are denounced from different sectors, and with limitations in regulation and human rights oversight. As a special case, Irwin and Gallagher (2013), observe that the Chinese mining companies are often portrayed as predators regarding environmental and labor norms compared to other companies, which is a threat for LAC.

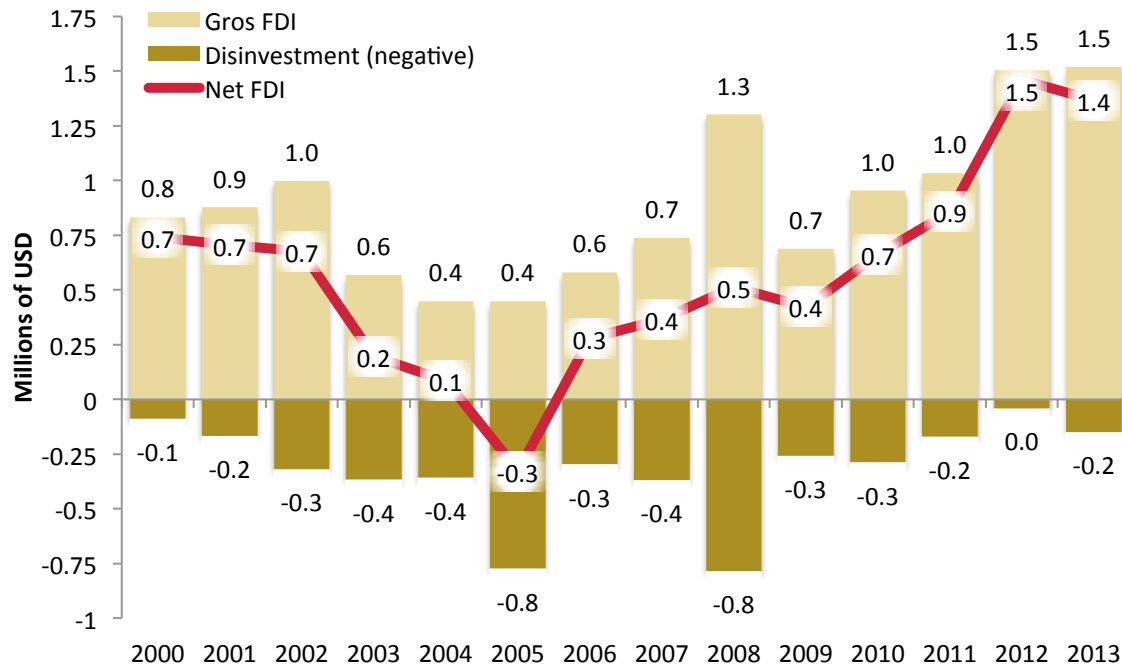
2.1 Chinese Investment In The Bolivian Economy

During the early 1990s, after series of reforms inspired by a neo-liberal model were enacted in Bolivia, economic policy began to improve and expand international insertion, reducing transaction costs, timelines and risks related to the movement of capital (Rojas and Nina, 2001).

2.1.1 Flows of Foreign Direct Investment in Bolivia

According to Figure 1, during the period 2000-2013 FDI to Bolivia shows a fluctuating behavior, recording for the year 2004 \$448.4 million USD, the lowest amount during the period, reaching a recovery in 2008 due to the increase in the price of raw materials that generated greater FDI injection, falling in 2009 and returning to growth through 2013, when it reached \$1,520 million USD.

FIGURE 1: Bolivia: Gross Foreign Direct Investment Flows

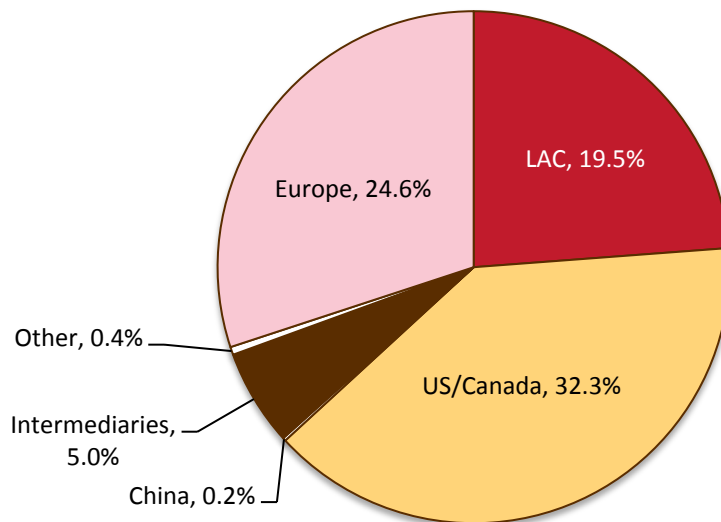


Source: Author's elaboration based on INE, BCB and United Nations data.

2.1.2 Origin of foreign direct investment

Disaggregating by country shows that the primary revenue source of FDI from 2000 to 2008 was the USA (with 46% of the total), several countries in Europe (with 28% of the total), and several South American countries (with 17%). China's FDI in Bolivia represents only 0.09% of the total (Figure2).

Figure 2: Bolivia FDI, According To Country Of Origin, 1999-2008



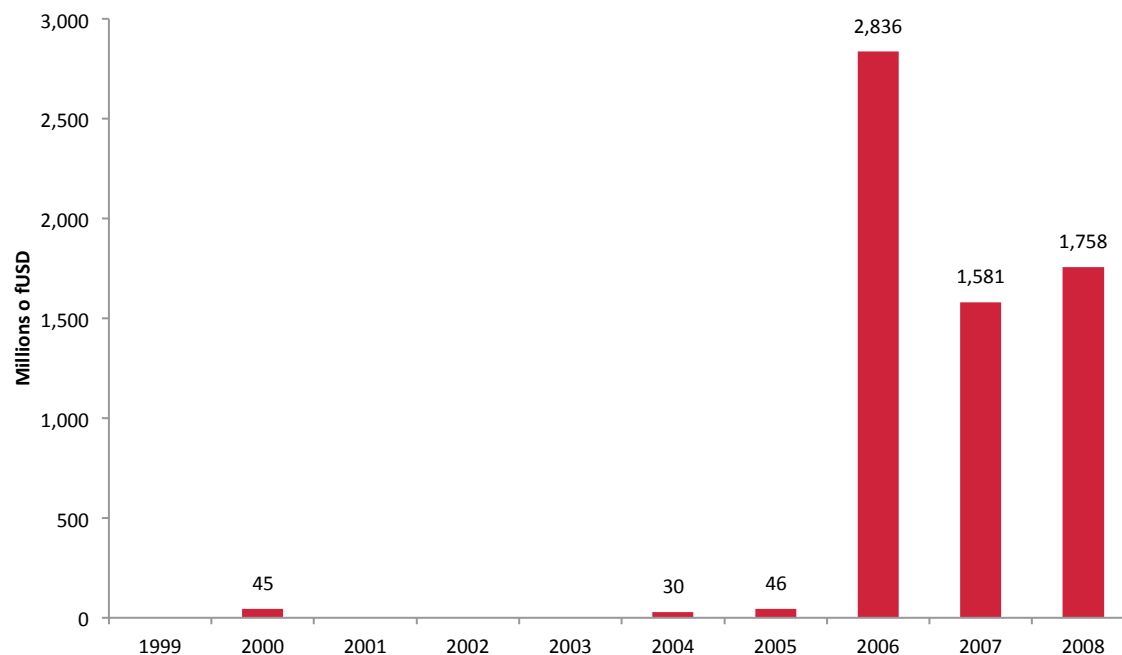
Source: Authors' calculations based on INE data. Note: Intermediaries include common pass-through countries, including the Dutch Antilles, the Bahamas, Barbados, Bermudas, the British Virgin Islands, the Cayman Islands, Liechtenstein, and Luxembourg. "Other" includes multilateral organizations.

The share of China's FDI in Bolivian economy as seen in Figure 3 is quite sporadic with small financial sums. During the year 2000 the first Chinese FDI in Bolivia is recorded, with a value of USD 45 million. During the period 2001-2003 no more Chinese FDI in Bolivia were registered.

China's FDI presence in the Bolivian economy did not return until 2004, with a share of USD 30 million accounting for 0.007% of the total FDI, down by 33% to the figure recorded in 2000. However, from 2005 to 2008, Chinese FDI in Bolivia increased gradually reaching a peak of USD 2.8 billion in 2006, which represented 0.5% of total FDI for that year, then decreasing by 38% for 2008, becoming that year to USD

1.8 billion. From 2009 to 2013, FDI flows came mainly from Spain (24%), Brazil (19%), Sweden (12%), United Kingdom (7%) and the USA (6%).

Figure 3: Chinese FDI in Bolivia, 1999-2008

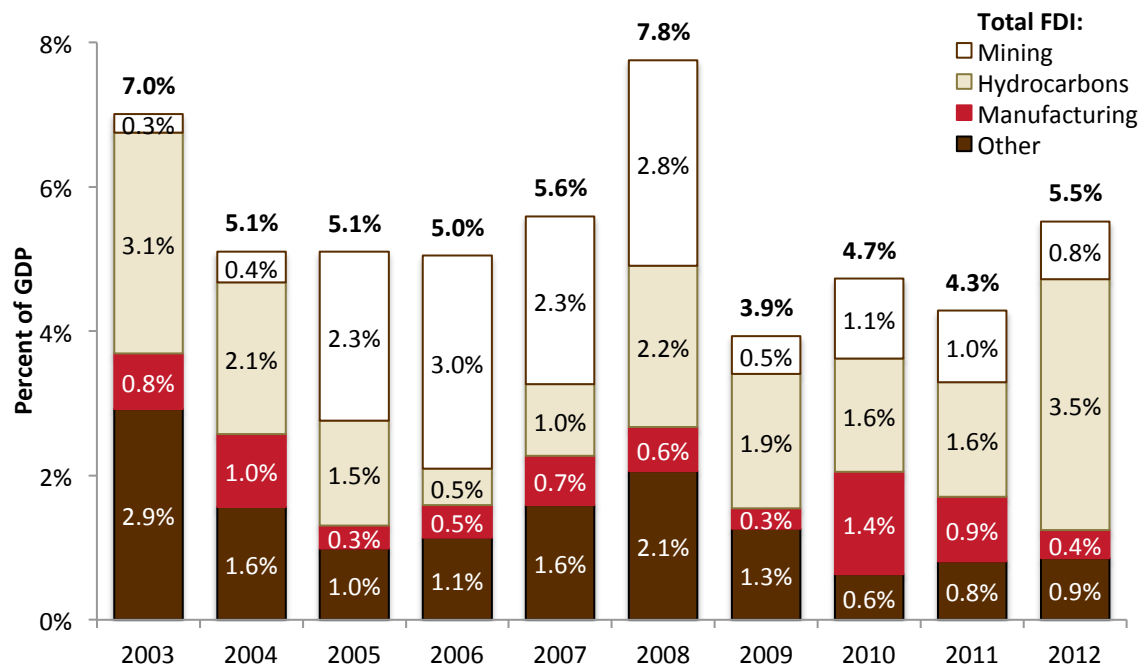


Source: Authors' calculations, using INE data 2000 - 2008.

2.1.3 Destination Of FDI In Bolivia

Overall FDI flows have been concentrated in the following sectors: oil, mining and manufacturing. In the five years from 2008 to 2012, FDI into hydrocarbons represented an average of 39% of the cumulative total during that period, mining 24%, and manufacturing 14%.

Figure 4: Destination Of FDI Flows In Bolivia, By Sector



Source: Authors' calculations using INE and BCB data.

* Production and distribution of electricity, gas and water, construction trade, hotels and restaurants transport storage and communication financial intermediation and others.

Beginning in 2000 FDI has been concentrated primarily in the hydrocarbons sector, reaching around \$4623 billion USD. On average from 2000 to 2004, FDI to these sectors represented around 46% of the total, followed by other services. This trend is mainly due to both sectors having been capitalized and obliged to reinvest, as in other services such as electricity distribution companies transport and communications.

FDI in the mining sector is comprises only 4% of the total, since prices of minerals did not provide great benefits for investors until recently. However, during the period of 2005 to 2010 this sector began to respond to price increases. In 2012, mining accounted for 14.5% of total FDI inflows.

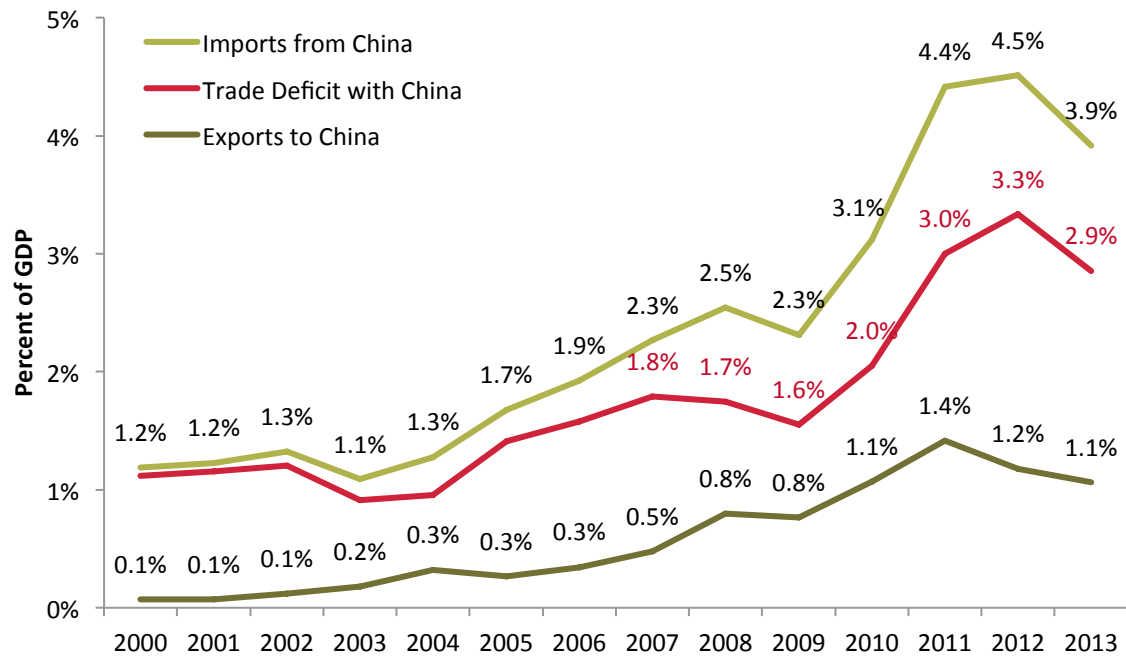
2.1.4 Incentive policies to attract FDI

Bolivia, through reforms, has introduced a number of incentives for investment, such as a single and uniform tariff of 10% applied to all imports of consumer goods, and a tariff of 5% on imports of capital goods, compensation mechanisms on export taxes (to ensure tax neutrality), free trade zones both for commerce and industries, and an Investment Law that stipulates equal rights, duties and guarantees to foreign and domestic investors. Bolivian law prohibits discrimination and guarantees freedom of economic activity, provided it does not involve unlawful activity. Other incentives designed to attract FDI include: bilateral agreements to promote and protect investment in the country, economic complementarity agreements, and agreements with international guarantee systems.

2.2 Bolivian Trade Flows with China

Figure 5 shows the trade flows between China and Bolivia from 2000 to 2013. In 2013, Bolivia recorded a trade deficit with China of 2.9% of GDP (\$880 million USD), a decline from 2012's peak of 3.3% of GDP. Recent years' trade deficits with China are due to higher imports of intermediate products for industry and parts and accessories of transport and equipment.

FIGURE 5: Bolivia-China Trade Balance, 2000-2013



Note: Data are on an FOB basis. China includes Hong Kong, Taiwan, and Macao. Source: Authors' calculations based on INE, WEO data.

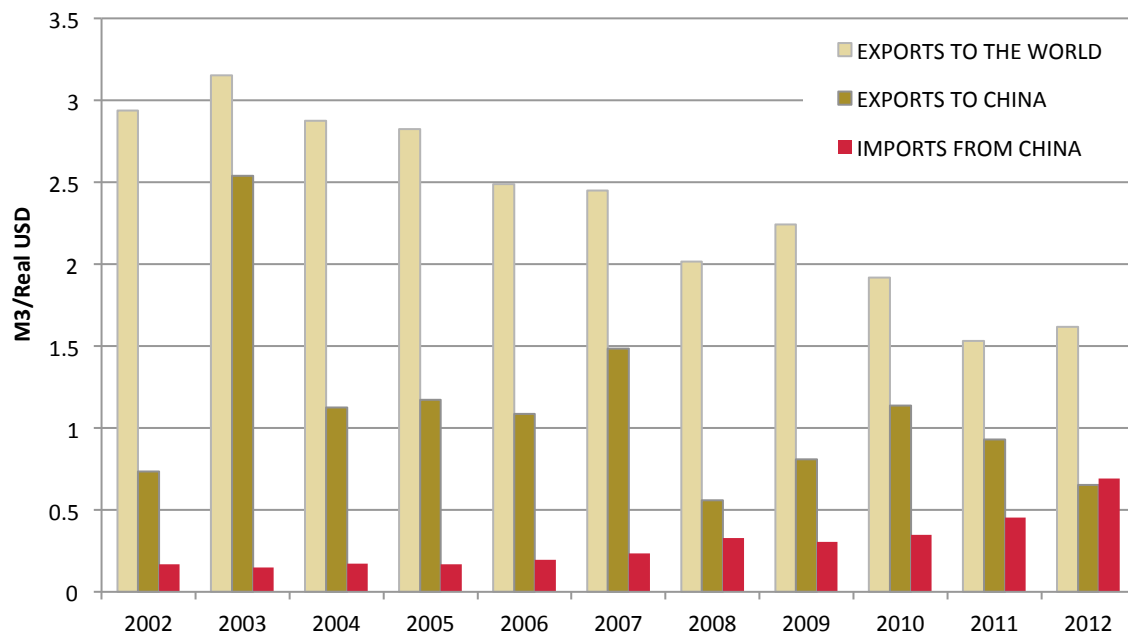
As shown in Figure 4, this trend has been recorded since 2000, but until 2005 the gap was much smaller. Since 2009 the deficit has increased substantially. This is mainly because much of the Bolivian exports to China are raw mineral materials, while imports from China are mainly manufactures. According to the Central Bank of Bolivia (BCB), between January and November of 2013, Bolivia exported 48 products to China, such as silver ore and concentrates (33% of the total), unwrought unalloyed tin (24%), zinc and its concentrates (16%) and tin and its concentrates (7%). On the other hand, the country bought from China 4,011 products during this period, among which stand out probing and drilling machines (3.5%), motorcycles (3.4%), cell phones (2.8%), and herbicides (1.9%) (INE, 2013).

This trend has major consequences for the manufacturing industry in Bolivia, since over time it is losing its sales position within both the national and international market. The sale of Chinese manufactured goods has grown exponentially, calling into question the survival of a large number of small and medium-sized enterprises

in Bolivia. Another serious threat bears mentioning: remaining stuck in a specialization of primary exports, characterized by very little dynamism.

Moreover, considering the environmental impact of this trend, according to Figure 6, Bolivia is exporting to the world products that have an important water footprint, implying a threat to the environment. Bolivian exports to China do not show a different trend from overall exports; the Bolivian water footprint on average was double the water footprint of imports from China, largely because of the trend toward primary goods in the economic relationship with China. Even though the total exports to China do not show a significant jump between 2002 and 2003, in terms of water intensity there is a notable jump, due to lower export value but higher water use given the nature of Bolivian exports: minerals, leather, and textiles. In 2008 the decline in exports' water intensity is not because a lower water use but due to a higher value of Bolivian exports given the increasing prices of raw materials.

FIGURE 6: BOLIVIA. EXPORTS ACCORDING TO WATER AVERAGE INTENSITY (2002-2012)



Source: Authors' calculations based on Water Footprint Network data.

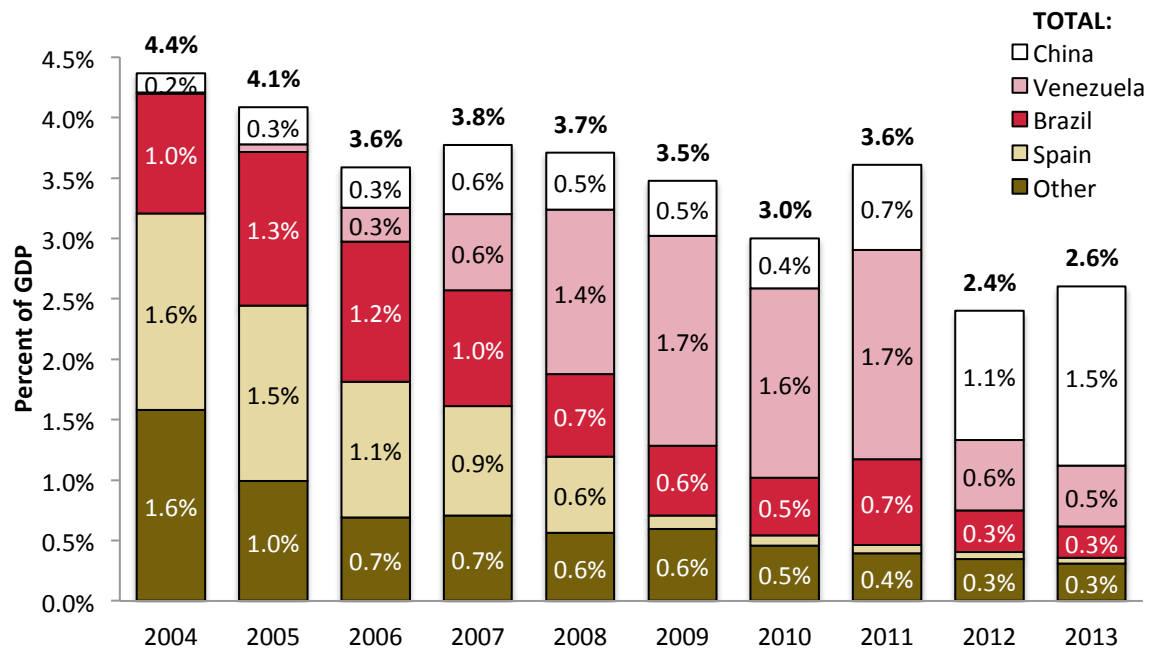
Still, China is not considered a key market for Bolivia, as it only represents 2.1% of its exports in contrast to Brazil with 31.5%, followed by Argentina with 17.7% (which can be explained as a result of Bolivian gas sold to Brazil and Argentina) (INE, 2013). However, as a supplier to Bolivia, China ranks as the second largest source of imports with 13.1% of the total, after Brazil, which represents 18.4%.

2.3 Bolivia's External debt with China

According to data from the Central Bank of Bolivia (BCB), at December 31, 2013, the balance of the debt in Bolivia reached \$5.0 billion USD, an increase of 14.34% over December 2012. Over the past 13 years, the debt-to-GDP ratio has fallen from 53% in 2000, to 28% in 2006 and to 15% in 2012, before rising in 2013 to 17%.

Bolivia's bilateral debt to China has been growing since 2001 in small amounts initially, until 2006, when the debt with China was \$38.6 million USD (0.3% of GDP), representing an increase of 80% in absolute terms or \$17.2 million USD over its 2001 level and in 2010 it reached \$82.2 million USD (0.4% of GDP), representing an increase of 112% in absolute terms. This trend accelerated during the last few years, reaching \$430 million USD (1.5% of GDP) in December 2013, an increase of 423% in absolute terms over its 2010 level. By April 2014, China has become the largest bilateral creditor of Bolivia, representing 59% of the total of the bilateral debt, according to data from BCB. This growth can be explained by the affinity that the Bolivian government has demonstrated for China, since it has shown support for Bolivia's process of political change.

Figure 7: Bolivia's Bilateral External Public Debt 2000 - 2013



Source: Authors' calculations based on BCB data.

2.4 Chinese Bilateral Aid with Bolivia

Relations between Bolivia and China officially began in 1985; following the establishment of bilateral relations, the leaders of both countries have reached agreements to deepen them.

An important area of cooperation is Chinese aid. According to the Chinese Embassy in Bolivia, the goal of the funding agency of China is cooperating with all development countries with which China has diplomatic relations, within the following areas: agriculture, water projects, war equipment, health, culture, education, technical cooperation, drilling and environmental protection.

The types of cooperation, all funded by the government of China, are classified as follows:

- Reimbursable Financial Cooperation: these agreements have a term of 10 years with 5 grace years, with a preferential interest rate of 3% for loans in Renminbi or 15.1% for loans in USD, subject to availability by the Chinese government.
- Reimbursable Technical Cooperation: these agreements have a term of 5 years of use, with a 5-year grace period and 10 years of repayment, without any interest or commission.
- Non-Reimbursable Technical Cooperation: these agreements are grants to support human capital, technology, and equipment, subject to availability by the Chinese government.

Within this framework, Bolivia has signed more than 400 agreements with China, including economic, technical, and agricultural cooperation and financial and telecommunications development, and even assistance in energy, mining, infrastructure and food security issues.

During the last few years, China has also lent equipment to the armed forces of Bolivia for the development of a communications satellite, supported the industrialization of lithium reserves, granted \$21 million Yuan (\$3 million USD) for the execution of projects of investment and purchase of capital, China-made machinery, and other goods. There are agreements of strategic cooperation between the Bolivian and Chinese ministries of agrarian development and agriculture, to deploy tasks for research and transfer in the improvement of agricultural production in Bolivia.

At the financial level, the China Development Bank established a consortium with the Bolivian State Bank Union, a fund involving an initial \$10 million USD in capital.

3. The Bolivian Mining Sector

3.1 Division between Private and Public-Sector

The mining industry in Bolivia is structured by two sectors: state-owned and private.

3.1.1 State Sector

COMIBOL was one of the most important state-owned enterprises in the mining sector supply chain before the reforms introduced in 1985, which decentralized it and restricted its functions to managing joint venture contracts, leases and services with mining companies or cooperatives (Espinoza, 2010). Since 2006, Bolivia has taken the first steps to recover natural resources. With S.D. 28901, COMIBOL assumed total control of the mining deposits of the Empresa Minera Huanuni, canceling the contract with the private company RBG Minera S.A.

In 2007, through Law 3720, COMIBOL was empowered to participate directly in the productive chain through prospecting, exploration, mining, concentration, smelting, refining, commercialization of minerals and metals, as well as managing areas declared to be fiscal reserves, in order to increase the State presence in the mining sector (Sanabria, 2009). Currently, the company performs extractive mining operations, producing 600 to 700 tons per month of tin concentrates whose value is about \$620 million USD, and supporting 4,560 jobs.

However, despite COMIBOL's expansion, the institution has presented several cases of corruption, among the most well known being the case of the Mutún Steel Company, where COMIBOL had hidden information about the price premium on the purchase of land for the concessionary Indian company Jindal, with a cost to the State of more than \$2 million USD (<http://www.noticiasfides.net>).

3.1.2 Private sector

The structure of the private sector within the Bolivian mining industry consists of two subsectors: medium and small-scale mining.

Medium-sized mining is organized through the National Association of Medium-Scale Mining (ANMM) involving 14 active companies. The goal of ANMM is to ensure the development of the mining industry and uphold its interests. This sector, unlike small industry, has ample access to financing from the banking system, allowing better technology and other aspects that are critical to minerals operations.

Small-scale mining is divided into two categories: small miners and mining cooperatives. Cooperatives are self-managed units that operate in private areas and leased sites (originally owned and managed by COMIBOL). They are grouped into regional and departmental associations, which make up the National Federation of Mining Cooperatives (FENCOMIN). FENCOMIN includes about 635 mining cooperatives that bring together approximately 65,890 members. An important subsector includes producers in arid places, riverbeds and producers of boron in the Salar de Uyuni, which are grouped into Regional Chambers and Department of Mining, which make up the National Mining Chamber (CANALMIN).

Workers of both medium-scale mining and small-scale mining are organized through 42 unions in the Federation of Mine Workers of Bolivia (FSTMB).

3.2 Institutional structure

The Ministry of Mining and Metallurgy is primarily responsible for the definition and implementation of policies and standards that form the framework for the metallurgical mining activities in Bolivia.

The Mining Code establishes the Superintendent of Mine as the highest authority of the administrative jurisdiction mining. The superintendent's powers are: a) To hear and resolve appeals filed against decisions of the regional superintendents, who are responsible for granting mining concessions on behalf of the state and resolving administrative case opposition under invalidity, expropriation, bondage, resignation and resource recalls; b) To ensure proper implementation of mining jurisdiction; and c) To appoint or remove officials of the general superintendence and regional superintendent offices.

3.2.1 Legal Framework for Mining

Mining activities in Bolivia are regulated by two sets of rules: general and complementary.

Among the general rules, until May 2014 the basic regulation was the Mining Code, established in 1997 (Law 1777). In May 2014, the Bolivian government established the new Law of Mining and Metallurgy 535 with the goal of diversifying investments and supporting the entire supply chain of mining industrialization.

The main changes in the Law 535 from the previous law (1777) are as follows:

- Historically, mining law in Bolivia was developed by foreign consultants and established by political imposition, but according to the Bolivian government, the new law is, for the first time, the result of consensus among the representatives of the small, cooperative, private and state-owned mining sectors. On May 28, 2014 at a roll-out event for the new law in the Department of Oruro, Acting President Álvaro García Linera said that this law had the “smell” of the Bolivian worker, after three years of building consensus between the representatives of the operators of the small, cooperative, private and state mining (ABI, May 28, 2014).

- Law 535 prioritizes mining expansion through greater logistical and tax facilities (exemption from payment of all taxes, except royalties) for cooperatives.
- It expands the authority of the Ministry of Mining and Metallurgy over mining and the resolution of mining-related conflicts, and gives the Ministry of Mining authority for issuing Environmental Licenses.
- In order of hierarchy, the State mining sector (COMIBOL) is given priority, followed by local private operators and finally foreign operators.
- Unlike the previous law, under the new law mining concessions are not transferable.
- It establishes that mining activities must fulfill a socio-economic function and comply with principles of sustainability.

Turning to complementary regulations, the most important is Environmental Law 1333, issued in 1992, which states that mining and extractive operations should be developed with a consideration for the comprehensive utilization of raw materials, waste treatment, and the safe disposal of tails, tailings and connectors. In addition, during and after operations, firms must plan for the recovery of affected areas in order to reduce and control erosion, stabilize the land, and protect water sources. It also sets out that "in each of its operations or mining concessions, dealers or mine operators must have an environmental license for their mining activities" (Art. 2).

The new Constitution of the Plurinational State of Bolivia, established in 2009, is another important aspect of the legal framework. Among its most relevant statements, it provides that:

- "Natural resources are directly owned by, and within the indivisible and essential domain of, the Bolivian people and will be for the State to administer in the service of the collective interest." (Art. 349, No. 1, authors' translation).
- "The State will assume oversight and management over exploration, extraction, processing, transportation and marketing of strategic natural resources through

public, cooperative, or community bodies, which may in turn contract with private companies and form joint ventures." (Art. 351, No. 1, authors' translation).

- "The State may enter into partnership with legal entities, be they Bolivian or foreign, for the use of natural resources. It must ensure the reinvestment of profits in the country" (Art. 351, No. 2, authors' translation).
- "The use of natural resources in a given territory will be subject to a consultation process with the affected population, called by the State, which will be free, prior and informed. Citizen participation is guaranteed in the process of environmental management and conservation of ecosystems, in agreement with the Constitution and the law. Within peasant nations and peoples, shall take place in accordance with their own rules and procedures" (Art. 352, authors' translation).

3.2.2 Tax policy framework

The mining sector tax system is established in the Mining Code, and consists of three items: Mining Royalties (MR), the Profit Taxes on Company Profits (IUE) and the windfall tax in addition to IUE (AA-IUE). Another group of taxes includes the Value Added Tax (IVA), Transactions Tax (IT), and the Specific Consumption Tax (ICE).

Characteristics of the tax law include:

- Mining royalties (MR) are defined according to the type of mineral and prices, and are on average 5% on gross sale value. However, for the cooperative mining sector it is reduced to 3% (in keeping with the new, more favorable legal framework given to the cooperative sector by the new political Constitution of the State, in light of its socio-economic function) (ERBOL, May 2014)

- 85% of MR revenue goes to Departmental governments, who must invest at least 10% in mining-related prospecting, exploration, industrialization, and environmental monitoring. The remaining 15% goes to municipal governments.
- The cooperative mining sector is exempt from IUE, IVA, ICE and IT taxes.
- The annual cost per grid for concessions less than 6 years old is \$25 USD.
- The IUE is 25% of annual net profit and is applicable to all companies that extract, produce, benefit, refined, and/or commercialize minerals and/or metals.
- The AA-IUE is 12.5% of annual net profit. The AAIUE must be paid for the mining companies that have had windfall profits from price spikes above a certain level, such as \$400 USD per troy ounce of gold, \$5.55 USD per troy ounce of silver, or \$2.90 USD per pound of tin.¹

MR revenue has grown in recent years, from its 2000 level of about \$8 million USD (0.1% of GDP) to \$168 million USD in 2011 (0.7% of GDP).

3.2.3 Environmental Management

Environmental issues in Bolivia are closely related to mining, which contributes to the continued deterioration of ecosystems, which in turn negatively impacts socioeconomic activities (Gutierrez, 2009). According to Morales (2010), pollution from refineries or steel plants around the discharge becomes contaminated with sulfur, chemical reagents, and other organics materials, whose negative effects directly and indirectly impact society and the surrounding ecosystem.

In spite of the legal environmental protections listed above (including Environmental Law No. 1333, which dictates that mining projects must consider treatment factors and possible pollution sources, and plan for remediation, and the

¹ For the complete list, see <http://www.lexivox.org/norms/BO-L-3787.xhtml>

Mining Code and Mining Law 535, which state that mining activities should adhere to principles of sustainable development), evidence indicates that mining pollution is still rampant. In recent years there have been several studies from many disciplines regarding the environment impacts of mining in Bolivia. The results show significant environmental liabilities. Some medium-scale mining companies have improved their practices, but not all of them. The cooperatives, which have an overwhelming number of members and exploit thousands of camps, do not practice environmental remediation. Also, according to recent data in *El Potosí* (July 2014), there are 450 cooperative mining companies, but of those 80% do not have an environmental license and are operating illegally. For its part, the public COMIBOL has not set a strong example in its operation of Huanuni, which had net income of \$70.4 million USD through 2009; it has not yet built a tailings dam to address major contamination affecting about 40 communities. (Sanabria, 2009; Michard J., 2008; CEDIB, 2012)

One of the merits attributed to royalties from the environmental point of view is that royalties are in fact an “ad valorem” tax on production. Under the assumption that extraction costs increase with the amount that has already been extracted, this type of tax reduces the rate of mineral extraction and its associated pollution externalities. However, the IUE does not have a depletion allowance and so it does not alter the rate of extraction or associated externalities (Muzondo, 1993).

3.3 The importance of the mining sector in Bolivia

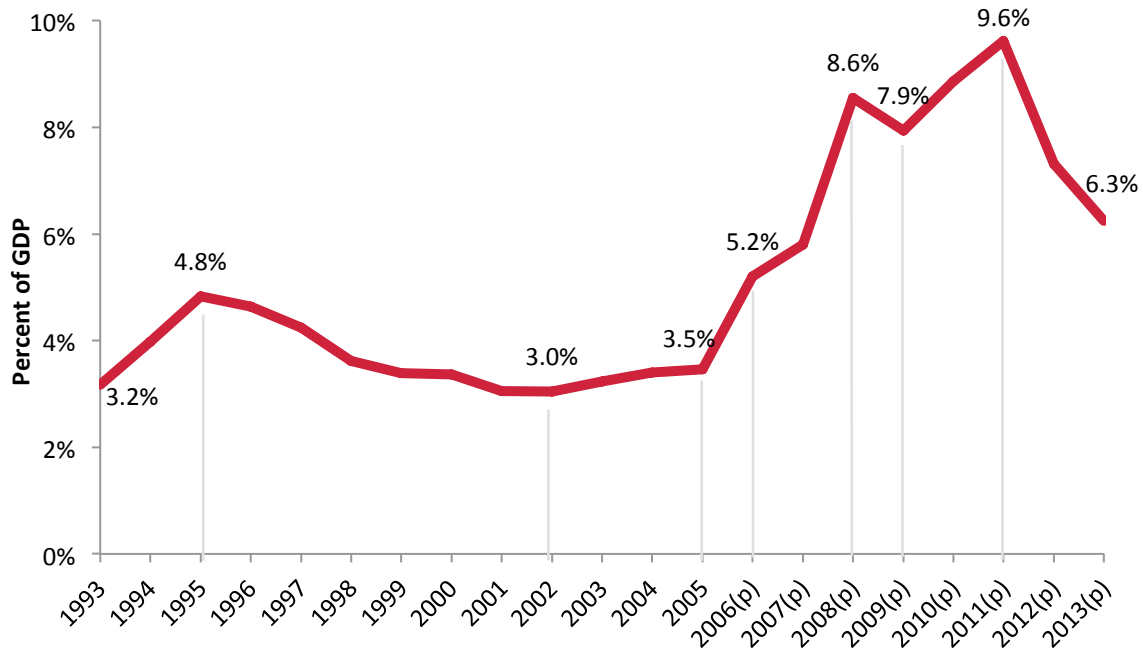
Bolivia is one of the least developed and poorest countries in Latin America: 45% of its population lives below the national poverty line, with 21% living in extreme poverty (INE, 2011). The numbers are even worse for rural areas, with 61% in poverty and 41% living in extreme poverty.

Historically, Bolivia has seen a series of resource booms exploited by foreigner interests and by a tiny Bolivian elite: silver, then tin, then oil and gas. The real benefits of the wealth taken from the ground went not to the Bolivian people as a whole, but to others. For example, the rise of the silver at the end of the 19th century left Bolivia an average of just 4% of the value of what was exported from the country. The present case appears to be an extension of this historical trend. State MR and IUE revenues from 1990 to 2005 reached just 2.3% of the value of mineral exports. From 2006 to 2010 it rose, but to just 8%; from \$8.686 billion USD exported, the State received just \$729.4 million USD (Diaz, V. 2011). Moreover, according to ECLAC (2012), in Bolivia, every million dollars invested from FDI supports just one position of direct employment, less than the 2.5 supported in South America overall and the 6.4 supported in the Caribbean. Thus, the adverse effects of FDI concentrated in natural resources exploitation outweigh the benefits in revenue and employment. Such a curious outcome for a country extremely rich in natural resources but poor in terms of the benefits received from them is referred to as the “Resource Curse” in the literature. The Resource Curse also implies economic, social and political damage, which is soon joined by environmental destruction, depending on the source of the natural resource, and negative multiplier effects from that destruction.

The mining sector’s share of GDP is crucial to the Bolivian economy, as illustrated by Figure 8. From 1995 to 2005, the mining sector has contributed between 3.0% and 4.8% of Bolivia’s GDP, but from 2006 to 2009 it began growing thanks to higher

international prices (INE, 2009). The sector shows a declining trend during recent years, dropping from 9.6% in 2011 to 6.3% in 2013. This decline reflects a collapse in prices and production due to the global financial crisis. This boom in prices and production is mainly due to the demand of raw materials by emerging economies such as China.

FIGURE 8: Bolivia, Mining As A Share Of GDP, 2000 - 2013



Source: Authors' calculations using INE data.

As shown in Table 1, mining revenues in the 1990s were very low. However, starting in of 2005 this changed, with royalty revenue reaching \$168.0 million USD and tax revenue reaching \$338.3 million USD in 2011, due to a favorable trends in mineral international prices.

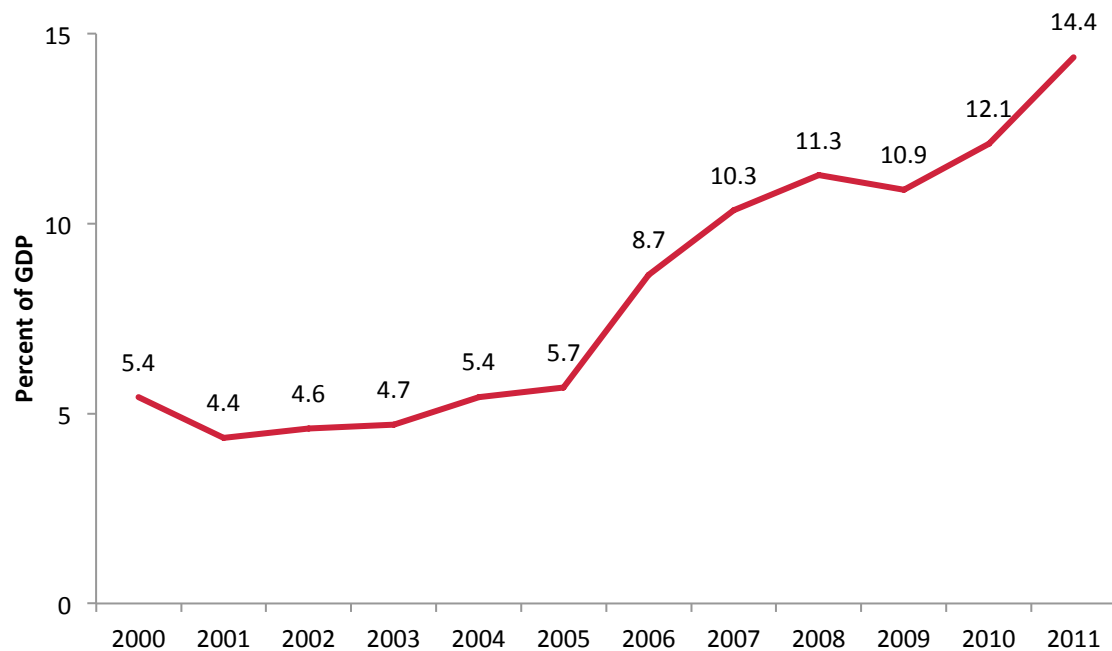
TABLE 1: Bolivian Mining Royalties And Taxes 1990-2011

	In Millions of USD			In Percent of GDP		
	Royalties	IUE, Other Taxes	Total	Royalties	IUE, Other Taxes	Total
1990	9.5		9.5	0.2%		0.2%
1991	7.5		7.5	0.1%		0.1%
1992	8.1		8.1	0.1%		0.1%
1993	3.5		3.5	0.1%		0.1%
1994	4.6	0.1	4.8	0.1%	0.0%	0.1%
1995	4.9	1.3	6.2	0.1%	0.0%	0.1%
1996	6.2	1.1	7.3	0.1%	0.0%	0.1%
1997	11.0	0.6	11.7	0.1%	0.0%	0.1%
1998	8.5	3.3	11.8	0.1%	0.0%	0.1%
1999	7.4	5.8	13.2	0.1%	0.1%	0.2%
2000	8.0	10.7	18.7	0.1%	0.1%	0.2%
2001	6.7	11.8	18.5	0.1%	0.1%	0.2%
2002	6.3	12.5	18.9	0.1%	0.2%	0.2%
2003	6.2	20.5	26.8	0.1%	0.3%	0.3%
2004	9.9	23.5	33.4	0.1%	0.3%	0.4%
2005	14.3	44.2	58.5	0.1%	0.5%	0.6%
2006	48.0	57.2	105.2	0.4%	0.5%	0.9%
2007	68.7	96.5	165.2	0.5%	0.7%	1.3%
2008	94.1	132.5	226.7	0.6%	0.8%	1.3%
2009	82.6	112.9	195.5	0.5%	0.6%	1.1%
2010 ^P	120.7	239.4	360.1	0.6%	1.2%	1.8%
2011 ^P	168.0	338.3	506.3	0.7%	1.4%	2.1%

P: Preliminary estimate. Source: Statistics of the Ministry of Mining and Metallurgy, IMF WEO database.

Mineral exports, shown in Figure 8, have been growing rapidly. Zinc, tin and silver have grown most quickly, in response to higher European demand as well as higher international prices, while gold, copper, lead and antimony recorded major declines. The highest value of exports came in 2011 (14.4% of GDP) as a result of a global boom in raw materials, starting in 2004.

FIGURE 9: Exports of Bolivian Minerals



Source: Authors' calculations based on INE data.

4. Environmental and social impacts assessment of Chinese funding in the Bolivian mining industry

This section evaluates two case studies with Chinese participation, following the net benefits framework developed by Zarsky and Stanley (2013). Both cases are located in the country's southwestern department of Potosí, which has the highest poverty rate (around 85%, UDAPE 2013) and the highest proportionate indigenous population in Bolivia. Potosí is representative of how the resource booms of the past (in silver and tin) did not bring sustained economic development to the local population.

3.2 Case Study 1: Canutillos Mine and Processing Plant

The northeastern area of the department of Potosi is primarily a mining area. The region has an important number of mining companies, mostly in the cooperative sector. Given the significant increase in international prices of minerals

discussed above, the mining sector is growing and with it, new mining companies are emerging.

As mentioned above, under the Government of President Evo Morales cooperative mining companies receive preferential treatment. Chinese entrepreneurs have reacted to this situation by undertaking agreements with local mining cooperatives. In this context, on February 3, 2010 a joint venture agreement was signed between the Jungie Mining Industry SRL. (which is Chinese-owned although currently Bolivian-managed) and the mining cooperative Alto Canutillos, under Resolution 4295TH /2010, with the support of the COMIBOL, with the objective of exploring and developing diverse minerals, but particularly tin in the Canutillos mine. The Alto Canutillos cooperative, consisting of 22 members, submitted a bid to Jungie SRL, seeking a partner that could bring technology and financing for their development of the Canutillos mine. Daniel Morales Muruchi, former leader of the Cooperative Minera Alto Canutillos, became Jungie SRL's legal representative, and the company started operations in late December 2012.

The Canutillos mine is located 48 kilometers northeast of Potosí city, in Tacobamba Municipality. Around the mine are located towns of Tacobamba, Colavi, Rodeo, Hahuacari and Ancoma, belonging to Tacobamba municipality, with a total population of 13,205 inhabitants; 61.38% of the population is living on the margins of poverty, while 32.89% live in extreme poverty and just 0.06% have their basic needs met (INE 2001). Communities have found their source of income around the mine, and also from agricultural products, such as potatoes, wheat and corn; raising sheep, goats and camelids. Mining in the town of Tacobamba is developed by private companies including Jungie Mining Industry SRL.

Picture 1: Canutillos Town, Potosí-Bolivia



Source: Author's fieldwork 2014.

3.2.1 Public Consultation

The net benefits approach places paramount importance on individual and collective public consultation with the affected population before the development of a natural resource begins. Furthermore, according to the New Constitution, communities own the territory around where they live. In the case of Jungie SRL, this process appears to have served its purpose, resulting in Jungie SRL changing its plans to locate its refining plant and tailings dam near a more receptive community.

Accordingly, once the Jungie-Alto Canutillos joint entity was constituted, it conducted surveys in the surrounding communities belonging to the Municipality of Tacobamba before beginning construction of its processing plant and tailings dam necessary for mining. The surveys indicated that the community was not willing to accept the construction of a mineral processing plant and tailings dam, arguing that the construction of this facility would generate pollution.

Picture 2: Offices, Jungie Mining Industry Canutillos, Potosí-Bolivia



Source: Author's fieldwork 2014.

Therefore, based on the majority decision by the communities living around the mine, neither plant nor the tailings dam was built there. Instead, Jungie SRL. built the minerals processing plant and tailings dam in the Agua Dulce community 5 Km from the city of Potosí. The land was donated by the COMIBOL under consultation with the municipality of Villa de Yocalla (specifically, the community of Agua Dulce), which has a population of 10,012 (INE, 2001). It has a very low human development, with an average living standard below the departmental average, a poverty rate of 63%, and a subsistence-level economy of the inhabitants. The source of income of the population of the Municipality of Yocalla village is based on agriculture and livestock farming, so land is the fundamental basis of the livelihood of the family unit.

Picture 3: Offices, Jungie Mining Industry Agua Dulce, Potosí - Bolivia



Source: Author's fieldwork 2014.

According to the leaders of the community of Agua Dulce, a public consultation was carried out to determine if the population was willing to accept the building of the processing plant in their community. The response was favorable, given that the community had high expectations for job creation and income for the community.

3.2.2 Economic Benefits Of Mine Bookbinding Treatment Plant In Agua Dulce

Jungie SRL has been working on the site since 2010. But according to interviews with officials from Jungie SRL, the company is still in the testing phase and will begin producing in 2015, so it has not yet generated revenue to pay royalties and taxes to the State. Its investment budget includes plans to invest around \$20 million USD, of which \$5.5 million USD is to be invested in mining equipment, \$6.5 million USD in the processing plant, \$4.3 million USD in processing equipment and nearly \$2.1 million USD in the tailings dam.

The company has a 20-year concession, with an expected annual production capacity of 300,000 tons; the plant has a production capacity of 2,500 tons per day. One of the benefits being generated by the company is employment for members of the cooperative and the community, where according to the INE (2001) about 50 families live, of which 30 work in the mine. Workers at the mine have monthly salaries between \$250 and \$900 USD, with health insurance (but not life insurance), and appropriate work clothing (which is given every three months), according to workers. However, the local newspaper *El Potosí* has printed complaints accusing Jungie Mining Industry of abuse and workers' rights violations, such as disregarding rules regarding overtime and nursing breaks (*El Potosí*, 2012).

In sum, the community allowed the company to operate in its territory under certain conditions, including: hiring people living around the plant, primarily in the community of Agua Dulce, building hospitals and schools, and other infrastructure to attract commerce to the community. Such an arrangement has local precedent. According to the Civic Committee of Potosí, the large majority of foreign mining

companies build roads, schools, hospitals and basic services to gain the community approval required under the New Constitution.

3.2.3 Royalty Revenue

Under the joint venture agreement, 7.5% of profits go to the cooperative, 12.5% go COMIBOL, and 80% go to Jungie. The joint entity must also pay mining royalties (MR) of which 85% goes to the departmental government and 15% goes to the municipal governments; the provincial government is minimally required to invest 10% in exploration and prospecting; and the Profit Taxes on Company Profits (IUE) of 25% of annual net profit.

3.2.4 Environmental Hazards

Even though Jungie Mining SRL started activities in 2010, the company did not get its environmental license until April 2014. This is an explicit violation of article 218 in the new mining law, which requires environmental licenses for for all mining activities and projects.

As the company has not entered the operational phase, its environmental impacts are not yet observable. However, it is expected to have considerable size and impact, comparable to the publicly run COMIBOL Huanuni mine. Huanuni is one of the most important in the region, with a net income of \$70.4 million USD between 2006 and 2009. However, it neglected to build a tailings dam to prevent from pollution entering the Huanuni River, which serves 40 communities. This neglect provides a troublesome precedent for mines' water management in the area, and for the government to enforce its own standards.

Though Jungie SRL plans currently do include a tailings dam, the company has not thus far demonstrated adherence to environmental standards, as evidenced by its delay in acquiring its environmental license. Furthermore, though Jungie SRL is still

in the testing phase, complaints about pollution are already emerging. In July 2014 the residents of Agua Dulce complained to Potosí authorities about leakage of acidic water from the tailings from the Jungie SRL into the Jayaj Mayu River, which is essential for farming, ranching, and local community members.

In addition to pollution, one of the biggest impacts will be on water consumption; the company estimates a monthly consumption of 2,465 cubic meters (651,184 gallons) of water.

PICTURE 4: AGUA DULCE WATER SUPPLY SYSTEM, POTOSÍ - BOLIVIA



Source: Authors' fieldwork, 2014.

Though it is still in its testing phase, Jungie SRL's water use has already damaged local harvests. Felipa Aguirre, one of the affected people in the town explains that during this period, agricultural production in the area was almost zero, due to a lack of water for irrigation or consumption. Agriculture had to rely on rainwater, and most of the crops were dry. As of this writing, the company faces trial and its operations are suspended until remediation is completed.

3.3 Case Study 2: Lithium Industrialization Process at the Salar de Uyuni

In the context of these discouraging experiences in the management and use of mining resources in Bolivia, the country is currently facing a new challenge: it possesses probably the largest deposits of lithium in the world, which are still unexploited. At the heart of Bolivia's lithium development efforts is a simple goal: to lift people out of poverty by achieving the maximum benefit possible from a natural resource that connects the nation to the cutting edge of global markets. But there is still no clear mechanism to achieve that goal and avoid a new Resource Curse.

About 80% of the known global lithium reserve base is located in the so called "Lithium Triangle," an area bordered by the three large South American salt flats: The Salar de Atacama in Chile, the Salar de Uyuni in Bolivia, and the Salar del Hombre Muerto in Argentina. With governments around the globe demanding increased fuel efficiency to reduce their dependence on fossil fuel, private foreign firms are intensively pursuing access to Bolivia's lithium. The US Geological Survey (USGS) estimates Bolivia's lithium reserves to be 5.4 million tons, nearly twice that of Chile. The reserve base is found principally in the Salar de Uyuni, a 3,860 square mile desert plateau (altiplano) area of the Bolivian Andes located in the department of Potosí, the same department as in the Jungie mining case. Salar de Uyuni is the largest salt flat in the world and the brightest object on the Earth's surface visible from space.

3.3.1 Population and Economic Activity

The Salar de Uyuni basin occupies approximately 61% of the Department of Potosí in Bolivia. The 2011 estimated population of the basin was 42,098 people. The most populated towns in the study area are Uyuni and Colcha "K". The most common employment sectors in the basin are quinoa agriculture (only 10% of the land is suitable for agriculture, but the activity occupies 80% of the population) and

camelid livestock (which occupies 60% of the land use). The Salar de Uyuni is also one of Bolivia's main tourist centers, attracting some 50,000 visitors a year, as well as being a fragile eco-system with many indigenous species (Revenga and Kura 2003). Tourism, which provides a living for 23% of the population, relies on these untouched landscapes. In addition, a further 12% of the population makes a living directly from the salt harvest. Usually land, climate, water and vegetation conditions force the communities to combine these economic activities to cover their basic needs.

3.3.2 The Bolivian Lithium Industrialization Strategy

Bolivia's lithium strategy dates to 1974 when the government, through Supreme Decree (SD) 11674, highlighted the importance of natural resources at the south east of Bolivia and declared the Uyuni Basin to be a Fiscal Reserve. This status, still in place today, gives the Bolivian State ownership of the Salar and the legal right to exploit and administer all of the natural resources within the reserve's boundaries. Legislation in 2008 (SD 29496) declared the development of natural resources from the Salar de Uyuni to be a national priority, with the specific goal of supporting economic and social development in Potosí. In the same vein, COMIBOL created then the National Directorate of Evaporitic Resources (renamed in 2010 to the National Management Committee for Evaporitic Resources, GNRE). This body will manage around \$5.7 million USD for natural resources development at the Salar de Uyuni. Within GNRE a Scientific Advisory Committee was created, bringing together experts from universities, private companies, and governments to share knowledge without having to commit to any long-term partnerships.

Box 1. Bolivian Lithium Industrialization Strategy

The strategy consists of three phases:

Phase 1: Pilot Plants

Development of infrastructure, installation and setup of the state pilot plants for lithium carbonate (LCE) and potassium chloride:

- The pilot LCE plant, located in Llipi, was initiated in September 2012 and opened on February 3, 2013, with a projected capacity of 40 tons per month.
- Infrastructure was built for 30 pieces of equipment in 2600 square meters.
- 2013.18 km of roads were built between Llipi and the evaporation pools.
- Production of LCE is now being concentrated for future sales, and in particular for the pilot plant of lithium ion batteries in La Palca.

Phase 2- Industrial Production

Industrial Plants design:

- Financing will be provided by the Bolivian Central Bank (BCB).
- Evaporation pools will be built.
- The lithium industrial plant is expected to produce 40,000 to 60,000 tons per year of LCE starting in 2014 (COMIBOL, 2008; La Razón, 2009).

Phase 3. Production of Ion Lithium Batteries (with LCE as a main ingredient)

- Training, experimentation and production of lithium ion batteries and other lithium products, performed by qualified Bolivian workers trained in China and elsewhere (21 workers as of this writing).
- Completed: Purchasing of turnkey technology.
- Contract with the Chinese firm Lin Yi Dake Trade Co. Ltda. to buy a pilot plant for lithium ion batteries, to be installed at La Palca in an area of 1600 square meters. This contract was signed in May 2012, with 10 technicians working in the installation.
- Production capacity of the Pilot Plant: 1200 Ah/day.
- Expected production: 1,000 cellphone batteries per day, 40 batteries for use in electric vehicles.
- Total cost: USD 3.7 millions.
- Job creation expected: 35 direct and 100 indirect jobs.
- Partnership or association with foreign enterprises will be sought in order to generate technology transfer.
- January 17, 2014: Inauguration of Pilot Plan of Batteries in La Palca.

Source: Own elaboration based on 2012, 2013 Reports from GNRE.

Since 2006, foreign corporations and governments, including Brazil, Canada, Japanese automakers, and the French electric car manufacturer Bolloré, have lobbied the Bolivian government for access to the lithium resources. Bolivia's current diplomatic tensions with Washington have left American companies on the sidelines as other foreign enterprises continue to actively negotiate lithium deals in Bolivia.

3.3 The Net Benefits Approach applied to the Bolivian Lithium Industrialization Process.

3.3.1 Local Acceptance of the Lithium Industrialization Process

The main towns involved in the lithium industrialization process are the ones bordering the Uyuni Salt Lake: Colcha-K, Uyuni, Tahua and Llipi. Their high poverty rates are the worst in the department of Potosí: in Llica and Tahua, 89% and 99.7% of population living in poverty, respectively, according to the unsatisfied basic needs method (CNPV 2001).

This context has promoted a mixed reaction to lithium development. Some groups and communities in the region openly support lithium development as an opportunity for increased income and development. But there are also important local groups with serious objections to such development. Quinoa producers and tourism operators have expressed concern about supposed benefits that the Bolivian government has promised from lithium, claiming that the benefits are irrelevant to local needs and could easily damage the three key activities in the region – agriculture, cattle rearing and tourism (Ströbele-Gregor, 2013). Moreover, many different international actors have tried to exploit the Salar de Uyuni's mineral riches in the past. But each time, local communities have mobilized to fight what they see as giveaway by corrupt political interests. One of the foreign players forced out of the Salar (by the communities and by a proposed new national tax on the

company) was Bolivia's first serious foreign lithium suitor, the U.S. company Food Machinery Chemical (FMC) formerly known as Lithco.

In this context, and after conducting surveys in the surrounding towns and interviewing key actors (such as the Comite Civico and local authorities) our conclusion is that the willingness to accept the project in the area is very low, for two main reasons: first, potential negative social, economic and environmental impacts; and secondly, the reluctance for foreign investors' participation given the history of exploitation of national natural resources.

3.3.2 Economic Benefits

According to Meridian Research Group (MRG) estimates, the concentration of lithium varies widely across the Salar, so production would be concentrated in small areas. The MRG report finds that the structure of the Salar de Uyuni is very different to the Salar de Atacama (Chile), the quality of lithium available per unit surface is much lower and a correspondingly greater area of the Salar would have to be exploited for an equivalent lithium production (Meridian Research 2008).

The report concludes that, considering the real grade and distribution of lithium in the Uyuni, its lithium might not be a particularly attractive resource and that the real exploitable reserve could be only approximately 300,000 tons rather than the estimated millions. Moreover, the available methods for mining could be highly environmentally damaging.

3.3.3 Royalties And Taxes

Enormous expectations have been generated regarding possible future profits, together with demands for their redistribution. However, neither the Bolivian government nor the Chinese company has reported on the income from the pilot plants. It is also important to highlight that the yearly contribution of the mining

sector to the public revenues has already increased significantly between 2006 and 2011, from 0.9 to 2.1 percent of GDP, as shown in Table 2 above (Ministry of Mining, 2013).

The positive impact of lithium development on human wellbeing is mainly due to employment opportunities and the general contribution to economic activity in the municipality and the country. However, with regard to the former point, it should be noted that, the workforce available in the municipalities are mainly unskilled so the potential for their participation in mining activities is uncertain. At the pilot plant of ion lithium batteries installed by the Chinese company Lin Yi Dake in La Palca, currently 21 qualified Bolivian professionals work in diverse areas; GNRE estimates that the projected activities at this plant will support 35 direct and around 100 indirect jobs.

There are no documented plans for social investments at this stage, by either the private enterprise or the Bolivian government. It is also well known that with regard to the exploitation of lithium reserves in Potosí, the history of resource conflict in Bolivia indicates strongly that the potential for conflict is indeed major. The local indigenous population and the mine workers in Potosí are well organized, but looking for short-term rewards.

3.3.4 Environmental Risk

Serious potential environmental problems stemming from lithium mining in Bolivia cannot be ignored. Bolivia's ecologically fragile Salar de Uyuni could become an environmental disaster, if sufficient precautions are not taken. Also, lithium development could seriously damage three main activities – agriculture, cattle rearing and tourism. There is already information that in Southwest Potosí, the legally protected Eduardo Avaroa Reserve has already been contaminated by evaporitic resource operations (Aguilar 2009).

Many Bolivian and international environmental organizations question the adequacy of Bolivia's environmental strategy for lithium development in southwest Potosí. The effects of lithium production on the ecosystem, apart from the destruction of natural habitats, would come primarily in the form of water use (due to the creation of evaporation pools) and pollution of water and air by the chemical processing of the lithium. The water reserves of the Salar de Uyuni are classified as non-renewable, as the groundwater regenerates only extremely slowly. Moreover, there is already a shortage of water in the region today (Aguilar 2009; Hollender and Shultz 2010).

Already, there is clear evidence of the competition for water in southwest Potosí between mining operations and crop irrigation (Aguilar, 2009). Another competing force is the tourism industry, though its water demands haven't been directly analyzed. Even more alarmingly, there are 90 active mining concessions around the Salar that already rely on the region's water resources. The most exploitative of these concessions is the San Cristobal Mine, concentrated on extracting tin, silver and zinc; which will be a certain competitor for fresh water and salt water from the Rio Grande.

In the face of all of these risks, the Chinese company Lin Yi Dake has not published any measures or plans to affront environmental deterioration. Thus, after describing the main components of the Net Benefits Approach, the results shows that the lithium industrialization process does not meet the standard of weak sustainability; the expected social and economic benefits are low and unlikely to outweigh social and environmental costs.

4. Policy Recommendations

Currently, the Bolivian economy is very dynamic and in good health. Especially noteworthy is that the Net International Reserves (NIR) of the country amounted to \$14.43 billion USD December 2013. For 2012, the last year for which the World Bank has this data, Bolivian reserves amounted to 14.6 months of national imports (placing Bolivia in 6th place worldwide) and 201.5% of national debt (placing it in 8th place worldwide). The IMF, ECLAC and World Bank, among others praise the strong economic performance of the country.

Certainly the Bolivian economy has been benefited from high world fuel prices, mainly through exports of natural gas to Brazil and Argentina. Moreover, the increase in the price of raw material exports allowed the income of the public sector to increase significantly. At the same time, Bolivia's policy of income redistribution has also been relevant, since it ensures that these benefits are broadly shared, through an improvement of the minimum wage and social programs that have an impact on poverty reduction. FDI flows seem to continue coming to Bolivia given the confidence created by the economic scenario. However the weak institutional framework is still a deep and remaining problem.

For example, in relation with the important NIR, they certainly provide the economic and financial stabilization to the country, support the confidence in its currency, guarantee its imports, prevent external imbalances and maintain the trust to honor the external debt. But why not create a Stabilization Fund to manage these important natural resources' revenues as in Chile or Norway? That is a recurrent suggestion but the mechanisms of savings, spending or even determining which entities will be responsible for its management are not easy to define. Overall, the lack of an institutional framework in the country is the main problem. Indeed having strong public institutions would allow the State to earn a reputation of credibility

for its management of fiscal policy, and guarantee a successful management of the stabilization fund. However, Bolivia is not institutionally ready for such a step. In this weak institutional context the presence of increasing Chinese trade flows and investments imply opportunities but also important threats and challenges for the country.

Overall, the growth of China's exports and its uneven commercial relationship with Bolivia create threats to Bolivian industries such as textiles and footwear, which face stiff competition. Bolivia should apply preventive measures, protecting its product, but also applying proactive measures, such as the promotion of production; imitating some policies of China, such as creating the conditions for greater FDI and promoting productivity to defend the spaces of the domestic market.

Turning now to Chinese investment in Bolivia, this FDI is highly concentrated in natural resource intensive sectors - hydrocarbons, mining, transport, and basic services - with scarce labor requirements and domestic input demand. In this aspect Chinese FDI is not much different from general trends of FDI inflows into Bolivia, in further promoting the deindustrialization of the economy mainly due to the high profitability that the development of raw materials offers today, despite the environmental and social impacts and the limitations in oversight and enforcement of human and worker rights. The Canutillos Mine study case illustrates clearly: even though the Chinese company Jungie SRL just recently started activities, it has already faced recurring environmental and social troubles.

One of the most basic truths of the resource curse is the prospect that when a government suddenly has a great deal of financial resources, there is no guarantee that the people will end up any better off. New revenues become an incentive for corruption and unsustainable exploitation on natural resources to those allied with the nation's leaders. Bolivia, unfortunately, is still an example of this, especially concerning the potentially devastating impact that mining activities may have on the

region's environment. This is a concern that the Bolivian government is not treating seriously; environmental issues are taking a back seat to political alliances like that with the cooperative mining sector, which is exempt from most of the taxes and has a bad record on environmental issues. The recent contamination of Pilcomayo River by mining operators in Potosí, (including Jungie) shows that the government does not have the institutional capacity or the political will to monitor these activities.

Our case study of Jungie, still in its testing stage, already shows significant environmental problems. First the mine's high water demand threatens the natural and human future of the surroundings. Moreover, if industrial-scale mining is the objective, the result will likely be permanent, contaminated tailings, threatening local soil and water quality. The environmental impact of mining also affects the local socio-economic activities in the production areas, through negative effects on the productive activity of local communities near mining operations. Canutillos, one of the oldest mining locations in Potosí, is still one of the poorest and more environmentally degraded towns.

How can we improve environmental outcomes from FDI and Chinese FDI in the mining sector? In particular:

- National incentive-based mining policy for environmental protection.
- A participatory process to identify and formulate measures for production improvement and environmental mitigation.
- An environmental adjustment program adapted to the socio-economic reality of small-scale mining, including pilot projects of design, construction and operation of dams.
- Promotion of sustainable technologies, raising environmental awareness through transparency of the results of environmental diagnosis studies and the communication of environmental regulations.

On the other hand, Chinese FDI also represents an opportunity for the Bolivian economy. Three factors explain why the Government gives special prominence to China as a potential investor. First, the government identifies ideologically, economically and socially with China, in its process of economic transition, especially since Bolivia changed its economic and social policy under President Evo Morales. Secondly, the Bolivian government considers China to be a country that does not only invest but also transmits knowledge, training Bolivians in the productive processes. Finally, Bolivia looks to China as a potential market enabling the economy to diversify their production.

Once again, a strong and transparent institutional framework is the key to driving Chinese FDI towards a more diversified economy, through technology transfer and training of human capital, which means requiring generation of value added as a pre-requisite for any FDI. Moreover, solid and transparent institutions are crucial to guarantee that FDI does not threaten the environment.

Thus, to promote a better long-term outcome for the Chinese FDI and promote a better environmental outcome of mining activities, Bolivia needs to work on:

- Anti-corruption measures and good governance in the mining sector.
- Ensuring a conflict-sensitive approach to mineral development.
- Building bilateral and multilateral clean technology cooperation. For example, in Bolivia, the Center for the Promotion of Sustainable Technologies has proposed the introduction of processes and technologies for cleaner production, which not only allows mining operations to improve its environmental performance, but also to gain savings in material, water and energy, resulting in a double benefit.
- Learning from the experience with Stabilization Funds in Chile, Colombia, and Norway.

- Adopting an integrated approach: given the complexity of the socio-environmental problem of mining in Bolivia, a more comprehensive approach is needed, to analyze and confront the problem under a framework of integrated watershed management, since one of the main environmental problems of mining activity is water pollution.

Turning to the tax regime for mining, there are important flaws, such as the bias in favor of the mining cooperative sector, based on political alliances, which has achieved clear preferences, such as extensive tax exemption, institutional support, and recently in the new mining law, preferential concessions. These advantages recognize the sector for its social function, but it paradoxically turns out to be the least productive, and in environmental terms the most polluting, given the precarious nature of its technology. Thus, this system of preferences should be reconsidered, and must be based on the incentives for best practices in terms of production, tax payments, and environmental performance.

The new Law of Mining and Metallurgy marks an important setback in environmental policy in Bolivia. It has caused great concern in the population, with the main criticisms as follows:

- The law was debated by mining stakeholders and approved by the Plurinational Legislative Assembly without considering the participation of the rest of civil society - indigenous peoples of the lowlands in particular - although that minerals are of basic domain from the Bolivian people as a whole and that the impacts of mining reach mainly to indigenous and native peoples.
- It puts preferential rights for miners over individual and collective rights of indigenous peoples and of all the Bolivian people, towns, rivers, lagoons, irrigation systems of drinking water which are means of livelihoods of communities and protected areas. For example, Articles 108, 109 and 110 give mining activities priority access to water, over the agrarian and household use.

Furthermore, the law expands mining from its traditional territory in Potosí, Oruro and in general the highlands to include lowlands, indigenous territories and natural parks, without considering the adverse effects on the environment.(Tejada, 2012).

- The law establishes the specific use of surface water and groundwater in favor of mining operators and does not specify the replacement of the water used, nor does it refer to plants for wastewater treatment. So the future of the coming generations runs the risk of not having access to water.
- It abolishes the role of the Competent Environmental Authority for the provision of licenses to the mining sector, causing a noticeable weakening of environmental management in order to deepen the extractivist developmental model. Article 132 states that "the Ministry of Mining and Metallurgy, as a sectorial authority, grants the environmental license... for mining activities, and must send a copy to the Ministry of environment and water for the purpose of registration".
- The Law does not establish either civil or criminal sanctions for mining operators who contaminate and/or produce environmental damage.

For all of these reasons, we recommend that the Law of Mining and Metallurgy be re-visited and reformed.

5. Conclusions

Even though Chinese participation in the Bolivian economy is still marginal compared with other trading partners, it must be highlighted that during the last years China has shown an impressive presence in the country in terms of exports and also as debt creditor. Moreover the government considers China as one of the most important and strategic allied for the next government period. Relations with China are in general geared toward trade and FDI in raw materials and agriculture, which implies damage to the environment. In this sense, China is not a very different

partner in comparison to the trading partners with whom Bolivia has relationships in the present.

FDI produces economic benefits in the recipient countries, because it can provide capital, currency exchange, technology, and improve the possibilities of access to foreign markets; but also has impacts on the type of development financed through their flows.

Bolivia still faces deep institutional problems; the country does not have an industrial or investment promotion strategy, consistent and in line with the national limitations and restrictions - objectives, policies, programs, actions and perspectives of clearly defined results.

The country is currently recognized by its sound economic management expressed in increasing GDP growth rates. However this good economic performance is mainly due to the high international prices of raw materials. China has been decisive in this outcome given its significant demand. Thus Bolivia must take advantage of this temporal event and put in place suitable measures, such as the creation of a Stabilization Fund, and the design of policies towards economic diversification, like building human capital and promoting competitive, emerging labor-intensive sectors.

Relating with the Stabilization Fund, its management will require policies and regulations that go beyond a political cycle. More complex is how to regulate the use of the fund to avoid a bad management. The challenge Bolivia faces is once more the lack of institutional maturity and an independent management of governmental power.

The study cases analyzed shows that Chinese FDI, which is concentrated in raw materials, minerals and lithium, has not fulfilled environmental regulations. However, as Bolivia has a weak institutional framework, the government also has a

joint responsibility in this outcome. The government system in place to protect the environment is inadequate at best. Public institutions, such as Bolivia's Ministry of the Environment and Water, which are responsible for ensuring compliance with environmental requirements, clearly lack the capacity or authority to intervene in an effective way.

With regard the mining sector, one major environmental problem that mining activities under the present Bolivian context could cause is a major water crisis. The south of Potosí where Canutillos mine is located already suffers from a serious water shortage, impacting agriculture and drinking water. Foreign entrepreneurs can easily take advantage of the weak institutional framework and develop unsustainable mining activities. So Bolivia is operating under the framework of short-term economic rewards and long-term environmental costs.

Finally the recently enacted Law of Mining and Metallurgy marks a major setback in oversight of the environment and the harmful effects of mining activities, as it greatly relaxes the possibility of expansion and mining without prior environmental and social considerations. This new framework could deepen the attraction of FDI into mining given the economic benefits that these companies could obtain. However the result for the country might be detrimental to the environment and livelihoods of surrounding towns, which leads us to conclude that even the weak sustainability criterion would ne be achieved.

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