

Extractives in Latin America and the Caribbean

The Basics

Martin Walter

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Martin Walter (martinw@iadb.org)

Extractives in Latin America and the Caribbean: the Basics

Martin Walter

This note provides a snapshot of key indicators of the Latin America and the Caribbean (LAC) extractives sector: the basic elements underpinning current debates. The first section examines LAC reserves and production of hydrocarbons and minerals. The second section explores recent market and investment trends, considering its effects on LAC economies. The final section concludes noting emerging social transformations in the sector and the need to foster a sense of shared responsibility among stakeholders.

Introduction

Centuries after the forceful expansion of the silver mines of Potosi in Bolivia and Zacatecas in Mexico by European colonial empires and the proliferation of oil exploration in the early decades of the twentieth century, the exploitation of natural resources –oil, gas, gold, silver, iron, copper, tin, and others– continues to shape both the role of Latin America and the Caribbean (LAC) in the global economy and its internal politics.

After all these years, critical questions remain unanswered, among them: how to ensure that the development of natural resources effectively benefits those most vulnerable? How to balance local expectations with national development plans and calibrate industry regulation and investment promotion? How to take advantage from natural riches without

becoming dependent on trade partners and overly vulnerable to market fluctuations?

This note provides a snapshot of key indicators of the LAC extractives sector: the basic elements underpinning current debates about the sector. Originally conceived as a basic list of key indicators, the information included in this note presents a simple narrative useful to frame the analysis and discussion of LAC hydrocarbons and minerals, which highlights the sector's economic importance and outstanding policy challenges.

Driven by robust demand from developing economies, particularly China, the price of non-renewable commodities soared during the past decade. As a result, LAC – a region endowed with some of the world's largest, oil, gas and mineral resources deposits –

experienced a boom in investment and trade in natural resources.

Investments in the extractives sector yielded significant benefits for the regional economy, fostering increased collection of taxes and royalties and economic activity. Currency inflows and trade balance improvements contributed to regional macroeconomic growth. The extractive industries became the main economic activity in hundreds of communities in the region, and critical infrastructure and social services in many of these communities were entirely funded by revenues from the sector.

The development of extractive industries has also been associated with a host of negative impacts, including corruption, social conflicts and environmental damages. Following a decade of high commodity prices and demand for LAC hydrocarbons

and minerals, the extractive industries face increasing production costs and a drastic drop in commodity prices. The recent cooling of the global economy is exposing the unpreparedness of many economies dependent on the primary sector to navigate the downturn, and it is prompting the review of policy frameworks, regulations, and investment plans in the sector. More challenging business conditions are exposing opportunities for reform.

The first section examines LAC reserves and production of hydrocarbons and minerals. The second section explores recent market and investment trends, considering its effects on LAC economies. The final section concludes noting emerging social transformations in the sector and the need to foster a sense of shared responsibility among stakeholders.

Natural resource wealth in the LAC region: Hydrocarbons and minerals

Descriptions of the geography of the LAC region lend themselves to the use of superlatives. The region spans over more than 8 million square miles, with climates ranging from arid to tropical to antarctic; it hosts both some of the wettest areas in the

world – Tutunendó in Colombia, with 464 inches of precipitation annually– and the driest –the Atacama Desert of Chile, where, in parts, no rain has ever been recorded (Berrizbeitia and Marchant 2013).

Its extensive plains, rainforests, and watersheds are found alongside mountainous chains, volcanoes, glaciers, and valleys, “replete with wonderful and even unseen panoramas and bountiful resources” (Berrizbeitia and Marchant 2013). The region holds 40% of the world’s biological diversity, 30% of the Earth’s available freshwater, and almost 50% of the world’s tropical forests (BID 2014); it is also rich in oil, gas and mineral resources.

Large deposits of organic matter trapped over geological times in the shores and confines of the continent have, over time, become immense reservesⁱ of oil and gas, which are being continually discovered. According to recent estimates, the region holds almost 20% of the world’s proven reserves of oil and over 4% of global proven reserves of gas (EIA 2015, Table 1).

The majority of these reserves are located in Venezuela’s Orinoco Basin, which holds 18% of global conventional oil reserves (298 billion barrels of oil) and 2.8% of gas reserves (197 trillion cubic feet of gas) (EIA 2015). The Orinoco Basin comprises the largest oil and gas reservoir in the world.

Brazil, Mexico and Ecuador also possess significant conventional oil and gas reserves; they are endowed with approximately 33.6 billion barrels (10.2% of LAC oil reserves, and 2% of global reserves) and 33.2 trillion cubic feet of gas (10% of regional gas reserves). Bolivia, Peru and Trinidad and Tobago hold major conventional gas reserves (36.9 cubic trillion feet combines), amounting to 12.5% of LAC total reserves.ⁱⁱ

In addition to conventional oil and gas reserves, recent exploration endeavors show that the region is endowed with sizable reserves of unconventional oil and gas resources. The US Energy Information Agency (EIA 2013) estimates that technically recoverable reserves of shale oil and gas in South American countries could exceed 53 billion barrels of oil and 15,900 trillion cubic feet of gas. Argentina, Venezuela, and Mexico are among top ten countries with technically recoverable reserves of shale oil and gas; Brazil possesses prime reserves of shale gas (Table 2). The EIA estimates LAC countries could make up to approximately 40 percent of the world’s total reserves of unconventional oil and gas.ⁱⁱⁱ

Table 1: LAC Conventional Oil and Gas Known Technically Recoverable Reserves (2015)

	Oil (billion barrels)		Gas (trillion cubic feet)	
World	1653	100%	6973	100%
LAC	329	19.9%	295	4.2%
Venezuela	298	91% *	197	71.9%*
Brazil	15	4.6%	16	5.8%
Mexico	9.8	3%	17	6.2%
Ecuador	8.8	3%	0.2	0.1%
Argentina	2.4	1%	11	4%
Colombia	2.4	1%	6.4	2.3%
Trinidad and Tobago	0.7	0.2%	12	4.4%
Peru	0.7	0.2%	15	5.5%
Chile	0.2	0.1%	3.5	1.3%
Bolivia	0.2	0.1%	9.9	3.6%
Others	0.1	0.0%	4.4	1.3%

* (LAC=100%)

Source: Authors elaboration; data from EIA 2015

Table 2 : Top 10 countries with technically recoverable shale resources (2011)

Rank	Country	Shale oil (billion barrels)	Rank	Country	Shale gas (trillion cubic feet)
1*	Russia	75	1	China	1,115
2	U.S.	58	2	Argentina	802
3	China	32	3	Algeria	707
4	Argentina	27	4	U.S.*	665
5	Libya	26	5	Canada	573
6	Australia	18	6	Mexico	545
7	Venezuela	13	7	Australia	437
8	Mexico	13	8	South Africa	390
9	Pakistan	9	9	Russia	285
10	Canada	9	10	Brazil	245
	<i>World Total</i>	<i>345</i>		<i>World Total</i>	<i>7,299</i>

* EIA estimates used for ranking order

Source: Authors elaboration; data from EIA 2013

The region accounts for approximately 13% of the global production of oil and 6% of natural gas. LAC countries produce over 9.5 million barrels of oil and more than 29 billion cubic feet of natural gas per day (IEA 2015, Figures 1 and 2). Just four countries – Venezuela, Mexico, Brazil and Colombia – produce more than 85% of the regional oil output. Gas production is concentrated in few countries; Venezuela, Mexico, Argentina, and Trinidad and Tobago generate 68% of the region’s natural gas.

The vast majority of hydrocarbons are produced by state-owned companies. In Mexico, Venezuela, Brazil, Colombia and Argentina, private capital participation in the upstream tranche is limited, often limited to joint ventures with state-owned companies. Major international companies (British Gas, British Petroleum, Chevron, Exxon, Shell, Repsol, etc.) and smaller local and international firms have an important role in the sector, for they provide critical services for the industry, exploit more technically challenging and risky plays, and focus on retail activities.

The region is also a key global player in the minerals sector. The tectonic motions that prompted the rise of the Trans-Mexican volcanic belt and the Andes mountain range over several million years contributed to the creation of major reserves of various mineral resources in the western regions of LAC. They are complemented by significant deposits of alluvial gold and other minerals in the eastern side of South America and in the Caribbean (Figure 4).

Brazil is endowed with approximately 95% of the world’s niobium reserves; Chile and Argentina possess 65% of the world’s lithium reserves; 49% of known economically-recoverable silver deposits are located in Peru, Chile, Mexico and Bolivia; and 44% of the world’s copper reserves are in Peru, Chile and Mexico (Figure 3). The region also has important reserves of tin, molybdenum, zinc, bauxite (aluminum), boron, iron ore, gold, antimony, coal, nickel, manganese, lead, and other minerals critical for the global economy.

Figure 3 : Production of Crude Oil in LAC
(2012-2014, including lease condensate)

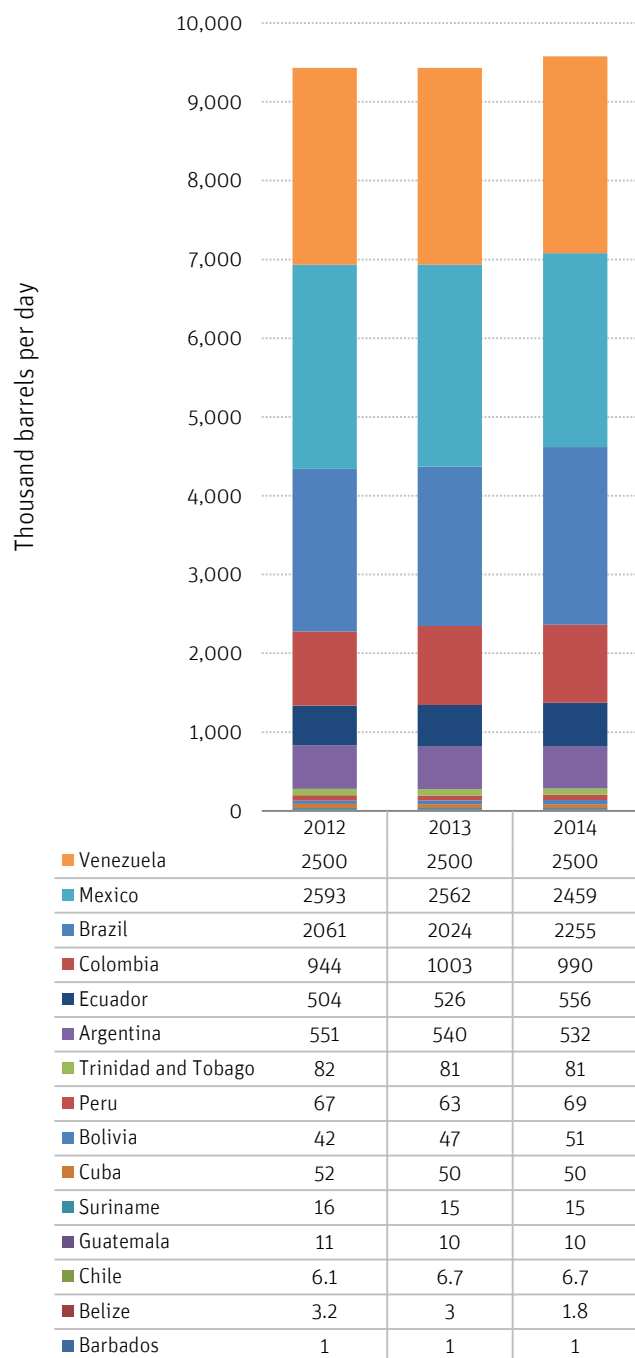
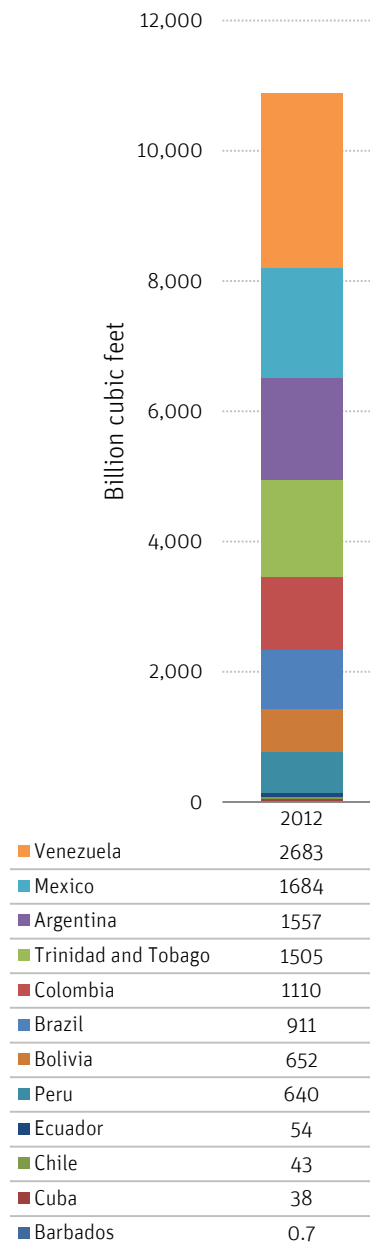
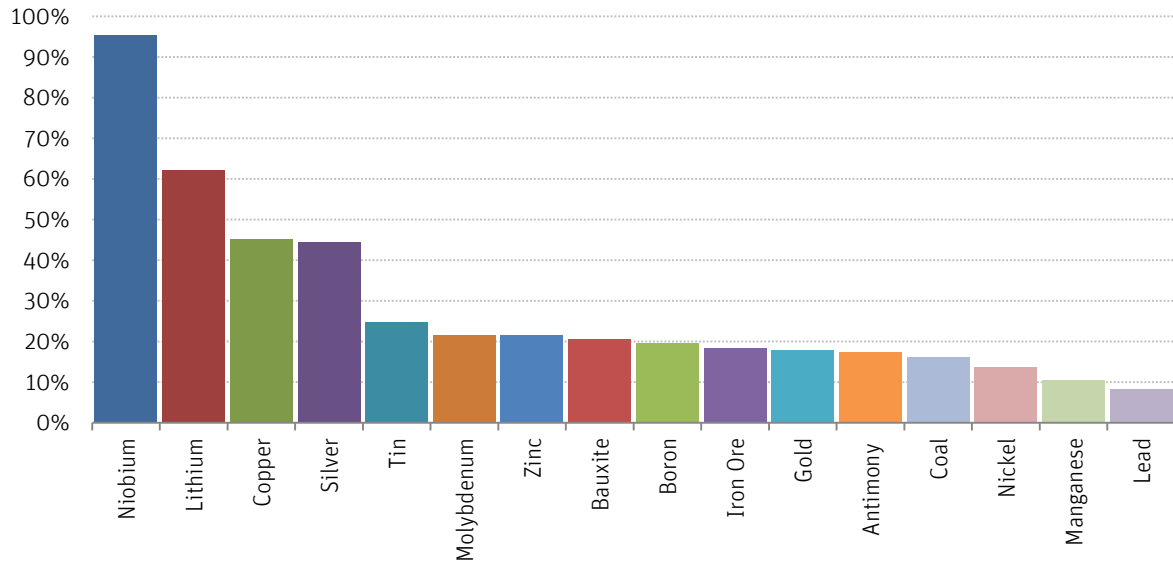


Figure 4: Gross natural gas production in LAC
(2012)



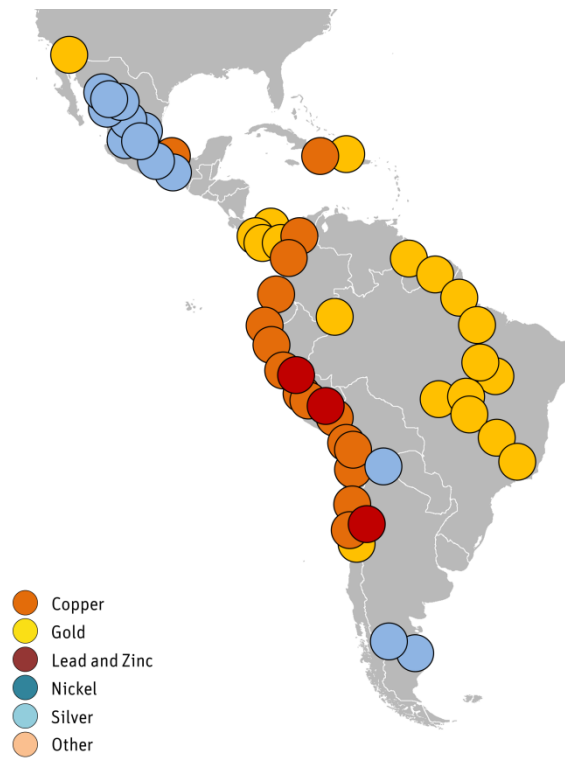
Source: Authors elaboration; data from EIA 2015

Figure 5: LAC Mineral Reserves (2012, as a percentage of world total)



Source: Authors elaboration; data from USGS 2014

Figure 6: Location of Significant Gold and Base Metals/Other Drill results (2014)

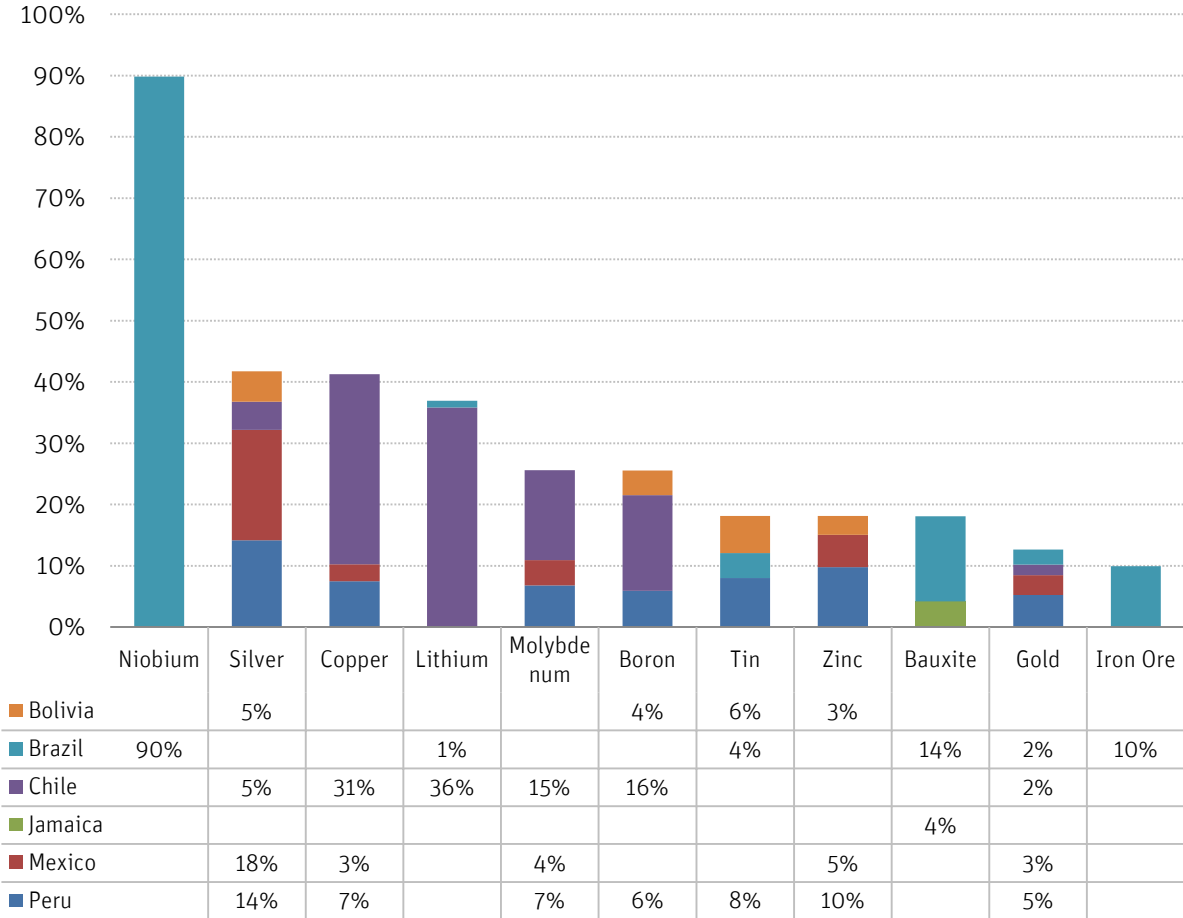


Source: SNL 2015 (World Exploration Trends)

Natural riches make the LAC region the world’s leading source of metals and the second most important source of oil (ECLAC 2013). The region produces 15% of the world’s gold, 45% of silver and 40% of copper (IEA 2014; USGS 2014, Figure 5). Although production is concentrated in a few countries – particularly Chile, Peru, Mexico, and Brazil– mineral extraction is an important activity throughout the region (SNL 2015).⁵

The current pipeline of mining projects includes several capital-intensive projects (over \$1 billion), such as BHP Billiton’s Escondida Mine in Chile, Vale’s Onça Puma Ferronickel mine and Salobo copper mine in Brazil, Barrick Gold/Goldcorp’s Pueblo Viejo gold mine in the Dominican Republic, and Buenaventura /Newmont’s Conga gold and copper mine in Peru.

Figure 5 : LAC Minerals Production (2013, percent of global production)



Source: Authors elaboration; data from USGS 2014

Between 50 and 70 percent of formal mining operations involved Canadian companies in the past decade, and their presence has increased significantly in recent years. By 2012, Canadian mining companies –Barrick Gold, Teck, Yamana Gold, Goldcorp, Kinross Gold, Pan-American Silver and numerous smaller companies– operated approximately 80 mining projects and had 48 more at the development or feasibility stage in the LAC region (Mining Association of Canada, 2012).

More recently, the sector has also been witness to increased participation from Asian companies, especially Chinese firms (Espinasa et al. 2015). Still, large formal players are neither the sole producers nor the most important in many parts of the LAC region.

Smaller mining operators are equally critical for the LAC mining sector. Artisanal and small scale mining (ASM) accounts for a smaller proportion of total regional mineral production, but it provides the majority of direct employment and is often the center of attention.^v In numerous mining districts in the LAC region, ASM actually accounts for the majority of extractive operations. In 2012, for example, ASM was responsible for an estimated 75% of Ecuador’s national gold production, which ranges between 3 and 5 million tons per annum; and in Peru, ASM produced 28,700 kg of fine gold in 2009, which was equivalent to approximately 16% of the total national gold output (UNEP 2012, according to official estimates). Other estimates suggest ASM operators produce approximately 7% of the region’s tin and 33% of LAC’s gold (Dorner et al. 2012).

Extractives’ Contribution to the Economy: recent trends and outstanding challenges

Hydrocarbons and minerals extracted in the LAC region supply world markets. Although the US and Europe remain LAC’s primary export destinations for hydrocarbons and minerals, China, India and other emerging markets are gaining increasing prominence as trade partners: between 2000 and 2013,

inter-regional trade in hydrocarbons and minerals grew by more than 10% per year, reaching \$33 billion in real terms in 2013. (Espinasa et al. 2015; ECLAC 2013).^{vi}

Demand for minerals for construction, infrastructure and manufacturing (which

require inputs such as steel, electrical conductors and industrial metals) has expanded rapidly as emerging economies embarked on a path of accelerated economic development during the last decade (Halada et al. 2008). As a consequence, by 2012, Peru became one of China's top suppliers of lead, copper, and zinc; Chile was its main provider of copper and molybdenum; and Brazil its second largest source of iron ore (Kotschwar *et al.*, 2012).

The profound transformation in international commerce is also reflected in the LAC region's investment scene, with new players from Asia playing an increasingly important role as a source of foreign direct investment: between 2005 and 2014, China's FDI in LAC climbed from US\$3.8 billion to US\$109.5 billion, while India's FDI in the region reached US\$16 billion by 2014 (Espinasa *et al.* 2015). Driven by high commodity prices, global investments in mining increased nearly ten-fold between 2000 and 2013, from US\$ 86 billion to US\$ 735 billion (ECLAC 2013).

The LAC region received an important portion of global investment flows over the

past decade. The average mineral project investment in LAC in 2012 was US\$730 million, more than twice Asia's average of US\$363 million (CCSC 2012, SNL 2015). In 2014, the region received approximately 25% of global exploration investment flows and held more than 28% of the world's mineral investment portfolio (SNL 2015). Similarly, inwards FDI flows to the oil and gas sector reached their highest level in 2012, at around US\$ 70 billion, or 11% of worldwide investment (ECLAC 2013).

Mining exploration investment flows mainly targeted copper, iron ore, and gold deposits (Table 3), with the lion's share of exploration investment going to a few select countries: Mexico (23% of total regional investment), Peru (20%), Chile (20%), Brazil (11%), Argentina (10%) and, Colombia (9%) (SNL 2015). Smaller Caribbean and Central American countries – French Guiana, Guyana, Suriname, Guatemala and Dominican Republic – received a fraction of exploration investment flows (1%), but they are rapidly emerging as important destinations for investment.

Table 3 : Investment for Exploration in the Mining Sector in LAC (2012)

	Total Global Investment (US\$ billion)	Investment in minerals, Global Share	Total LAC Investment (US\$ billion)	LAC of Global Share
Total	735	100.0%	247.6	33.7%
Copper	200	27.2%	116.9	58.5%
Iron ore	245	33.3%	66.7	27.2%
Gold	125	17.0%	40.1	32.1%
Other	30	4.1%	7.2	24.0%
Nickel	60	8.2%	6.8	11.3%
Silver	8	1.1%	5.8	72.5%
Lead/zinc	17	2.3%	3.6	21.2%
Uranium	25	3.4%	0.4	1.6%
Diamonds	9	1.2%	0.1	1.1%

Source: SNL 2013

In consideration of the reserves and production patterns described in the preceding sections, it shouldn't be surprising that extractives account for nearly 26% of total foreign direct investment (FDI) to the LAC region; nor that approximately half of the FDI targets the primary sector (oil, gas, mining, and agriculture) in South America (excluding Brazil) (ECLAC 2013).

These investment flows reflect FDI profitability in the extractive sector in the first decade of the twenty-first century. From 2007 through 2011, the highest profitability from FDI was in countries where the main target sector for FDI was the extraction of raw materials for export (ECLAC 2013b). In that period, repatriated

profits in the mining sector alone averaged approximately \$50 billion; reinvested earnings during that period averaged approximately \$40 billion (MEG 2013).

In 2013, fuels and mining products accounted for 40% of total South and Central American exports, compared to a global average of 22% (WTO 2013). Extractive sector's rents^{vii} represented more than 15% of GDP in resource-rich^{viii} LAC countries in 2013 (Table 4). Indeed, the economic fortunes of large hydrocarbon producers, such as Venezuela, Ecuador, Brazil and Mexico, have been inextricable from the extractive sector's performance; a situation not unlike that faced by the main mineral producers, Chile and Peru. For other smaller LAC economies, such as Trinidad

and Tobago, Jamaica, Guyana, and Suriname, limited economic diversification and relative dependence on the primary

sector has made them equally, if not more, vulnerable to global commodity price busts.

Table 4: Natural Resource rents in Latin America and the Caribbean (as % of GDP, 2013)

	Total natural resources rents	Oil rents	Natural gas rents	Mineral rents	Forest rents	Coal rents
Trinidad & Tobago	34.4	14.1	20.2	0	0	0
Venezuela	26	23.6	1.2	1.1	0.1	0
Ecuador	17	16.2	0	0.1	0.7	0
Guyana	16.9	0	0	11.7	5.2	0
Bolivia	16.1	4.8	7.9	2.3	1.1	0
Chile	16.1	0.1	0	14.6	1.3	0
Colombia	9.7	7.7	0.4	0.8	0.3	0.6
Peru	9.7	1.5	0.7	7.1	0.4	0
Mexico	7.7	6.1	0.5	0.8	0.2	0

Source: World Development Indicators (2014)

The decade of abundance in the extractive sector, which started in the early 2000s, is now concluded. Since 2011, commodity prices have plummeted, as have fiscal revenues and investment flows to the LAC region (IMF 2015, SNL 2015). To illustrate, as copper prices slipped to \$4,747.5 per tonne in November 2015 –a 53% cut since peaking at \$10,160 per tonne in 2011– mining’s contribution to Chile’s GDP was reduced to just 10%; a figure significantly inferior to the 15-18% range prevalent during previous years (WSJ Aug 2015). Foreign investment in LAC fell by 16% in 2014, with declines in Chile, Colombia, and

Peru concentrated in the mining sector, and in line with repositioning in Argentina and Brazil’s hydrocarbon sector.

Dwindling windfall revenues impact many governments’ fiscal stance,^{ix} it may be conducive both to larger budget deficits in the public sector and to reduced profits in the private sector. Fiscal pressure can create a window of opportunity for reforming fiscal policies, including subsidies and tax regimes; and it may also hinder ongoing reform initiatives as well. Political alliances and agreements forged during the boom years may be reevaluated and trigger increased contentiousness in the sector. This

is typically the case when extractive companies reevaluate investment plans and expenditures to respond to more challenging economic scenarios; and fail to manage stakeholder expectations generated during the boom years.

In this context, policymakers and stakeholders in the LAC region, especially those in commodity-exporting countries, are actively exploring policies to address the challenges that come with the downturn and to ensure that operations in the extractive sector effectively contribute to inclusive, environmentally safe, long-term economic growth. Nevertheless, the new commodity cycle is highlighting difficulties in the establishment of resilient systems that leverage natural riches for the benefit of all citizens.

The institutional conditions in which LAC's extractive industries operate are imperfect (Balza and Espinasa 2014; RGI 2015); and the LAC region has a long way to go in consolidating anti-corruption controls and effectively enforcing legal and regulatory frameworks for extractives (Vieyra and Masson 2014; Quiroz 2014). Reaching into the extractive 'honey pot' continues to be a tempting option to tackle short-term

political problems and for the personal benefit of the corrupt, but one that can significantly affect rent flows and development patterns over the long-term.

These challenges manifest at all governance levels –from the national to the local level– but sub-national governments are uniquely vulnerable to them. Subnational jurisdictions tend to have limited control over national level policy decisions, and more limited capacity and resources than national jurisdictions to manage revenue windfall. Paradoxically, those that should benefit most from extractive windfalls are also most vulnerable to governance dysfunctions.

Most new areas of extractive investment in LAC countries are located in sparsely populated regions, where local communities can be affected by the disruption of established livelihoods, loss of arable land, and competition over resources such as land, water, energy and labor. The absence of adequate social participation and monitoring mechanisms, and effective and transparent revenue governance are often driving factors for conflict, affecting stakeholder relations and the reliability of *social licenses*^x to operate (Esteves *et al.*

2012). At the same time, conflicts associated with extractive investments entail significant losses for all stakeholders: lower resource production, fewer royalties, reduced local investment and social and political costs (Davis and Frank 2014).

Moreover, the lack of adequate regulatory and economic incentives to integrate the extractive industries to national and local economies hinder the sector's potential to promote long term inclusive resource-based economic development. Insufficient value-added activities and local participation in productive processes can stunt the multiplier effect of extractive industries and social benefits associated to activities in the sector.

Juan Pablo Perez Alonso, OPEC's Venezuelan founder, famously stressed that oil is "the devil's excrement." He was referring to the difficulties experienced by Venezuela and other countries that are economically dependent on their natural resources to turn their comparative

advantage into sustained socio-economic growth. These countries seem to be "cursed" to systematically experience institutional volatility, corruption, environmental and social impacts and other challenges linked to their resource wealth.

Challengers to this notion point to the success of resource-rich countries such as the Canada and Norway; they stress that resource-based growth can be achieved with stable forward-thinking institutions and socio-environmental, industrial and technological policies aimed at bolstering sustainability, productivity and competitiveness.^{xi} Indeed, economically-integrated investments in the extractive sector can foster upstream, downstream and horizontal economic linkages that trigger multiplier effects, broaden the tax base and foster diversified and sustained growth (Bastida 2014). Adequate institutional quality and government capacity can ensure the quality and efficiency of public management and shape more responsible stakeholder practices.

What then? Thinking about resource-based development in the LAC region

The development of the natural resource sector varies based on the size of a country's economy and its depth of experience with mining and oil and gas development. The needs in terms of policy, institutional capacity (sector governance and safeguards), information, and other critical governance factors vary widely among 'established' extractive countries (Peru, Chile, Mexico), 'maturing' extractive countries (Colombia, Ecuador), and 'emerging' extractive countries (Guyana, Suriname, Dominican Republic). A simple corollary is that no single policy package can "fix" the ills of the extractive sector and maximize potential benefits; which helps understand the proliferation of initiatives to enhance social, environmental and economic performance of the sector over the past decades.

Actors that traditionally had limited clout and visibility –non-governmental organizations, private investment funds, and indigenous communities– are finding ways to more successfully shape practices and decisions. Civil society organizations and private firms are engaging at the local and international level, alongside governments,

to develop common agendas and tools for the governance of the sector. Governments are implementing major legal reforms aimed at the improvement of regulatory and institutional frameworks, for example, through laws guaranteeing the freedom of information, contract transparency, and public participation in policy making and implementation processes (Vieyra, Masson, Walter 2014). Yet, it is increasingly clear that solutions to the challenges of extractives in the LAC region will not reflect the decisions of centralized decision-making entities. Recent trends suggest that resource-based development patterns will either reflect concerted stakeholder efforts rooted in mutual respect and trust, or inevitably fail.

Moving forward, in addition to considering the critical role of geography, institutions, and the quality of governance in shaping sector performance, it will be necessary to stress the need for *stewardship* –the ethos guiding responsible planning and management of natural resources. Sustained and inclusive resource-based economic development demands that all stakeholders (government, community and industry) are

aware of the externalities of the sector and that they operate with a long-term view. If the potential of the sector to promote industry and broader socio-economic development (jobs, health, education) is harnessed with a disregard of negative externalities, long term impacts may far

surpass short term benefits of the extractive industries. Promoting stewardship demands credible high-quality information –a factual basis for debates about preferences– and more stable and transparent dialogue mechanisms to build trust and a sense of shared responsibility between parties.

Endnotes

ⁱ Reserves, according to the definition of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) (2005), are “a concentration or occurrence of diamonds, natural solid inorganic or fossilized inorganic material including base and precious metals, coal and industrial minerals [*and hydrocarbons*] in or on the Earth’s crust in a form, quantity, grade or quality to create reasonable prospects for economic extraction.” Note that we have added hydrocarbons, and that the size of reserves is defined in consideration of technical, economic, legal, environmental, socioeconomic and governmental factors. Indeed, the size of reserves is dynamic. It shifts with: 1. production, which depletes specific reserves, and 2. entrepreneurial activities (exploration, technology development) which creates new reserves. This is the main challenge estimating the *length* of reserves (in years).

ⁱⁱ In addition to known conventional oil and gas reserves, a recent assessment by the US Geological Service (USGS 2012) suggests that the region may also hold globally significant undiscovered conventional oil and gas resources in the offshore Santos Basin (off the coast of Brazil), the Guyana-Suriname basin, and the Falklands Plateau.

ⁱⁱⁱ Most of Argentina’s potential lies in its Neuquén Basin, which contains the Vaca Muerta shale formation, which has an estimated 16.2 billion barrels and 308 trillion cubic feet of natural gas. Mexico holds a portion of the Eagle Ford shale formation in the Burgos Basin, which extends to the south of the state of Texas. This is a play with an estimated 343 trillion cubic feet of risked

technically recoverable shale gas (AS 2014). In Brazil, there are 240 potential areas available for bidding on shale gas blocs interspersed throughout the country, including 110 identified as "new frontiers" in the Acre, Parecis, São Francisco, Paraná, and Parnaíba bays and 130 in mature bays of Recôncavo and Sergipe-Alagoas (Pereira 2014).

^{iv} The majority of mining activities are carried out by private companies in large scale open pit mines.

^v As noted by Hrushka (2013), it is important to distinguish ASM from illegal mining. Illegal mining applies to situations where mining activities are explicitly prohibited, which typically include urban areas, national border areas, protected areas, riverbeds or/and similar, where other land use than mineral extraction is considered a national priority. In areas where no prohibition is in place, ASM is legal. Critically, the absence of legislation regulating (allowing/prohibiting) ASM does imply that ASM is "illegal".

^{vi} Trade with the rest of the world grew by an average of 1.5% during the same period.

^{vii} Resource rents are an indicator of the contribution of natural resources to total economic output (GDP). They are calculated subtracting, per unit, commodity market price and average extraction cost (assuming a normal return on capital), multiplied by the total number of units produced in the economy. Note that this definition of economic rent differs from that conventionally used in the System of National Accounts, where rents are a form of property income, consisting of "payments to landowners by a tenant for the use of the land or payments to the owners of subsoil assets by institutional units permitting them to extract subsoil deposits."

^{viii} The IMF Guide on Resource Revenue Transparency (2007) categorizes countries as mineral- and hydrocarbon-rich countries when they meet "either of the following criteria: (i) an average share of hydrocarbon and/or mineral fiscal revenues in total fiscal revenue of at least 25% (...) or (ii) an average share of hydrocarbon and/or mineral export proceeds in total export proceeds of at least 25%..."

^{ix} Lower commodity prices also lead to increased inflation, as foreign currency inflows dwindle.

^x An extractive project is seen as having a *social license to operate* when it has the broad, ongoing approval and acceptance of society (independently from whether the project is compliant with laws and regulations).

^{xi} See Manzano 2014 and Frankel 2010 for a more detailed literature review of the relationship between extractive industries and economic development.

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