

THE GEOPOLITICS OF OIL AND GAS: THE ROLE OF LATIN AMERICA

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THE GEOPOLITICS OF OIL AND GAS: THE ROLE OF LATIN AMERICA

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The geopolitics of oil and gas: the role of Latin America

The topic of geopolitics of oil and gas awakens interest in society and among industry experts, given its relevance to understand the current and future energy context. In order to understand more specifically the main challenges in Latin America and its role in the global context, the Konrad Adenauer Foundation and its Regional Programme Energy Security and Climate Change in Latin America - EKLA, in partnership with FGV Growth & Development and Catavento Consulting, organized a discussion with industry experts and opinion leaders, held on October 30, 2015.

The event's opening remarks were delivered by Jorge Camargo, president of the Brazilian Institute of Petroleum, Gas and Biofuels – IBP, who has had extensive international experience in the industry for over three decades. He highlighted his vision in relation to the business environment - both from the point of view of geology and the institutional conditions in the countries with the highest production of the region. Next, Roberto Castello Branco, Institutional Director of the Growth and Development Center at FGV, gave a lecture with a macroeconomic perspective and a longer-term view about the moment currently experienced by the oil and gas sector. Also present to the

roundtable were members the Konrad Adenauer Foundation and a German delegation of experts in the oil and gas sector. The debate was mediated by Clarissa Lins, founding partner of Catavento.

The result of this rich debate is covered in this white paper. The first part, entitled "An overview of the oil and gas industry in Latin America", written by Clarissa Lins, Raoni Moraes and Lavinia Hollanda, discusses aspects of the industry in the main producing countries in the region. In the second part, called "The oil shock 2014/2015: causes and implications," Roberto Castello Branco analyzes the macroeconomic impact of oil price fluctuations.



An overview of the oil and gas industry in Latin America

Clarissa Lins, Raoni Morais e Lavinia Hollanda¹

INTRODUCTION

The oil and gas industry and its value chain are traditionally referred to as a strategic sector in countries that have these resources, largely because of their relevance in the productive base of the economy. Although its relative share in the domestic production of goods and services varies from country to country, the degree of dependence that any economy has is undeniable, especially when compared to traditional energy sources. Global energy demand is now largely met by coal, oil and gas (82%), according to data from the International Energy Agency - IEA.

The structure of the global supply of fossil fuels has been changing since the United States began to play the role of “*swing producer*” by adding about 5 million barrels of oil equivalent to the global market in just over five years, due to the shale industry’s dynamism. In addition, the new position of OPEC in a low price environment,

favoring the maintenance of its share of the global market at the expense of a recovery in the price level is noteworthy.

Global energy supply and demand forecasts provided by IEA point to a relative maintenance of the 2015 scenario: lower prices for a longer period of time³,

1. Clarissa Lins and Raoni Morais are partners in Catavento Consultoria. Lavinia Hollanda has a doctorate in Economics from EPGE/FGV.

2. BP Statistical Review Workbook 2015.

demand growing at decreasing rates in various regions of the world and a mix of producers similar to that seen in recent years - that is, with a predominance of US and OPEC countries, as well as contributions from some non-OECD countries, such as Brazil.

Historically, Latin America represents a small share of global production - less than 5% - with Venezuela and Mexico being the players with global representation. However, factors such as the discovery of a world-class oil province in Brazil, the expectation of developing unconventional gas in Argentina and the opening of the oil and gas industry in Mexico, after more than seventy years of monopoly by the state-owned company have attracted the interest of global players to the region.

The first chapter of this *white paper* aims at giving an overview of the oil and gas industry in Latin America. Initially, Latin America's insertion in the global context and the industry's main characteristics on the regional level are presented.

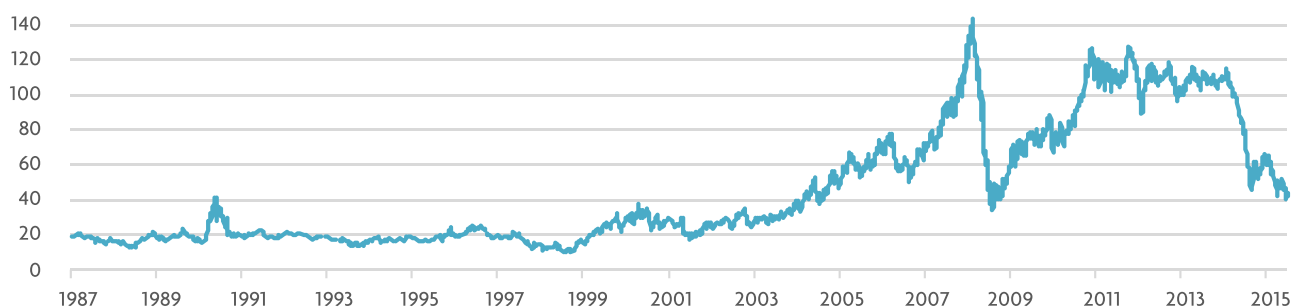
In sequence, the document presents the macroeconomic situation of the Latin American countries with the most relevant oil and gas production - Brazil, Venezuela, Argentina, Mexico and Colombia - including their competitiveness levels. These countries attractiveness is analyzed considering political and regulatory aspects, as well as geological characteristics of reserves. The regions with the largest potential to develop non-conventional reserves are highlighted.

Finally, several aspects of national strategies to ensure energy security and how they relate to the region's energy integration potential were analyzed.

GLOBAL AND REGIONAL CONTEXT

The end of the commodity super-cycle - which lasted nearly 15 years⁴ - deeply affected the oil industry, with a 50% drop in oil prices between mid-June 2014 and November 2015.

FIGURE 1 - OIL PRICE EVOLUTION (BRENT, US\$)



IEA "Spot Prices"

3. While disclosing the *World Energy Outlook 2015*, the IEA points to the possibility of oil prices remaining around USD \$ 50/b by 2020. For details, see http://www.worldenergyoutlook.org/media/weowebiste/2015/151110_WEO2015_presentation.pdf.

4. As detailed in the second half of this paper, in an article by Roberto Castello Branco.

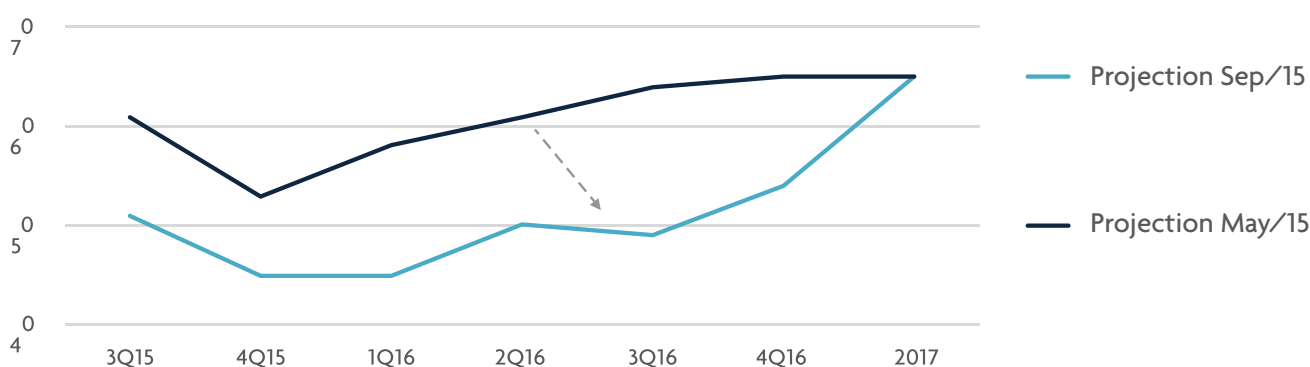
Three factors were essential to this scenario: (i) the maintenance of OPEC's supply at high levels without production limitation, (ii) Resilience of non-OPEC countries' supply, mainly the American shale production, and (iii) Slowdown in demand, principally from China.

This combination of factors led to a shock mostly driven by supply⁵, which resulted in excess produc-

tion and a sudden drop in prices. In this context, the industry's situation in all levels of the chain has been of major cuts in expected investments⁶, layoffs and reallocation of production efforts to increase operational efficiency.

In addition, the systematic reduction in oil price projections for the next two years puts even more pressure on the industry to control costs and increase efficiency.

FIGURE 2 – OIL PRICE PROJECTION (BRENT, US\$)



ICE; Goldman Sachs Investment Research, September 2015

If we consider a year and a half horizon, between the third quarter of 2015 and the fourth quarter of 2016, and keeping the current level of production constant⁷, the accumulated loss in the sector's overall revenues, based solely on the price difference between the May 2015 projection and the September 2015 projection, amounts to more than \$ 550 billion.

A closer look at the regional landscape shows a tendency of growth in the demand for energy until 2040, albeit at a lower rate than that observed in the previous two decades, and a new setup of the energy mix – less oil and more gas. This means that Latin America will follow global trends, as can be attested by the base scenario released by the IEA⁸.

5. As presented by the IMF in its "World Economic Outlook", of April 2015.

6. On average, the International Oil Companies – IOCs announced investment cuts of about 20% to 30% throughout 2015, for coming years.

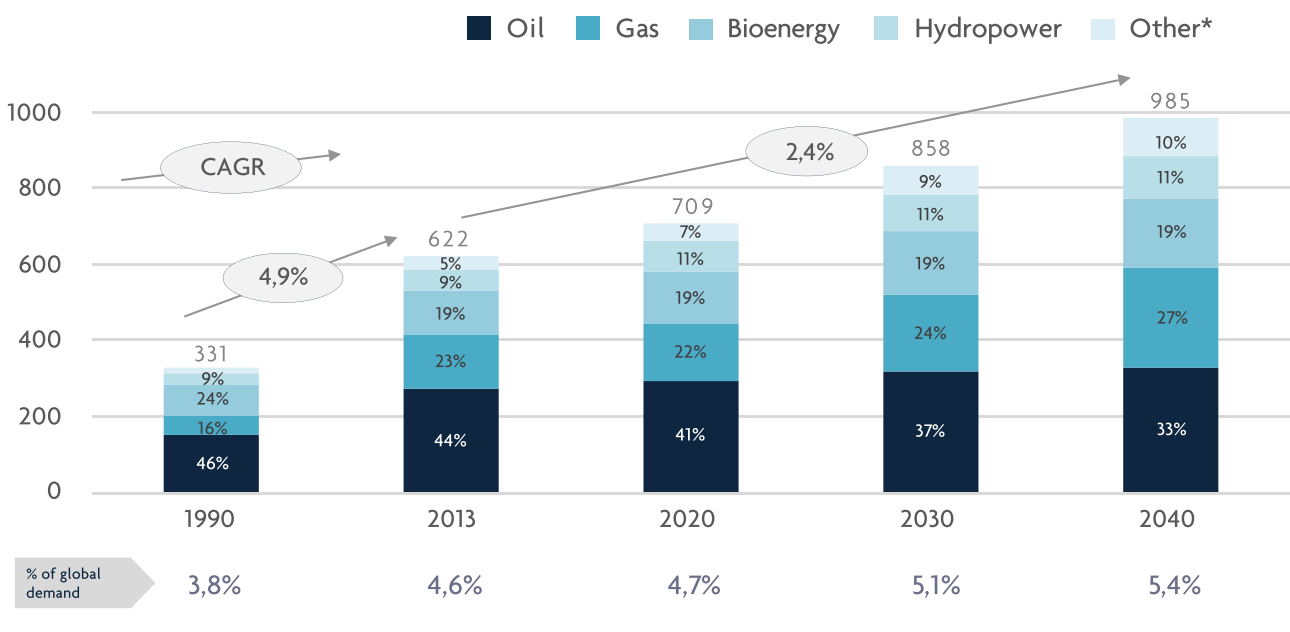
7. Global production of 96.3 million barrels per day during the second half of 2015, according to IEA "Oil Market Report", of 11/sep/2015.

8. For more details, see World Energy Outlook 2014 of IEA, New Policy Scenario. Also see an assessment done by Catavento for the Brazilian Oil Institute – IBP in <http://catavento.biz/tendencias-para-o-setor-de-energia-sao-apresentadas-no-ibp-pela-catavento/>

Despite the projected growth in energy demand of 2.4% per year until 2040, Latin America's share in global demand remains stagnant at 5%.

In terms of production, projections for Latin America predict a slight increase in its participation in global supply, both in oil production and natural gas.

FIGURE 3 – ENERGY DEMAND IN LATIN AMERICA, BY SOURCE TYPE (MTOE), % OF TOTAL



IEA, WEO 2014 – New Policies Scenario; WEO Special Report 2015. / * – "others" include coal, nuclear and renewable, except hydropower and bioenergy

Thus, the projections indicate that Latin America tends to keep its global relative representation, even though it presents some variations by country due to their geological, regulatory and institutional contexts.

OIL AND GAS PRODUCTION IN LATIN AMERICA

Five countries in Latin America stand out in terms of oil and natural gas production in the region: Brazil, Argentina, Venezuela, Mexico and Colombia.

Traditionally, only Mexico and Venezuela composed the first tier of large local producers. However, over the past ten years they have consistently shown a decrease in production, while Brazil has since the 2000s changed its production level, reaching the range of 2.5 million barrels per day and joining the aforementioned first echelon of producers.

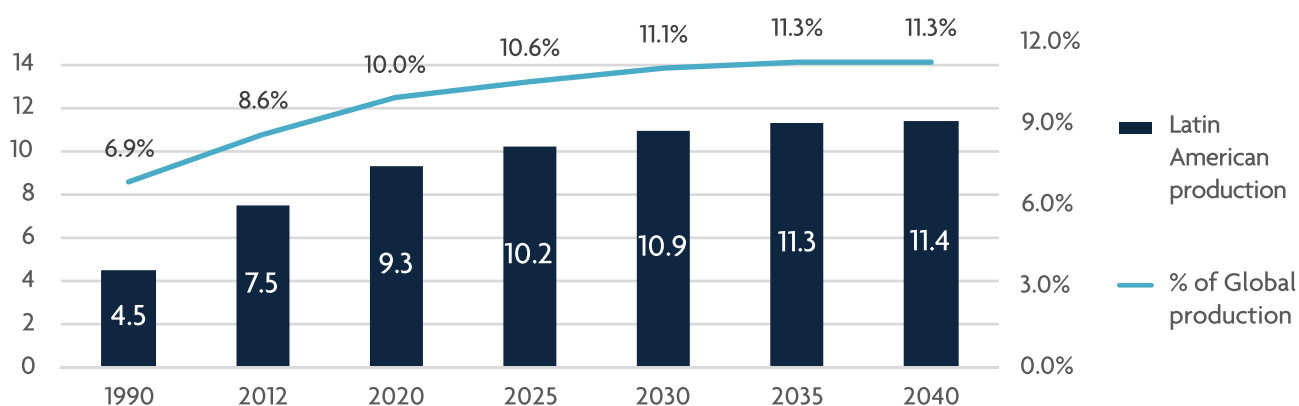
It is, nonetheless, worth noting that Mexican and Venezuelan production has been showing a downward trend since mid-2000s – a prospect that shall remain at least for the next few years⁹. As for Brazil, the prospect is of a continuing increase

9. Columbia University, "The impact of the decline in oil prices on the economics, politics and oil industry of Venezuela", September 2015 and "US crude oil exchanges with Mexico", February 2015.

in production in coming years, but at lower rates, primarily due to Petrobras' lower investment capacity. On a second tier, Argentina and Colombia maintain

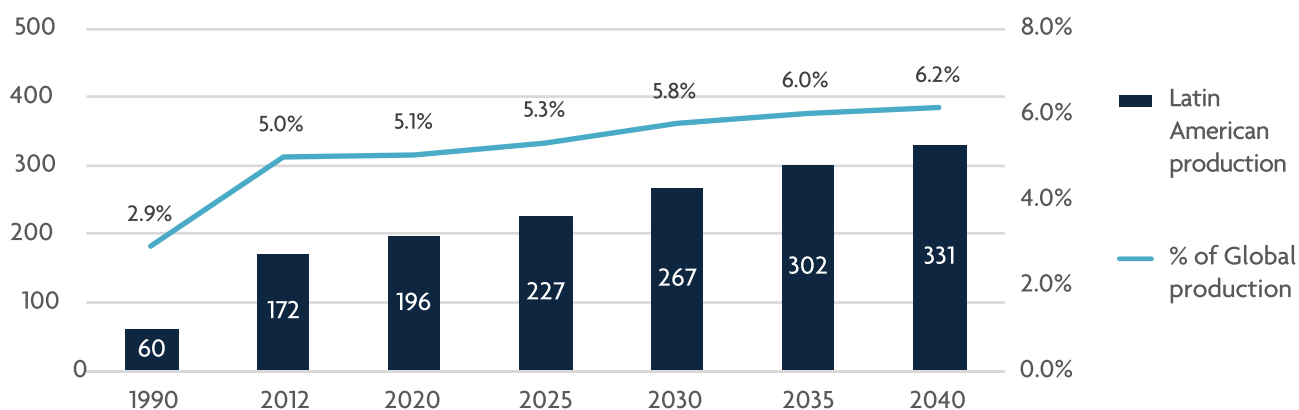
their production between 500,000 and one million barrels per day, but Argentina shows a downward trend while Colombia shows an upward trend.

FIGURE 4 – OIL PRODUCTION* IN LATIN AMERICA AND SHARE IN GLOBAL PRODUCTION (MILLION BARRELS PER DAY)



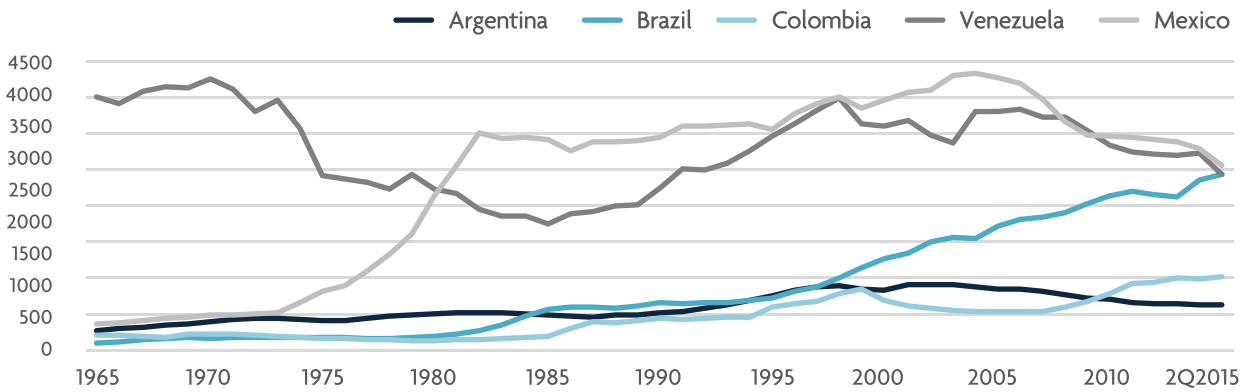
IEA, WEO 2014 – New Policies Scenario / * – * Considers "crude" oil, liquids of natural gas and non-conventional oil

FIGURE 5 – GAS PRODUCTION IN LATIN AMERICA AND SHARE IN GLOBAL PRODUCTION (BILLION CUBIC METERS PER YEAR)



IEA, WEO 2014 – New Policies Scenario

FIGURE 6 – EVOLUTION OF OIL PRODUCTION* IN LATIN AMERICA’S MAIN COUNTRIES (THOUSAND BARRELS PER DAY)



IEA, "Oil Market Report"; BP Statistical Review 2015; ANP, "Boletim Mensal da Produção de Petróleo e Gás Natural" / * - * Includes "crude" and tight oil, oil sands and LNG.

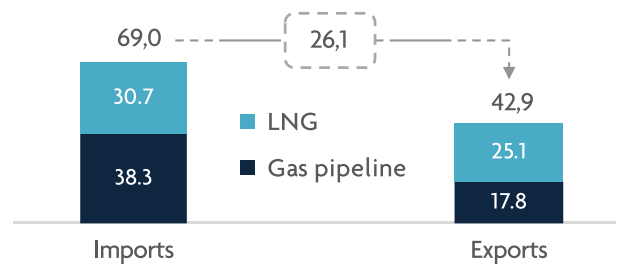
As a result of these five countries’ domestic production and consumption levels, Latin America is a net exporter in the global oil market. Mexico and Venezuela have the largest export volumes, given that Brazil consumes a large portion of its production¹⁰.

With regards to natural gas, the region is net importer and it is important to highlight Peru and Trinidad & Tobago’s share in the composition of total exports of LNG.

FIGURE 6 – LATIN AMERICA’S TOTAL OIL TRADE (2014, THOUSAND BARRELS PER DAY)



LATIN AMERICA’S GAS IMPORTS/EXPORTS (2014, BILLION CUBIC METERS PER YEAR)



BP Statistical Review 2015

¹⁰ In the 1st quarter of 2015, Brazilian average consumption was 3.2 million barrels per day, according to IEA "Oil Market Report", of September 11, 2015.

OTHER LATIN AMERICAN PRODUCING COUNTRIES

Other countries, within specific aspects, are relatively relevant, but appear on a different level than the five mentioned above.

Peru has an attractive regulatory framework based on concessions and a relevant natural gas production, including a liquefaction terminal for exporting LNG through the Pacific. However, it faces several social and environmental restrictions due to the presence of indigenous communities and the interference in the Amazon biome. As for the Atlantic shore, Trinidad & Tobago is the most important reference due to the GNL trade.

Although Ecuador is part of the Organization of Petroleum Exporting Countries (OPEC), it faces great interference of the Bolivarian government and, therefore, is not able to really develop its production at a significant level.

Chile has a large market, an attractive regulatory framework, but few natural resources. Finally, Bolivia suffers from low external credibility due to the government's level of interventionism and, therefore, is not able to attract relevant investments to develop its gas potential.

COMPETITIVENESS OF THE REGION'S LEADING COUNTRIES

Attracting international investments and expertise through companies that make up the global supply chain and/or foreign direct investment depends on the institutional and political environments and on the macroeconomic context. Clear rules, predictability and solid sustainable growth

prospects are critical success factors for a country to attract capital and investments.

In order to illustrate the overall situation of the five countries analyzed in this paper, some reference metrics were used, such as the Global Competitiveness Index calculated annually by the World Economic Forum¹¹, GDP growth and investment rate.

11. For more details, see <http://www.weforum.org/reports/global-competitiveness-report-2015-2016>

FIGURE 7 – LEADING LATIN AMERICAN COUNTRIES' INDICATORS

INDICATOR	BRAZIL	ARGENTINA	VENEZUELA	MEXICO	COLOMBIA
2014 GDP, US\$ billion ¹	2.346	543	206	1.291	378
2014 GDP growth ¹	0,1%	0,5%	-4% E	2,1%	4,6%
2015 GDP growth projection ¹	-3,0%	0,4%	-10,0%	2,3%	2,5%
2014 Total Investment (%GDP) ¹	20%	20%	19%	22%	26%
Consumption of Fossil Sources (% of total) ²	57%	90%	90%	90%	76%
Competitiveness Index ³ (total: 140 countries)	75°	106°	132°	57°	61°

1) FMI, "World Economic Outlook 2015"; 2) Banco Mundial, "World Development Indicators"; 3) World Economic Forum, "Global Competitiveness Index 2015-2016".

In 2014, Brazil, Argentina and Venezuela showed poor results in terms of GDP growth, significantly lower than achieved by Mexico and Colombia, as a result of the macroeconomic policies in place in these countries. In 2015 the projection is that the difference in growth between these countries will be even more pronounced. Venezuela's situation is noteworthy given the seriousness of the political and economic crisis it faces. It might be one of the rare countries in the world whose GDP dropped nearly 15% over two consecutive years.

From the global competitiveness point of view, some factors in the region are noteworthy, such as the fragility of its institutions and the poor innovation capacity.

While evaluating institutions, several criteria related to public and private bodies should be considered, such as ethics, corruption, respect for

physical and intellectual property rights, rate of interference in institutions, public sector's performance, security (for instance, cost of violence, organized crime, police reliability).

As for innovation, the main criteria are the capacity to produce innovation, the quality of scientific research institutions, company investments in R&D, university-company partnerships, government procurement of high-tech products, availability of engineers and scientists and patent registration.

Regarding these two issues, what contributes the most to negative results in these countries are the ethical and corruption assessments, both on the public and private levels, and the low number of patents registered. In the cases of Colombia and Mexico, organized crime is also an important factor, while in Venezuela nearly all criteria are evaluated poorly.

FIGURE 8 – COMPETIVENESS OF MAJOR LATIN AMERICAN COUNTRIES

THEMES	BRAZIL	ARGENTINA	VENEZUELA	MEXICO	COLOMBIA
Institutions					
Infrastructure					
Macroeconomic environment					
Health and basic education					
Higher education					
Market for goods					
Jobs					
Financial market					
Technological preparedness					
Market size					
Business sophistication					
Innovation					

World Economic Forum, Global Competitiveness Index 2015-2016.

0-2,5 2,6-3,5 3,6-4,5 4,6-5,5 5,6-7,0

GEOLOGICAL POTENTIAL AND REGULATORY FRAMEWORK

Although each country's macroeconomic and institutional contexts are essential elements to define competitiveness, there are other determining factors that influence the decision to invest in the oil and gas sector such as: quality of reserves – to which the volume and type of oil/resource contribute, as well as expected productivity – and the country's regulatory framework. Thus, we seek to make these characteristics evident in the main countries analyzed.

BRAZIL

The discovery of the pre-salt led to a significant increase in the total volume of proven oil reserves in Brazil, which increased by over 40% between 2007 and 2014. Most of them are located in the basins of Campos and Santos (including pre-salt and post-salt), totaling about 15 billion barrels of oil in Brazil¹².

The most coveted reserves in the pre-salt have oil ranging from average to high quality and, so far, have shown excellent productivity rates, re-

12. ANP (Brazilian Oil Agency) "national reserves", available at: <http://www.anp.gov.br/?pg=74777&m=&t1=&t2=&t3=&t4=&ar=&ps=&1430426275995>

Although it benefits from an extremely generous geology, Brazil implemented a regulatory model characterized by the complexity of rules and the requirement of large bureaucratic effort

duced time of construction of wells and low production costs¹³. According to industry experts, the pre-salt is one of the most promising oil provinces discovered in recent years.

Although it benefits from an extremely generous geology, Brazil implemented a regulatory model characterized by the complexity of rules and the requirement of large bureaucratic effort. Post-salt reserves, largely discovered after opening the sector to private participation¹⁴, are explored and developed according to a concessionary license system. As for the development of pre-salt reserves, it is made through production-sharing contracts (for areas tendered after the "Oil Law" – 2010), with Petrobras being the sole operator, or concessions contracts (before 2010). In addition to these two models, there is still the "onerous transfer of rights agreement" ("Cessão Onerosa"), created in 2010, in which Petrobras, by paying certain amount, acquired the right to operate up to 5 billion barrels of oil and natural gas without going through a bidding process¹⁵.

The slow pace of exploration of the pre-salt is attributed, in part, to the requirement of Petrobras' participation in at least 30% of all blocks and as the operator, even though it is facing great financial and institutional difficulties.

To make matters worse, Brazil's political and economic environment is of poor governability and low credibility, and has consistently presented negative reviews in its macroeconomic projections for 2015 - inflation exceeding 10% and GDP declining more than 3%¹⁶.

ARGENTINA

Argentina currently faces an unfavorable economic environment, with restrictions of capital and exchange controls that limit access to the global supply chain and increase financing costs. Furthermore, it is facing low credibility in the international market due to the recent default¹⁷ resulting from the policy adopted by the previous regime.

13. Petrobras, "BTG Pactual VI Latam CEO Conference - New York", October 1st, 2015, available at <http://www.investidorpetrobras.com.br/pt/apresentacoes/apresentacoes-gerais>.

14. Law nº 9.478, also known as the Petrobras Law of August 6, 1997.

15. A detailed explanation about the several regimes can be found in Camargo (2013).

16. Brazilian Central Bank, "Boletim Focus", November, 20, 2015.

17. Estado de São Paulo Newspaper, available at <http://economia.estadao.com.br/noticias/geral,agencia-sep-rebaixa-nota-da-argentina-para-default-seletivo,1536355>

The victory of Mauricio Macri, from the opposition party, in the presidential election of November 2015 raises expectations about the progressive normalization of the macroeconomic scenario and the resumption of more favorable policies for foreign investment.

Specifically in the oil and gas industry, the low reliability level was reinforced in 2012, when YPF Repsol's assets were nationalized and the government regained control over the sector's main company. Despite adopting the concessions regime, the State's interference is very significant.

In geological terms, Argentina has great potential in non-conventional resources in Vaca Muerta, in the Neuquen basin, whose volume details are shown in the "Potential of non-conventionals" section below. Among the positive aspects, the high average productivity of wells is noteworthy and is comparable to the best shale wells in the USA and there is margin for cost reduction per well of 25% to 30%¹⁸.

Although the prospects for the development of shale gas in Argentina compare its reserves with those being developed in the United States, their actual use will depend on the implementation of clear rules, both in the contracts to be signed with YPF as regarding price signaling.

VENEZUELA

Venezuela is going through a period of serious economic recession, high inflation and low private sector confidence, due to nationalizations and a price control policy. In addition, it faces a troubled political scenario, with claims of human rights violations and lack of transparency in the government.

Because it is very dependent on oil¹⁹, the economy has been seriously affected by the drop in oil prices (the fiscal break-even price for 2015 is estimated at US\$ 117.5 per barrel²⁰), increasing the need for a fiscal adjustment and flexibility of the exchange rate in order to soften the scenario of economic crisis.

Although disputed²¹, official data show total proven reserves of nearly 300 billion barrels of extra heavy oil and 5.6 trillion cubic meters of natural gas.

The Venezuelan regulatory framework is very peculiar. It provides for the creation of joint ventures that maintain all oil operations under PDVSA's control, either directly through the state-owned company or through equity control of the joint ventures. Anyhow, the recent evolution of national production illustrates the model's failure and that of policies in place. The lack of a perspective of change in this context in the short run leads Venezuela to lose relevance in the global oil and gas scenario, basically due to its own choices²².

18. Goldman Sachs, "Argentina: Tapping the Bakken of South America", 14 de outubro de 2015.

19. A indústria de O&G representou entre 90-96% das exportações venezuelanas nos últimos 7 anos e a receita fiscal gerada foi responsável por mais de 60% do total arrecadado pelo governo nesse período.

20. Deutsche Bank Research, "EM oil producers: breakeven pain thresholds", de 16 de outubro de 2014.

21. Forbes "How Big Are The Currently Known Oil Reserves And What Are The Chances Of Finding New Ones?", disponível em: <http://www.forbes.com/sites/quora/2013/03/27/how-big-are-the-currently-known-oil-reserves-and-what-are-the-chances-of-finding-new-ones/>.

22. Pode-se citar os subsídios do governo venezuelano às exportações de petróleo para Cuba e os subsídios na gasolina, que tornam esse combustível na Venezuela o mais barato do mundo, como apresentado pela Columbia University, em "Impact of the decline in oil prices on Venezuela", de setembro de 2015.

MEXICO

Mexico has good macroeconomic indicators, with a strong base industry and telecommunications, and wasn't largely affected by China's slowdown, given its greater dependence on the US. However, internally, it has serious problems of corruption in institutions and in state owned companies, high poverty and infrastructure bottlenecks.

Its oil reserves are both shallow and deep offshore, located in the Southeast part of the country - that is, in the Gulf of Mexico. This provides privileged access to leading suppliers of technology and offshore services, which operate in the US portion of the Gulf.

The key issue for exploring those reserves is the regulatory attractiveness. For a long time, Mexico had a system of service contracts, where the state-owned company, Pemex, had exclusive exploration and production rights and international operators acted as service providers, as well as other companies in the value chain.

After more than seven decades working in a regime that favored Pemex, the Mexican government approved the sector's opening in mid-2014²³. The schedule of auctions, as well as the areas and the contract model were made public and reform's transparency was praised. The auction process provides two very objective steps to minimize the arbitrariness of the process. First, the companies are analyzed for their qualifications, financial health, work program and minimum investment commitment. In the second step, the only criterion considered is the state's share in net income.

Upon completion of the placement of the first lot of Round One, with little success, the government provided positive reviews in the rules for the second phase of the bidding process, with greater predictability of minimum prices and easing of procurement rules. Thus, Mexico shows its belief that opening the sector can attract investment to the country in order to boost its production - which is declining for nearly a decade - and hence generate wealth for the country.

COLOMBIA

Colombia has a more favorable fiscal position than major neighbors, although the country's largest export sector has been affected by the fall in oil prices in the international market. However, the prospects for economic growth in the coming years are more resilient mainly due to the depreciation of the Peso and the incentive to export non-commodity products.

The country's proven reserves total 2.4 billion oil barrels and 2 billion cubic meters of natural gas, besides relatively unexplored offshore reserves - except for the Chuchupa field in the Guajira region.

Among the five countries presented, Colombia is the one that has the most efficient regulatory framework. The concessions regime presents a model of royalties and taxation that is attractive to international investments - like adjustment of rates based on production.

²³. *El País*, "O México acaba com o monopólio estatal de petróleo e gás" (Mexico ends its state monopoly on oil and gas), available at: http://brasil.elpais.com/brasil/2014/07/22/internacional/1405990229_685854.html

POTENTIAL OF NON-CONVENTIONALS

According to the study “*World shale gas and shale oil resource assessment*” of the American Energy Information Administration (EIA), the potential that can be exploited from unconventional reserves in the world is extraordinary. And Latin America stands as one of the regions with this potential, and Argentina as a major promise.

However, many infrastructure and regulatory difficulties, mainly related to the environmental aspect, must be resolved in order for these reserves to be developed. The hydraulic fracturing - required technique for extracting such resource - is considered of great environmental impact and the regulation of this activity is essential to the success of projects with non-conventionals. In addition, due to the logistics movement and the potential impact on local communities, the operations of non-conventional resources in areas of higher population density have faced strong public resistance²⁴.

As for infrastructure, Argentina seems to have the best conditions, since its shale reserves are in the same basin where oil and gas activities are already largely developed.

In Brazil, the onshore basins account for approximately 76% of the country’s total sedimentary basins area. However, due to the lack of data and exploratory activities in these basins Brazil’s true onshore potential remains unknown. Given the difficulties of expanding the exploration activity for conventional resources onshore, the boundary of the non-conventional becomes even more distant for the Brazilian E&P industry.

Among the three most promising sedimentary basins for non-conventional production in Brazil (Parana Basin, Solimões Basin and the Amazon Basin), the EIA estimates that the technically recoverable reserves for this type of production would be 245 trillion cubic meters. However, efforts like the 12th round of the ANP (Brazilian National Petroleum Agency) in 2013, which sought to encourage the exploitation of unconventional resources, were thwarted by the suspension of the exploration rights of unconventional resources by federal prosecutors as of 2014.

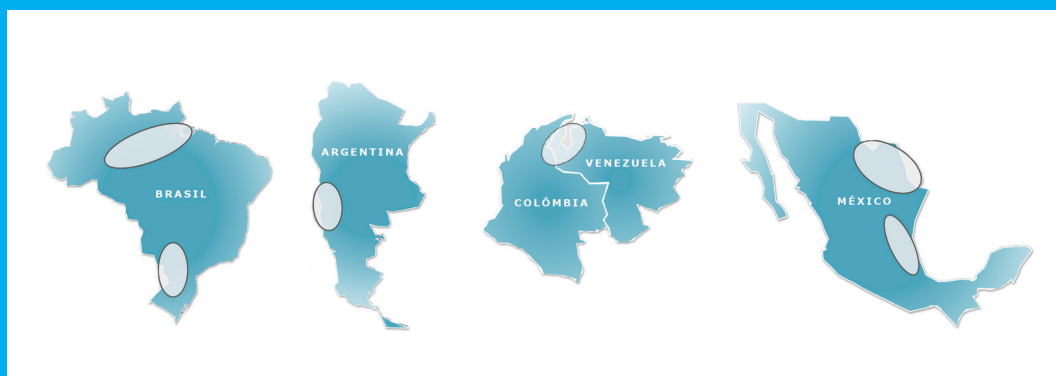
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²⁴. In some European countries, like France and Romania, the exploitation of unconventional resources was suspended. Available at: <http://shalegas-europe.eu/shale-gas-explained/shale-gas-and-europe/france/>

POTENTIAL OF NON-CONVENTIONALS IN MAJOR LATIN AMERICAN COUNTRIES

COUNTRIES	RESOURCES
Brazil	Parana Basin – estimated 4.3 billion oil barrels and 80 trillion cubic meters of gas. Amazonas/Solimões Basin – estimated 1.1 billion barrels of oil and 165 trillion cubic meters of gas.
Argentina	<i>Largest reserves located in the Neuquén Basin (Vaca Muerta and Los Molles), with estimated 20 billion barrels of shale oil and 583 trillion cubic meters of shale gas.</i>
Venezuela	Maracaibo Basin – located between Colombia and Venezuela, estimated at 15 billion barrels of shale oil and 202 trillion cubic meters of shale gas.
Mexico	Burgos Basin – estimated 6.3 billion barrels of oil and 393 trillion cubic meters of gas. Tampico Basin – estimated 5.5 billion barrels of oil and 23 trillion cubic meters of gas.
Colombia	Maracaibo Basin – located between Colombia and Venezuela, estimated at 15 billion barrels of shale oil and 202 trillion cubic meters of shale gas.

EIA, "World Shale Gas and Shale Oil Resource Assessment", 2013



THE CHALLENGE OF REGIONAL INTEGRATION AND ENERGY SECURITY

Many efforts have been made among some Latin American countries to increase the degree of energy integration in the region and optimize the use of each country's potential. What has been observed in practice, however, was a successful implementation of only a few of these projects, of which the pipeline Brazil-Bolivia (Gasbol), the Bolivia-Argentina gas pipeline and – opening the range to other types of energy – the Itaipu hydroelectric plant, a partnership between Brazil and Paraguay stand out. Other smaller projects can be cited, such as the Colombia-Venezuela pipeline and the Argentina-Chile pipeline.

The most notorious of such attempts is the “Gran Gasoducto del Sur”, which intended to connect, via a natural gas pipeline, Venezuela, Brazil and Argentina over 8,000 km with a total cost of up to US\$ 23 billion . Due to all the technical, regulatory and financial difficulties, the project never came to pass. In this sense, except for a few specific examples, the level of Latin American energy integration is scarce and mostly comes down to the sub-regional level.

Compared with other regions , Latin American countries stand comfortably with regards to energy security. In addition to relying less on fossil power generation sources , they have significant reserve

volumes and most of their demand is met by domestic production.

In general, the countries are relatively self-sufficient concerning to their oil needs.

In the case of natural gas, however, the situation is different. The imports of gas by pipeline represent significant volumes of the total domestic supply in countries like Mexico and Brazil , thus setting a greater risk of external dependence . On the other hand, the maturity of the gas sales contract between Brazil and Bolivia - in 2019 - could also jeopardize an important market for Bolivia.

In this context, LNG trade is put forward as an alternative for several countries in the region – gas producers and consumers. The existence of installed capacity of liquefaction and regasification ensures reasonable insertion of the region in the Atlantic and Pacific LNG trading markets. In addition to the exporting countries mentioned above, importers such as Mexico, Brazil, Argentina and Chile (in that order of importance) are included. The use of LNG, in many cases, enables the use of gas as an alternative energy, particularly for the supply of the electricity sector, presenting an alternative to the construction of expensive and complex pipelines.

25. BBC Mundo, “Sin gasoducto al Sur”, disponível em: http://news.bbc.co.uk/hi/spanish/business/newsid_7646000/7646941.stm.

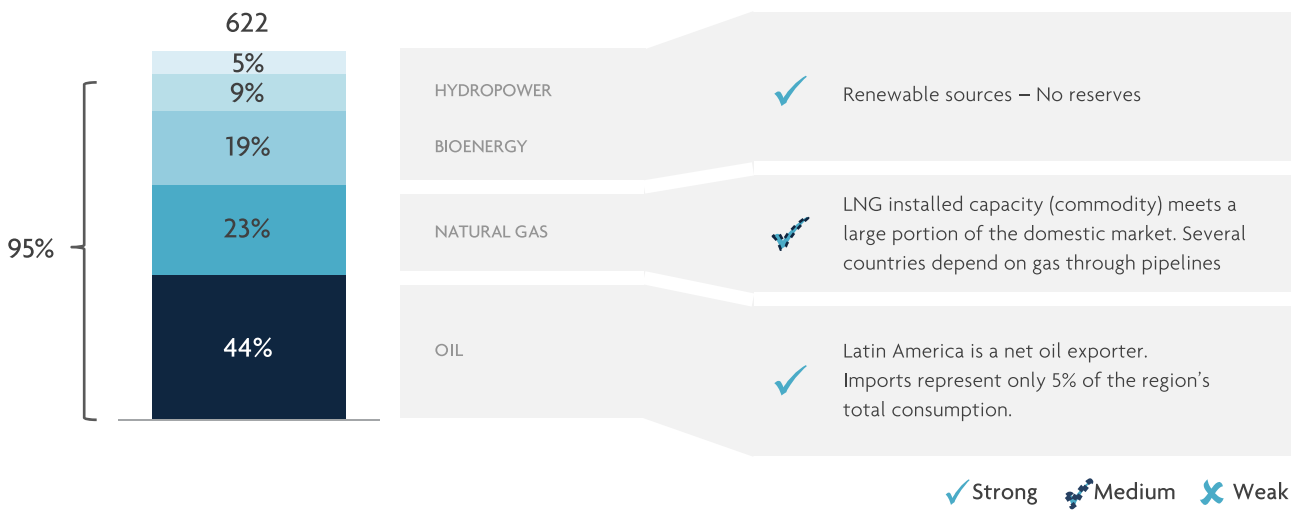
26. Na União Europeia, por exemplo, o aspecto estratégico das reservas tem uma relevância muito maior, dada a dependência do fornecimento de gás natural da Rússia – envolta em inúmeros conflitos políticos – e da energia nuclear, que em diversos países – como Alemanha, Suécia, Itália – está sendo progressivamente desativada e representa hoje 14% do consumo energético total (segundo IEA).

27. Representatividade de 70% (44% óleo, 23% gás, e 3% carvão), ante 82% globalmente (IEA).

28. Considerem-se as reservas descobertas brasileiras do pré-sal, as reservas estimadas da Venezuela, o potencial de petróleo e gás não convencionais nos países apresentados e as demais reservas existentes.

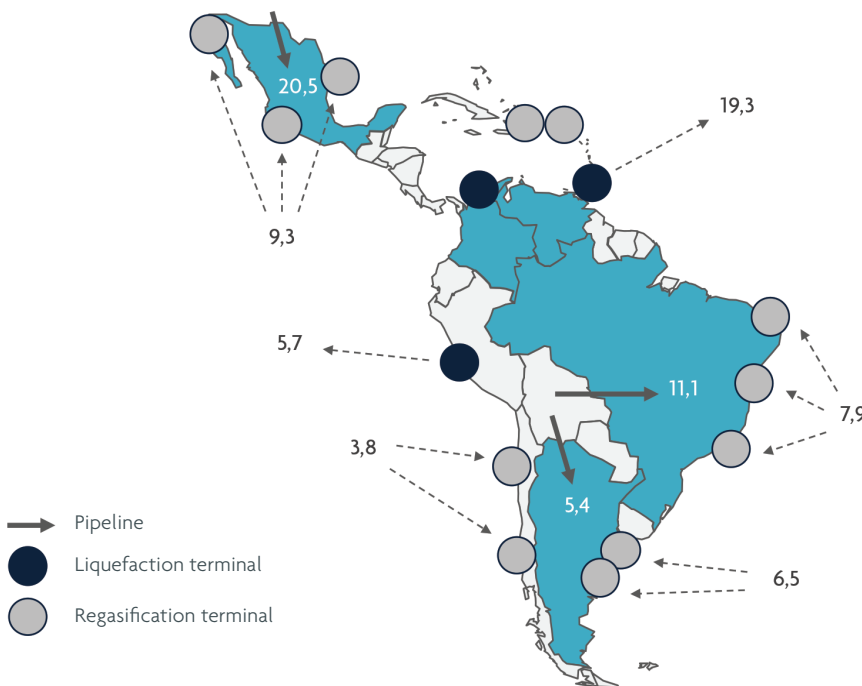
29. Segundo BP Statistical Review 2015, importações por gasodutos representaram cerca de 24% do consumo interno do México e 28% do Brasil.

FIGURE 9 – ENERGY DEMAND IN LATIN AMERICA, BY TYPE OF SOURCE IN 2013 (MTOE, % OF TOTAL) / LATIN AMERICAN INDEPENDENCE OF EXTERNAL RESERVES



IEA, WEO "Special Report 2015"; BP Statistical Review 2015 / NOTE - The remaining 5% include coal, nuclear and renewable, except hydro and bioenergy.

FIGURE 10 – GAS TRADE BY COUNTRY (2014, BILLION CUBIC METERS PER YEAR)



BP Statistical Review 2015; Global LNG Info, "World LNG plants and terminals" / NOTE – Colombian liquefaction plant under construction.

The determining factors for Latin America's low interest to promote energy integration are the technical difficulties to enable some projects, the perception of little need for integration, based on the availability of natural resources in each country, and a complex political context that hampers the implementation of integration initiatives by governments.

The first issue is intrinsically linked to Latin America's geography. To the north, Mexico can only connect to South America by an isthmus formed by some Caribbean countries and islands. To the south, an extensive area of the Amazon rainforest and the Andes Mountains form large natural barriers in addition to the enormous distances between production centers and consumers, which practically turn integration projects unfeasible.

The abundance of national reserves and other substitute energy resources in these countries also contributes to promoting the sense of energy security, at least in the short term and discourages the huge investments required for integration. This last factor could pose a future risk to the countries' energy security, considering that investments in production can require long periods of time and not follow a possible stronger growth in demand.

Finally, the political obstacles to the implementation of integration projects are closely related to the reduced capacity for coordination and implementation of local governments. Each country faces its own troubled political situation, which hampers the alignment of views and the coordination of efforts aimed at implementing large projects of regional integration. Similarly, macroeconomic difficulties faced by many Latin American countries lead to competition from neighboring countries in the region – both in selling products in the international market, but also in attracting foreign direct investment.

In face of the potential landscape of regional self-sufficiency in Latin America, the great challenge is how to ensure energy security for all the countries that it comprises. Although there are some factors that mitigate this need, the ideal alternative is greater integration between the countries, with the use of their potential.

FINAL REMARKS – LATIN AMERICA: COOPERATION OR COMPETITION?

The region historically shows a low appetite for energy integration, despite having relevant markets and attractive world-class geological assets.

These countries have had erratic behavior over the past decades, ranging from state control (known as petrostate - *petroestado*) and the liberalization of the oil and gas industry³⁰ at the mercy of fluctuations in oil prices in the international market.

In a context of lower prices and the need for industry efficiency, local governments find themselves under pressure to attract foreign funds to enable the development of reserves. In this context, it is important to focus on (i) the construction of a predictable regulatory framework that is compatible with the risk/return equation; (ii) the enforcement of contracts that meet the interests of the State and operators and (iii) the existence of a modern and efficient environmental legislation, that does not create unnecessary barriers to development.

Additionally, one cannot forget that climate policies resulting from international negotiations under the COP21 tend to represent an additional decision-making element on energy policies. There is a clear tendency to focus on low carbon-emitting energy sources and Latin American countries should take this into account when designing their energy scenario.

30. This will be further explored in the second part of the document in Roberto Castello Branco's text.



Major interventions aimed at energy integration in Latin America are unlikely in the near future due to the complexity and high costs of the infrastructure works that would be interesting from an energy point of view, and because of the each country's current relative independence in production/domestic consumption – or, rather, due to the inefficiency of local governments for its execution.

The macroeconomic and political environment of each country plays an important role in defining strategies for the energy sector and the efforts that can be aimed at energy integration. Despite the internal difficulties, however, Latin American countries are very privileged in natural resources, which ultimately offset much of the countries' inability to plan and execute projects in order to meet the population's energy demand.

Therefore, each country seeks to implement policies that increase the potential for exploration and development of its reserves, making it a direct competitor of the neighboring country, insofar as global resources are scarce.

There is no appreciation of cooperation nor the pursuit to establish a vibrant regional market, making Latin America a mere sum of individual interests in the energy sector. The place it occupies in the international arena is, thus, limited to the momentary attractiveness of each local reality.





The 2014/2015 Oil Shock: Its causes and implications

Roberto Castello Branco* / FGV Growth & Development

INTRODUCTION

Oil is the commodity with the highest market capitalization in the world. At average market prices, its production represented approximately 4% of global GDP in 2014, compared to just 1.25% for steel, the predominant industrial metal¹.

Oil serves 32.5% of the global consumption of primary energy, although the intensity of consumption, measured by the ratio between consumption and global GDP has fallen 57.6% in the past 35 years. Most of the oil production, about 63%, is intended for transportation, whereas power generation, in which investments are focused in non-renewable sources, accounts for only 5%.

In our opinion the analysis of the oil economy comprises at least four basic dimensions: environmental, geopolitical, technological and economic.

Albeit the declining contribution to global CO₂ emissions, to 35.6% in 2012 from 50.6% in 1973, mitigating these emissions is one of the factors that encourage investment in reducing the intensity of oil consumption, as in the development and production of flexible-fuel vehicles (gasoline/ethanol), hybrid electric vehicles (HEV) and battery electric vehicles (BEV).

On the one hand, geopolitical events can cause oil price shocks, and on the other, changes in oil prices have the potential to produce geopolitical implications insofar as they are perceived as permanent.

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¹. GDP calculated with market exchange rates.

Experience with commodity super price cycles suggests that oil prices are likely to remain “low for long”, although moderate recovery from current levels can occur

Concern about the relationship between oil and geopolitics acquired greater relevance with the transition of the global exploration and production center of the Gulf of Mexico to the Persian Gulf. The embargo practiced in October 1973 by the Arab members of OPEC against Israel and its allies is identified as one of the landmarks of the use of oil as an instrument of political power.

However, there are disputes regarding if the embargo had a geopolitical or economic motivation, as the oil price doubling in early 1974 would have occurred anyway: the expansionary monetary policy pursued at the time by the US fomented a widespread and significant increase in commodity prices. In addition, the embargo was lifted without the achievement of its political goal².

On the other hand, one could argue that the recent drop in oil prices may have helped induce the signing of the nuclear deal with Iran as well as the rapprochement between Cuba and the US, the latter in view of the deterioration of the Venezuelan economy and the consequent weakening of Petrocaribe.

The creation in the mid-nineteenth century of the United States Geological Service (USGS) was a turning point in the technology of exploration and

production of oil. Recent advances in “ultra deep water” exploitation, such as the pre-salt, and the domain of “hydraulic fracturing/horizontal drilling”, are additional evidence supporting the hypothesis of endogeneity of mineral resources. Technological innovations respond to price incentives and reveal an important source of expansion of oil supply, demystifying the idea of “peak oil” or the so-called “natural resource Malthusianism.”

Our approach is focused on the analysis of the determinants and effects of the recent price shock on the global economy and oil industry in Latin America.

In section 2 the price movement is examined in the context of the economics of natural resources, which provides a theoretical and empirical framework to analyze the behavior of commodity prices over time.

At the root of the price shock is the revolution of the shale oil whose expansionary effect was sanctioned by Saudi Arabia’s decision not to play the role of “swing producer”. Per se, such a revolution produces structural changes in the oil economy, which involves, for example, the likely increase of price elasticity for short-term bid prices and the increase of relative operation costs in determining the break-even price.

2. See Barsky and Killian (2001).

Experience with commodity super price cycles suggests that oil prices are likely to remain “low for long”, although moderate recovery from current levels can occur.

In section 3, we describe how the end of the oil price super cycle adversely affects the economies of the exporting countries through the temporary and permanent components of economic growth. By the degree of dependence on exports and oil tax revenues we try to assess the relative intensity of the short-term negative economic impact caused by the price drop.

For various reasons, we believe that the vulnerabilities of the Venezuelan economy, whose GDP has contracted by 4% last year, make it the country in Latin America to be most adversely impacted by the dynamics of oil prices.

Finally, we try to draw some lessons applicable to public policies in Brazil and Latin America in general.

THE DETERMINANTS OF THE SHOCK IN OIL PRICES

Economists separate time series of real commodity prices in two components: long-term trends and cycles. In turn, the cycles are divided into two categories: short-term and medium-term, the latter known as “super cycles” due to their longer persistence.

Following the downward trend between the mid and late nineteenth century, the empirical evidence - Jacks (2013) - shows that since 1900 oil prices started a rising long-term trend, with cumulative increase of 614% in the period 1900-2010 and 355% from 1950 to 2010.

The short-term cycles, which are determined by the macroeconomic business cycles, vary between 2 and 4 years of length and are characterized by high price volatility.

The “super cycle” phenomenon, which could take between 10 and 25 years, is characterized by prices consistently above the long-term trend. Such cycles are caused by demand shocks arising from the combination of faster economic growth and a simultaneous increase in commodity consumption intensity, given the low price elasticity of supply in the short term, typical of non-renewable natural resources.

The economic literature identifies three “super cycles” of real oil prices since the early twentieth century: 1900-1920, 1960-1980 and the last one, which started in the late twentieth century and probably came to an end in 2014 . The low frequency of these cycles is related to the low frequency of global demand shocks, which suggests that despite the response of investment to lower prices the recent shock is likely to persist for a reasonable number of years.

The super cycles tend to be positively correlated to historic events, such as industrialization and urbanization/suburbanization in the USA, the recovery of the European economy after the war and the acceleration of Japan’s and China’s economic growth.

Despite the fact that commodity price movements - mainly those of mineral origin - register the phenomenon of “co-movement” induced by common factors such as the acceleration of global economic growth, the end of the last super cycle showed distinct characteristics when comparing minerals and metals with oil.

3. See, for instance, Cuddington (2012) and Jacks (2013).

The prices of most minerals and metals peaked in the first quarter of 2011 and then started a declining trend, which was softer than that of oil prices. For some commodities, such as iron ore and coking coal, the accumulated reduction in prices over four years was 70%, higher than the recent reduction experienced by oil prices. The end of the latter's super cycle manifested abruptly, with a decline of approximately 55% for the most part concentrated in the second half of 2014.

The overall global investment in mining reached a peak in 2012 with US\$ 130 billion while in the oil industry it is estimated to have happened in 2012, when it reached \$ 450 billion.

It is possible to argue about explanations for the difference in standards between metal commodities and oil in the process of falling prices. While the former's demand derives from industrial production, whose expansion pace slowed down gradually and almost concurrently to the growth in global supply for those commodities; with oil the role of OPEC, an organization that has no parallel in mining, was critical to convey the excess global supply to prices.

According to econometric estimates, the drop in oil prices was determined by slower growth in demand – 1/3 of the reduction – derived from the slowdown in economic growth of China and major emerging economies, and the remaining 2/3 are associated with the response of supply to the high price incentives, typical ingredients of the end of a "super cycle"⁴.

The hypothesis of "financialization" – speculation by financial investors on commodity exchanges – does not find empirical support in studies on commodity prices. In this particular situation, according to the IEA, world oil inventories stand at very high levels since 2013.

Between 2010 and 2014, US production increased by 3.8 million barrels per day (Mboed), a volume greater than that produced annually by traditional producers such as Nigeria, Kuwait or the United Arab Emirates. The US has surpassed Saudi Arabia and Russia as the world's largest oil producer. The US was the first country in history to record an increase in production of over 1 Mboed for three consecutive years.

The major part of this movement stems from the shale oil and gas revolution that resulted from technological innovations in the regulatory environment encouraging private investment. It did not simply place the US in the lead of global oil production, but allowed significant productivity gains and cost reduction, whose potential has not been fully perceived.

Despite higher costs than in the Middle East, for example, the projects for shale oil are less capital-intensive, their risks are relatively low and the revenue flows start sooner than in a conventional or deep water project, which increases the relative importance of operation costs and raises expected rates of return.

In this structural transformation environment, the rational response of Saudi Arabia was to give up its traditional role of "swing producer", which if exercised would lead it to give up market share and profits for the benefit of less efficient producers. Thus, OPEC validated the supply shock, which was mainly promoted by the expansion of US production.

At the moment, the global oil industry has two major producers: Saudi Arabia and the USA, with two remarkable features.

Both have excess capacity that can be quickly activated. Saudi Arabia is a very low cost producer, while the US has costs that have recently

4. See, for example, *World Economic Outlook*, April 2015.



dropped significantly and a potential for additional declines, given that the technology of “fracking” is still in development.

THE ECONOMIC EFFECTS OF THE PRICE SHOCK

The estimated impact of the reduction in oil prices on global economic growth in 2015 is limited to 0.3-0.5% of GDP, equivalent to US\$ 350/500 billion.

This is explained by the fact that although the oil-importing countries have a much larger share of global GDP than exporters, the positive impact on the former is far lower than the negative effects on the economies of the second group. Among the greatest beneficiaries are the US, Japan, China,

South Korea and India, the top five importers, but whose ratio of oil consumption/GDP is relatively limited, being respectively, 3.8%, 4.0%, 5.4%, 3.8% and 7.5%.

For countries that fully transfer the international prices to the domestic consumer there was an increase of disposable income, causing a positive impact on consumption and aggregated demand.

Countries that subsidize the consumption of oil byproducts, such as India (diesel) and Brazil (all but jet fuel), the price adjustment for the removal of subsidies was softened by the 50% drop in international oil prices. If on the one hand there was a loss of disposable income, on the other, distortions that implied in misallocation of resources, damaging to economic growth were eliminated⁵.

⁵ In the case of Petrobras, pricing of oil products consistently below international prices led to billion-dollar losses.

The US and Brazil are noteworthy cases. Apparently, the main economic effect for the US economy originated from the shale oil revolution, is estimated to have caused net benefits of US\$ 2.5 / 3.0 trillion, which is equivalent to about 1.5 times the Brazilian GDP⁶.

The Brazilian experience differs from that of the US. While the institutional environment was very favorable to the shale oil revolution, in Brazil it was largely responsible for the huge losses sustained by Petrobras, who in the middle of the past decade has made the largest discovery to date in ultra deep waters. Price controls of oil byproducts, high investment costs in the downstream and the demand for local content combined with poor governance were typical ingredients of an episode of the so-called "natural resource curse".

This suggests that mastering advanced technology is a necessary condition but not sufficient for success in the development of oil projects. The quality of the institutional environment is a key element in determining the success of exploration and oil production activities.

In the short term, the effects of the end of the super cycle in prices are transferred to producers through exports and public finances.

Oil exports account for a very high percentage of total exports in Libya (97%), Equatorial Guinea (90%), Algeria (88%), Nigeria (87%), Saudi Arabia (86%), Qatar (82%), Venezuela (82%), Kuwait (72%), Iran (79%), Oman (78%), Gabon (66%), Kazakhstan (57%) and Russia (50%). The magnitude of the negative shock will depend on



6. See E. Gilje et al (2015).

exchange rate policies. The more rigid the exchange rate, the greater the effect, such is the case in Venezuela. The more flexible the exchange rate regime, the lower the effects will be, such is the case in Russia, Nigeria and Colombia, which have let their currencies devalue.

African producers such as Equatorial Guinea and Libya, and the Middle East – Iraq, Qatar, Oman, Bahrain, Kuwait and Saudi Arabia – have public finances extremely dependent on revenues from oil, which account for 70% to 90% of their fiscal revenues.

The prices necessary for a balanced budget – “break even fiscal prices” – are above US\$ 50 per barrel in most exporting countries, reaching levels around US\$ 120 in countries like Iran, Iraq, Algeria and Bahrain. The boom years have promoted strong growth of public spending, which contributed to raising the “break even prices” compared to the beginning of the cycle, accentuating their vulnerability.

Among the producers in Latin America, except for Venezuela, the average dependence of economies on oil prices is much lower than in Africa and the Middle East. In Colombia, revenues from oil account for roughly 15% of total tax revenues, and in Ecuador, Mexico and Bolivia, they stand around 25 to 35%.

It is estimated that the most affected economy in the region is Venezuela, whose vulnerability is derived from high exposure to the volatility of oil prices and the distortions associated with State intervention in the economic activity added to hostility towards the private sector that led to the

deterioration of the domestic economic environment even before the price shock.

IMF estimates indicate that the actual product loss accumulated in Venezuela between 2014 and 2016 will reach 17%, which, if confirmed, resembles an episode classified as a “rare macroeconomic disaster”⁷.

The accumulation of assets during the super cycle mitigates the effects on public finances, as in the case of Norway and the GCC countries. Gulf countries have invested in diversifying their economies, seeking expansion of the manufacturing and services industries.

While in developed economies cyclical fluctuations tend to constitute deviations from a stable of long-term trend, in emerging economies – group that the oil exporters belong to – the long-term trends show volatility, as the recessions often convey strong fluctuations for total factor productivity, the main source of expansion of economic activity in the long run^{8,9}.

Thus, to enable a more appropriate view of a longer-term perspective it is worth considering that by directly contributing to the increase of terms of trade of exporting countries – increasing export prices relatively to imports – the effects of a commodities’ super cycle affects the real product growth through its cyclical (temporary) and structural components (permanent).

The gains in the terms of trade produce real income increases which in turn influence the expansion of consumption, which can lead GDP growth in the short term to overcome the capacity for growth in the long run, which is given by physical and human capital and total factor productivity.

7. In this respect, see Barro, R. and Ursua, J, (2011).

8. Few are the important developed oil exporting economies, such as the noteworthy Canada, Norway and Australia.

9. Total productivity of factors corresponds to the efficiency of how the production factors, physical capital and human capital are combined.

The almost systematic adoption of pro-cyclical fiscal policies by governments of oil exporting countries – through deficit increase during the expansion phase of the cycle and reduction in the contraction phase – tends to accelerate growth above its potential capacity during the high price cycle. In contrast, the pro-cyclicality of fiscal policy contributes to deepen the recessionary effect of the 2014/2015 price shock, as governments begin to lack the resources to stimulate demand in order to soften the macroeconomic effect of the negative price shock.

Another element that leads to temporary growth increase is the use of fixed or administered exchange rates, a mechanism that prevents at least partially the appreciation in real terms of the exporting country's domestic currency. When flexible exchange rates are in place, the gain in terms of trade produces real appreciation of the domestic currency, which in turn negatively affects the sectors producing tradable goods and services, moderating expansion in the short term, making it more aligned to the potential capacity.

To the extent that economic agents interpret the high oil prices as a long lasting event, investment in the sector and its supporting activities such as transportation, infrastructure, services, machinery and equipment, tend to increase, contributing to expanding growth capacity in the long run.

Another effect of a more permanent nature is achieved through the incentives for increased labor participation in the workforce and investment in human capital via education and training.

Finally, a super cycle encourages the use of technological innovations, the increase of investment in research and development and inter-sectorial reallocation of capital and labor, which tend to

positively influence total factor productivity and therefore economic growth in the long run.

Of course, the relative magnitude of the effects on the cyclical and structural components of real product growth depends on the specific conditions of each economy. However, the end of a long cycle of high prices leads to the reversal of its positive effects on growth and, especially for countries that have adopted inappropriate policies, it leads to the shift of the growth trend to a path of lower rates in the long run.

In Venezuela, which has the largest proven oil reserves in the world, production fell by 600,000 Mboed in 10 years. This suggests loss of productivity and underinvestment, which can be attributed to the massive emigration of human capital and imposition of considerable restrictions on the operation of the relative price system and it is quite likely that the super cycle has not brought any structural benefit¹⁰. Rather, it is very probable that in the absence of deep structural reforms the Venezuelan economy faces long-term prospects that are much more modest than in the past.

The IMF estimates that the shock in oil prices will produce an average contraction of 2.25% per year in GDP of exporting countries in the period 2015/2017, when compared to the period 2012/2014. Of course, the intensity of the downturn will vary up or down depending on the dynamics of each oil-exporting economy.

CONCLUSION

This brief analysis allows us to say that specialization in the production of commodities such as oil, and therefore the exploitation of comparative

¹⁰ There is evidence of migration from Venezuela to other countries, especially the US and Colombia, of oil engineers and geologists since 2003.

It is estimated that the most affected economy in the region is Venezuela, whose vulnerability is derived from high exposure to the volatility of oil prices and the distortions associated with State intervention in the economic activity added to hostility towards the private sector that led to the deterioration of the domestic economic environment even before the price shock

advantages, benefits long run economic growth provided that some conditions are met. Among these, we highlight the investment education, the adoption of fiscal responsibility and counter-cyclical fiscal policies, the adoption of a floating exchange rate regime and the creation of a friendly environment for private investment, innovation and realization of efficiency gains.

The combination of emphasis on mineral education, research and development and a legal and regulatory framework favorable to entrepreneurship and competition has historically been a hallmark of the American oil industry. The recent experience of successful exploration of shale oil gives us another example of the relevance of the good quality of institutions for the development of the oil industry, whose principles can be at least partially applicable to Latin America.

The region holds 19.4% of proven oil reserves in the world, second only to the Middle East, but still represents only 8.6% of global production. As a

consequence, Latin America displays the highest ratio proven reserves/production, over 100 years, among all regions.

A long cycle of high commodity prices often leads rulers and producers to believe that the price movement is a structural feature rather than cyclical.

Such an illusion is in the base of wrong management decisions such as contempt for cost control and asset acquisitions merely driven by the goal to grow, whose negative implications are masked in the short term by the rising price outlook.

Similarly, politicians come to see natural resources as inexhaustible sources of wealth regardless of the efficiency with which they are exploited. This conception gives rise to the so-called "natural resource nationalism," which usually translates into nationalization of assets, restrictive regulations for private investment and for productivity gains and excessive taxation.

This not only prevents the maximization of gains offered by the expansion of global demand, as it sharpens the negative impact of the end of the high price cycle, exposing the oil industry to an asymmetry of risks in which the “downside risks” outweigh the “upside risks.”

Needless to say how much these distortions are present in the oil and gas industry in Latin America. In this cycle we witnessed nationalization and/or expropriation in Venezuela, Bolivia and Argentina and the considerable increase in state intervention in the Brazilian oil industry.

In a much lower price environment than what was seen in the past decade - and that will likely persist for a long period of time - it is essential to carry out structural reforms that enable the efficient exploitation of the resource potential of Latin America and contribute to sustainable economic growth.

In this field, even during the super cycle, Colombia and Peru tried to create institutional conditions for the industry to flourish. With the energy reform, Mexico is taking steps in the right direction to loosen the state monopoly that exists since 1938.

Argentina, which has enormous potential in the exploration of natural gas, after the expropriation of YPF seems to signal towards the adoption of more liberalizing policies but is faced with lack of credibility due to the long history of disrespect for contracts and rights of property by the federal government and provinces.

In Brazil, the requirement for local content and the high complexity of the certification process constitute high risk factors and costs for the investor and hamper the efficient exploitation of existing resources. Similarly, the sharing scheme, which also involved the creation of another state-owned enterprise and the obligation of Petrobras to be the sole operator and invest at least 30% of each bid block is inhibiting investment and does not lead to maximizing government revenue.

In addition, the complex legislation for environmental licensing involves long delays in project development and reduction of return rates.

The inadequacy of regulation directly affects the oil industry and generates negative spillovers to the rest of the economy, adversely affecting economic growth.



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