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More documentation related to this discussion can be found at: [oe.cd/cmkt](http://oe.cd/cmkt).

Please contact Ms. Lynn Robertson [E-mail: [Lynn.Robertson@oecd.org](mailto:Lynn.Robertson@oecd.org)], if you have any questions regarding this document.

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## *Competition for-the-market*

### *Liquefied Petroleum Gas Market Regulation in Ecuador*

#### **- Contribution from Ecuador\* -**

#### **1. Introduction**

1. At the moment of developing competition policy for a State, the diverse stakeholders that intervene in the market should address the following questions: At what level should the government intervene in the market? and, Would State regulation allow for an increased competition level on a determined market? Economic theory shows that markets with a large participation of economic operators (understood as enterprises), have a greater competitive pressure, which translates into better prices and quality of the offered goods and services.

2. Nevertheless, there are markets that due to their structure or characteristics, face an imperfect competition (a lack of certain competitive characteristics) in their condition of “perfectly competitive price takers”. In light of this lack of competition, state intervention is required in order to safeguard the public interest.<sup>1</sup>

3. Within “for the market” cases, on which an economic operator gets the totality of the market, we find natural monopolies in which, because of the economies of scale within the specific market, it is more efficient for a lone operator to offer the good or service instead of several operators. This market structure establishes challenges for the competition agencies regarding regulation.

4. This article contains three sections, the first one refers to the definition and characteristics of natural monopolies which allows the understanding of the causes and difficulties for the entrance of new operators in this kind of markets. The second section focuses on the structure and economic policy of the liquefied petroleum gas (GLP) in Ecuador. The third section will expose the problems and challenges that the Superintendency for Market Power Control faces when analyzing natural monopolies.

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\* This contribution was prepared by Pablo Carrasco Torrontegui and Patricio Pozo Vintimilla.

The opinions contained in the present article are of exclusive responsibility of the authors and do not represent the vision or a statement of the Superintendency for Market Power Control. The authors appreciate the comments of Gabriela Arias and Francisco Urresta of the Superintendency for Market Power Control.

<sup>1</sup> Scientific Background on the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2014, Jean Tirole: Market Power and Regulation, compiled by the Economic Sciences Prize Committee of the Royal Swedish Academy of Sciences (Oct. 13, 2014) available at [http://www.nobelprize.org/nobel\\_prizes/economic-sciences/laureates/2014/advanced-economicsciences2014.pdf](http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2014/advanced-economicsciences2014.pdf). (here and after, Jean Tirole: Market Power and Regulation)

## 2. Natural Monopoly and competition policy

5. A natural monopoly is the situation in which an economic operator in a market shows the following characteristics: a) Economies of scale present on, b) any production level; and, c) on the long term.<sup>2 3</sup>

6. This situation results in only one firm being able to provide the total production of a market at a lower cost than several firms would offer on the long term. This condition is also known as: “Subadditivity of the costs function within the market”<sup>4</sup>, expressed in the form of:

$$CT(Q) < CT(q_1) + CT(q_2) + \dots + CT(q_n)$$

- Where:  $CT(Q)$  is the total production cost
- $CT(q_1) + CT(q_2) + \dots + CT(q_n)$  is the sum of the costs of each operator
- “n” is the number of operators that take part in the market and is equal or higher than 2,  $n \geq 2$ .

7. In other words, the formula represents that the total production cost is lower when only one economic operator makes the whole production, than when two or more operators share a part of the total production within the market.<sup>5</sup>

8. Form the production standpoint, the natural monopoly is efficient for the society if only one operator generates the whole of the production because the entrance of new competitors could increase the total average production cost.

9. On the other hand, regarding potential competitors, there are high entry barriers that make it harder to take part in this kind of markets, such as investment on infrastructure and qualified labor force for starting operations, in comparison with an economic operator that is already in the market and would have some cost advantages.<sup>6</sup>

10. “A theory of social welfare” explains how political and economic forces shape the institutions that are in charge of eliminating market distortions, regulating the market for an optimal resource allocation and, by default, avoiding a configuration of negative results

<sup>2</sup> Goolsbee Austan, Steven Levitt and Chad Syverson. Microeconomics. New York: Macmillan Higher Education Company, 2013. p. 287.

<sup>3</sup> Baumol defines natural monopolies as: “An industry in which multifirm production is more costly than production by a monopoly (subadditivity of the cost function)”. Baumol William, “On the Proper Cost Tests for Natural Monopoly in a Multiproduct Industry”, The American Economic Review, Vol. 67, No. 5, 1977, p. 810.

<sup>4</sup> Joskow Paul, “Regulation of natural monopoly”, in Handbook of Law and Economics, Volume 2, Edited by A. Mitchell Polinsky and Steven Shavell, Elsevier, 2007, 1232 – 1234.

<sup>5</sup> It is important to clarify indicate that, at the moment of analyzing subadditivity, it should be focused in a single production level that not necessarily reflects all production levels, which would be called “globally subadditive”. Greener Monica, “Chapter 2 - The Theory of Natural Monopoly and Literature Review”, in Electricity Marginal Cost Pricing, Elsevier, 2012, p. 15. DOI: 10.1016/B978-0-12-385134-5.00002-8.

<sup>6</sup> Perloff M. Jeffrey, “Monopoly and Monopsony”, in D’Ambrosio A. & Mann P, Microeconomics Theory and Applications with Calculus, Fourth Edition, Edinburgh Gate: Pearson Education, 2018, pp. 406-407.

such as the abuse of dominant position within a relevant market<sup>7</sup>. Nevertheless, the implementation of regulatory mechanisms that aim to increase the number of economic operators does not result in a viable option to generate more competitive pressure on natural monopolies<sup>8 9</sup>, because of the aforementioned conditions.

11. In the Ecuadorian case, one of the markets that present such characteristics is the liquefied petroleum gas (GLP) which is analyzed in the next section.

### 3. The GLP market in Ecuador. Structure and thoughts

12. As an introduction, we must state that the Constitution of the Republic of Ecuador, in its article 323 establishes that natural non-renewable resources such as natural gas and petroleum, are strategic sectors for which the State reserves for itself the exclusivity over its regulation and administration<sup>10</sup>.

13. In Ecuador, the GLP market is composed by the upstream market that consists in production and imports, and on the other hand, we find the downstream market consisting in the internal commercialization stage of the product.

14. The situation is reflected in the following figure:

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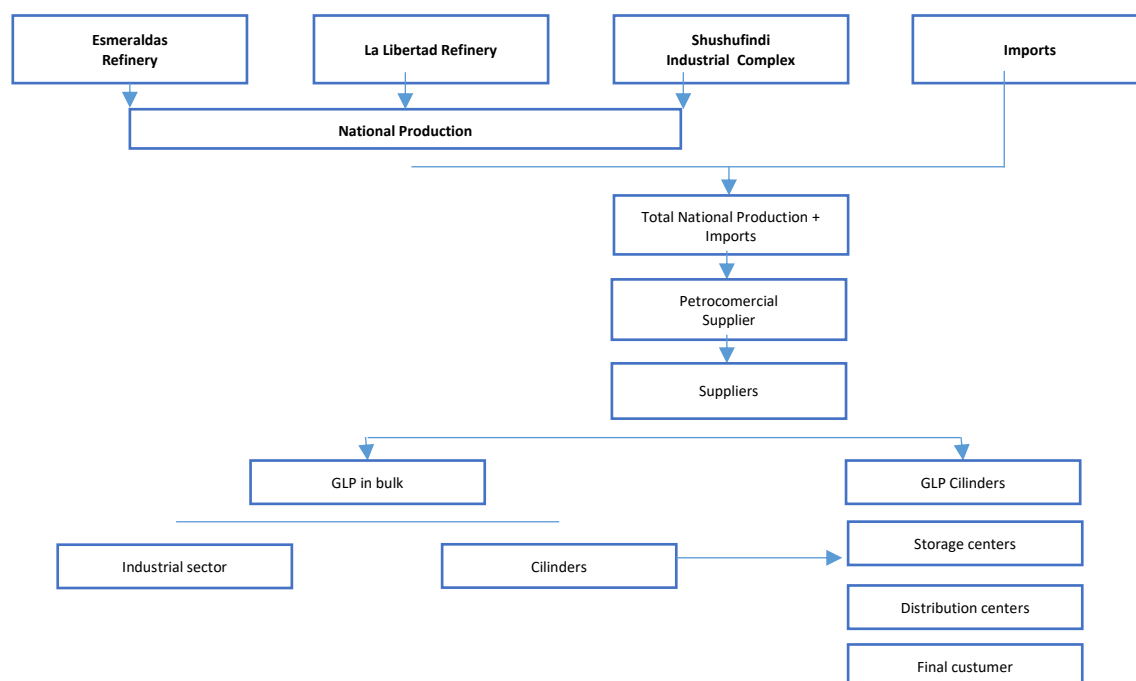
<sup>7</sup> Fornalczyk Anna, "Regulation of a Natural Monopoly in Theory and Practice," Yearbook of Antitrust and Regulatory Studies 4, 2011, pp. 239-244.

<sup>8</sup> Posner Richard, "Natural Monopoly and Its Regulation", 21 Stanford Law Review 548, 1968, 548 – 550.

<sup>9</sup> At the moment of developing competition policies, public administration must solve the information asymmetry in front of the monopolist agents that has a wider knowledge of the market. This situation is reduced in a large degree because Ecuadorian State has exclusive operation in producing an exporting liquefied petroleum gas. Coase Ronald, "The Nature of the Firm", Economica, Blackwell Publishing, 1937, 386 - 340.

<sup>10</sup> Article 313.- The State reserves the right to administrate, regulate, control and manage strategic sectors, accordingly to the principles of environmental sustainability, precaution, prevention and efficiency. Strategic sectors are the ones exclusively controlled and decided by the State, which based on their magnitude and transcendence, have decisive economic, social, political and environmental influence and should be oriented toward the comprehensive development of rights and the social interest. The sectors considered strategic are energy in all its forms, telecommunications, non renewable natural resources, hydrocarbur transport and refination, biodiversity, genetic patrimony, radioelectric spectrum, water and others determined by the law. Constitution of the Republic of Ecuador, R.O. 449, October, 20th 2008.

Figure 1. Ecuadorian GLP market supply chain



Source: Petrocomercial EP.

15. In the GLP downstream market, there are 11 competing economic operators<sup>11</sup>, nevertheless, the GLP upstream market is exclusive for the Ecuadorian State through the public enterprise PETROECUADOR EP.<sup>12</sup>

16. In this sense, GLP distribution destined to the domestic sector constitutes 67% of the market, while 27% is destined to the generation of electricity and the production of ceramic, and the remaining 6% is destined to agribusiness and vehicles<sup>13</sup>.

17. On the other hand, since 1992, the Ecuadorian State subsidizes around 80% of the value of the service of domestic use GLP<sup>14</sup>. This situation is particularly important because

<sup>11</sup> Executive Decree 2282, published in the Official Registry 508 of February 4 2002.

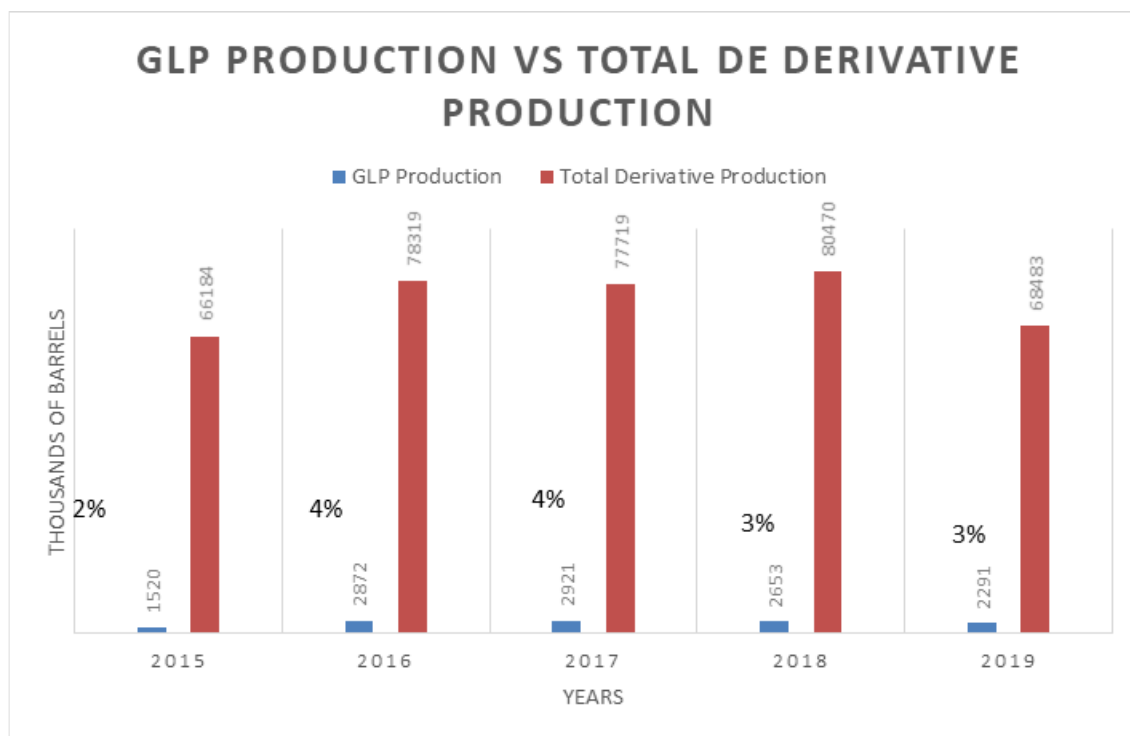
<sup>12</sup> According to the Hidrocarbure Law and the Executive Decree 315, PETROECUADOR EP is in charge of: the transportation, refinement, internal and external commercialization of crude oil and its derivatives. Referencia: <https://www.eppetroecuador.ec/wp-content/uploads/downloads/2019/01/Plan-Estrategico-Empresarial-2018-2021-Act-2019-Aprobado-mediante-resoluci%C3%B3n-DIR-EPP-03-2019-01-16.pdf>.

<sup>13</sup> Boletín estadístico de la actividad hidrocarburífera correspondiente al año 2016, Agencia de Regulación y Control Hidrocarburífero, [https://www.controlhidrocarburos.gob.ec/wp-content/uploads/downloads/2018/02/BOLET%C3%8dN-ESTAD%C3%8dSTICO-2016\\_11.pdf](https://www.controlhidrocarburos.gob.ec/wp-content/uploads/downloads/2018/02/BOLET%C3%8dN-ESTAD%C3%8dSTICO-2016_11.pdf), p. 50.

<sup>14</sup> Ecuador is the country with the highest level of subsidies to fossil fuels as percentage of the GDP in Latin America. In 2011, Ecuador destined 6,31% of GDP for petroleum derivatives and 0,18% for subsidies to electricity. Andrés Martínez Sojos et al, "Subsidios a los Combustibles Fósiles en Ecuador: Diagnóstico y Opciones para su Progresiva Reducción", Revista Iberoamericana de Economía Ecológica, Vol. 28, No. 1, 2018, pp. 87-106. <https://www.raco.cat/index.php/Revibec/article/view/338980>.

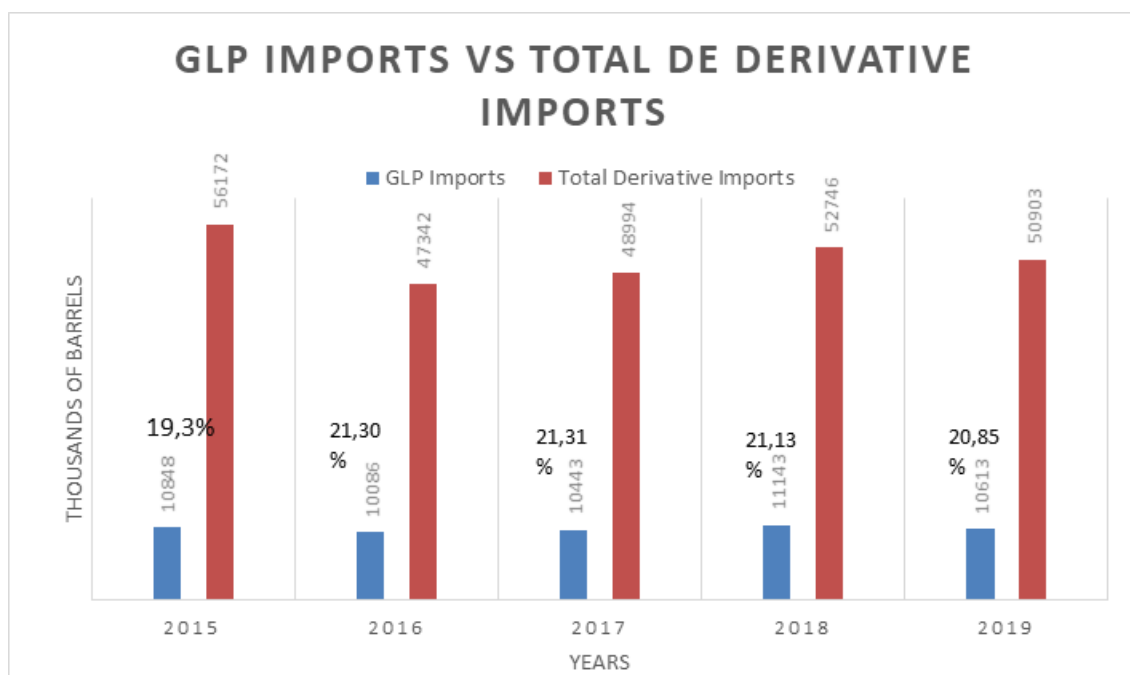
approximately 85% of the GLP that is consumed in Ecuador is imported and the remaining 15% is locally produced, as shown in the following figures:

**Figure 2. GLP Production and Derivatives**



Source: Petroecuador EP (Statistical reports, public database).

**Figure 3. GLP Imports and derivatives**



Source: Petroecuador EP (Statistical reports, public database).

18. In 2018, the domestic sector that uses GLP registered a 2,88% growth in comparison to 2017, which represents a consumption of 13% of the national demand.

19. In this sense, the national hydrocarbons production compared with GLP as for its import and export prices are highly superior to the national commercialization prices, for which, GLP subsidies reached USD 582 million in 2017 and USD 780 million in 2018 with a forecast of USD 764 million for 2019<sup>15</sup>.

20. Finally, in the case that the Ecuadorian State decides to grant a concession to a private economic operator, looking to allow its participation in the GLP upstream market, the operator will have to face high entry barriers such as investment in infrastructure for fuel production, storage and importation, for which this market presents characteristics of a natural monopoly.

#### **4. Challenges for the Superintendency for Market Power Control of Ecuador. A new approach to GLP market regulation.**

21. The Ecuadorian GLP market presents a wide and complex regulation, for which, when issuing norms that could affect market conditions with the intention of increasing competition levels; those norms should consider the real conditions of this market, incorporate the issues regarding capital distribution within a State and the social costs it generates.

22. One of the challenges for competition authorities around the world, is the regulation level that should exist in order to prevent the monopolist from abusing its market power, exploit and reduce consumer surplus, effectively affecting the welfare of the society, yet, avoiding that this regulation provokes the monopolist to exit the market<sup>16</sup>.

23. Issuing an optimal regulation that favors competition conditions requires an effort of institutional strengthening regarding economic statistical analysis that incorporates tools such as game theory and behavioral economics.

24. Having in mind the economic situation Ecuador is currently facing, it is important for the National Government to evaluate the balance of payments, and the need for increasing the local production of GLP for the internal market in order to achieve a gradual reduction of the imports volume.

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<sup>15</sup> The final subsidy in each scenario belongs to the real values provided by Petroecuador EP, from 2018 onwards. This quantity was calculated by multiplying the GLP demand times the forecasted subsidy per gallon or kilogram. The data was obtained from the Central Bank of Ecuador, Petroecuador EP, OPEC and the International Monetary Fund, it was made by Petroecuador EP. [https://www.finanzas.gob.ec/wp-content/uploads/downloads/2019/07/Presentacio%CC%81n\\_BID\\_BPE-1.pdf](https://www.finanzas.gob.ec/wp-content/uploads/downloads/2019/07/Presentacio%CC%81n_BID_BPE-1.pdf).

<sup>16</sup> Op. cit; Jean Tirole: Market Power and Regulation.

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