University of Azuay

Faculty of Law

School of International Studies

"DETERMINATION OF FACTORS THAT EXPLAIN FOREIGN DIRECT INVESTMENT IN ECUADOR DURING 2007-2019"

Graduation work prior to obtaining Bachelor's degree in International Studies with a bilingual mention in Foreign Trade

Authors:
Daniel Samaniego Crespo,
José Sarmiento Beltrán

Director:
Econ. Luis Pinos Luzuriaga

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ABSTRACT

Despite the benefits that a country may get because of receiving foreign direct investment (FDI), such as: job growth, the creation of a more competitive market, the provision of financing and technology; Ecuador is currently one of the Latin American countries that receives the least capital from abroad. This is because the country does not have the necessary conditions that allow it to be an attractive destination for foreign investors. For this reason, in order to determine the factors that explain FDI in Ecuador during 2007-2019, it will be carried out a process that begins by collecting theoretical information, to later contrast it with data on the attraction of FDI in Ecuador, to finally apply a multiple regression analysis of variables in time series with the aim of determining the incidence that different independent variables (market size, trade openness, labor costs, macroeconomic stability, tax policies, economic stability, and political stability) have on the attraction of FDI in the country, which in this case would be the dependent variable. Thus, the result of this model is that the variables market size and tax policies are those that explain FDI in Ecuador during such period.

Keywords: FDI, Ecuador, market size, tax policies, multiple linear regression.

RESUMEN

A pesar de los beneficios que un país puede percibir a causa de la recepción de inversión extranjera directa (IED), tales como: el crecimiento de empleo, la creación de un mercado más competitivo, la provisión de financiamiento y tecnología; en la actualidad el Ecuador es uno de los países latinoamericanos que menor capital recibe del exterior. Esto debido a que el país no cuenta con las condiciones necesarias que le permitan ser un destino atractivo para los inversionistas extranjeros. Por esta razón, con el objetivo de determinar los factores que explican la IED en el Ecuador durante el período 2007-2019, se llevará a cabo un proceso que inicia por recopilar información teórica, para posteriormente contrastarla con datos sobre la situación del Ecuador frente a la atracción de IED, para finalmente a través de un análisis de regresión múltiple de variables en series de tiempo, determinar la incidencia que diferentes variables independientes (tamaño del mercado, apertura comercial, costos laborales, estabilidad macroeconómica, políticas impositivas, estabilidad económica y estabilidad política) tienen sobre la atracción de IED en el país, que en este caso sería la variable dependiente. Así, este modelo obtuvo como resultado que las variables tamaño del mercado y políticas impositivas son las que explican la IED en el Ecuador durante dicho período.

Palabras clave: IED, Ecuador, tamaño del mercado, políticas impositivas, regresión lineal múltiple.

INTRODUCTION

As a developing country, it is important to Ecuador to become an attractive destination for foreign investment, since the benefits that this entails, such as the provision of financing or the generation of employment, can help the country to refrain resorting huge economic loans as the main source of financing, thus avoiding an explosive growth of debt. However, because Ecuador does not create the necessary conditions for foreign investors, it has become one of the smallest recipients of foreign direct investment; in recent years, the FDI received by Ecuador represents only 0.43% of the total received in Latin America, which places the country in fourteenth place out of eighteen countries in the region (World Bank, 2019). For this reason, it is important to determine the factors that explain foreign direct investment in Ecuador during 2007-2019.

Thus, conducting a literature review was essential to identify the most influential variables in attracting FDI, mainly in developing countries, and the type of relationship (direct or inverse) that exists between these variables and the flow of FDI. Next, the country's situation regarding the attraction of FDI from 2007 to 2019 was analyzed; after obtaining the registered FDI figures in Ecuador during this period, we proceeded to analyze the relationship between these figures with the variables previously identified in the literary review. In a complementary manner, a multiple regression analysis of variables was carried out in annual time series log linear model, in order to distinguish in the Ecuadorian case which variables are representative when occurring an increase or decrease in FDI in each year. Subsequently, through the formulation of an equation, the level of impact that the most representative variables have when attracting FDI to Ecuador was determined. Finally, based on the research carried out, possible suggestions that help the entry of foreign capital and its continuous reinvestment in the country were presented.

CHAPTER 1: STATE OF ART

1.1. Conceptual framework

The balance of payments is a tool used by a country in order to summarize all economic transactions from a particular country with the rest of the world during a determined period of time; this balance records all foreign exchange income and expenditures with the aim of detecting external imbalances and identifying their causes; this will keep government informed about a country's international position to help it to develop appropriate monetary, fiscal, and trade policies (Kozikowski Zarska, 2013). Figure 1 shows the structure of the balance of payments which is made up of three main accounts. The first one, current account, records the income of money through the export of services and merchandise, and the outflow of money through imports; this account also records two types of incomes, the primary: it reflects the earnings obtained by factors of production or the earnings assigned to supply labor force, financial assets and natural resources; the secondary: it reflects the delivery and receipt of actual or financial resources without receiving any economic value in return (Central Bank of Ecuador).

The second one is capital account. This considers transfers (inputs and outputs) related to natural resources, contracts, license leases, and trade assets and goodwill (Ibid.). In the third one, the financial account, it is registered the inflows and outflows of money through equity securities when the voting power involved is less than 10%, and debt securities such as bonds or promissory notes that are negotiable; this account also includes the compensation of contracts at the time of their settlement and premiums paid when conveying options; likewise, a category for commercial credits, loans, currency and deposits is comprised (Ibid). Finally, there is a category of direct investment, in which it is possible to distinguish participations in capital, reinvestment of profits, and debt instruments; it is worth mentioning that there is a fourth account for errors and omissions with the aim to correct any imbalance caused by imperfections in source data and compilation (Ibid.). Transactions described above

that are recorded in the balance of payments are the ways in which money enters and leaves Ecuadorian economy.

Figure No. 1 Balance of payments structure
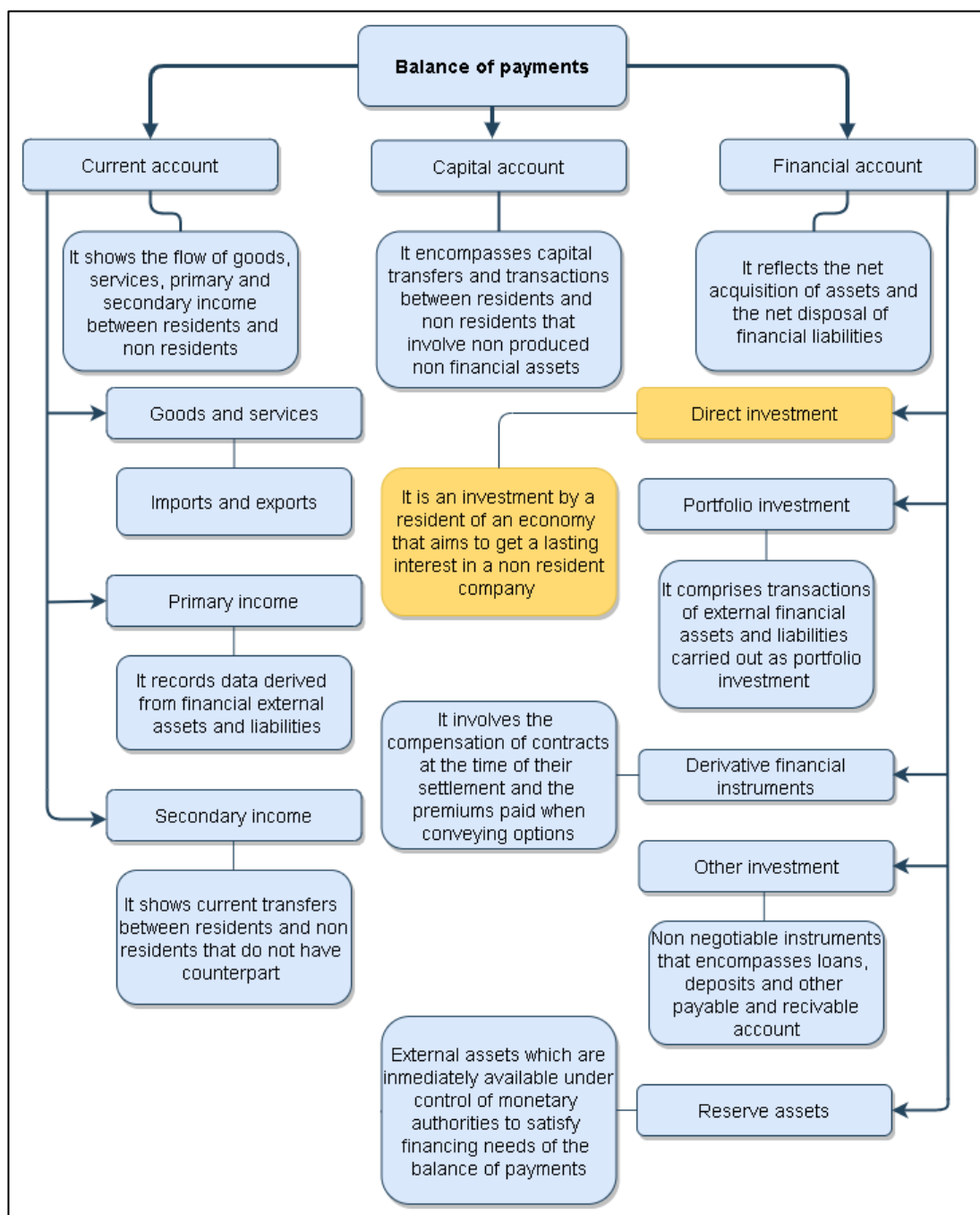
Source: Own elaboration based on data from the Central Bank of Ecuador.

The location of foreign direct investment (FDI) as part of the financial account is based on the so-called "Framework for Direct Investment Relationships". This sets out the

criteria to determine whether a cross-border financial transaction becomes a relationship of foreign direct investment. FDI has been defined through different words that try to express the same meaning; thus, Moran (2012) states that FDI "takes place when a corporation in one country establishes a commercial operation in another country by creating a new wholly owned subsidiary, the acquisition of a local company, or the arrangement of a joint venture in the host economy". The main factor that distinguishes FDI from other types of investments is that it does not only imply a transfer of resources, but also the acquisition of control since the subsidiary does not only have a financial obligation towards the parent company, but is part of the organizational structure (Krugman & Obstfeld, 2006). An investor seeks to establish a long term strategic relationship that guarantees a significant level of influence by the investor in the management of the direct investment company (Wan, 2010). This is why it is considered that a direct investment relationship exists when it is owned at least 10% of the ordinary shares; thereby acquiring lasting management power (Ibid.).

In general terms, two types of FDI can be differentiated according to the intention of a company to invest in an international destination. The first type is called horizontal, this takes place when a subsidiary reproduces the entire production process, carried out by the parent company in its national facilities, in other parts of the world; the second type of FDI is vertical, this occurs when the production chain is divided by transferring part of the process to the subsidiary (Krugman, Obstfeld & Melitz, 2012). Although in both cases the objective of making an international investment focuses on taking advantage of production factors that in certain countries may be less expensive in relation to their productivity in order to allow investing firm to maintain and increase its competitive capacities; as Jesús Mogrovejo (2005) describes it, a horizontal investment would be manifested when exporting costs are too high, then a company finds it beneficial to establish a production plant in the market of interest; on the other hand, a vertical investment would be explained by the company's need to access low cost factors, for which it will locate each production stage in the lowest cost international location.

Foreign direct investment presents a variety of benefits for both, the investor and the receiving country; in this case it is appropriate to focus on these latter. Among the main benefits are the following: economic growth, increase of job opportunities, stimulation of technological development through the adoption of foreign know-how

and technology (Wan, 2010). Additionally, one of the greatest benefits derived from the presence of FDI in a country is that it can be considered an alternative way to carry out the same objectives as international loans since it is usual for parent companies to provide capital to its foreign subsidiaries (Krugman & Obstfeld, 2006) and so with the entry of that capital into the receiving country's economy, the execution of various public and private projects can be financed. In general terms, it can be considered that a country that benefits adequately from FDI will achieve a more competitive presence at the international level.

1.2.   Theories related to localization of foreign direct investment

During the last decades, FDI has become increasingly important, which is why different academics have been interested in trying to explain the behavior of FDI flows between one country and other through theoretical and empirical models. However, it is worth mentioning that to date any author has been able to reach a conclusive statement on this subject. Conversely, the usual thing is that the work carried out by an author is taken by another or others to expand it, deepen it, or in turn, refute it. It is suitable to point out that some of these theoretical models have been taken as a basis for their development the contributions made by international trade theories, among which is the theory of Heckscher and Ohlin, authors who assert that international trade is determined by the differences of factor endowments; therefore, countries would be expected to export those goods that take advantage of abundant local factors and to import the products that make intensive use of factors that are scarce in that place (Hill, 2011). The relationship that can be found between this theory and the flow of capital among countries is that at the time of carrying out an international exchange of goods, indirectly there would be a movement of capital between the countries that participated in a commercial activity.

The British Economist Alfred Marshall was who developed an analysis of external economies. These latter take place when economies of scale occur in industry rather than in individual companies; Marshall was surprised by the existence of what are known as "industrial districts": geographic concentrations of industries that are not explained solely by the existence of natural resources (Krugman, Obstfeld & Melitz, 2012). Within the context of external economies, Marshall distinguished three reasons

for which there was a concentration of productive activities: the availability of qualified labor, the availability of factors and specific services to the industry, and the existence of flows of knowledge between companies in the same location (Villarreal, 2004). Once the possible reasons why companies in certain industries find it beneficial to locate in the same geographic locations have been examined; what is still pending is to determine what are the factors that initially motivate companies to locate in a specific geographic location.

To answer the question about motivations behind the location of companies, the North-American Melvin Greenhut (1955) contributes with his "General Theory of Plant Location" in which he suggests a division of three groups: demand, costs, and personal considerations. Within these three groups there are several subgroups that delve different aspects. For instance, the first case, demand, considers the influence caused by consumers' prejudices regarding the proximity, type, and speed of the service; the scope of the market area, which itself is part determined by costs, pricing policies, and the dispersion of buyers, etc. (Greenhut, 1955). Concerning about costs, this group includes: land (rent, taxes, etc.); labor and administrative management (health, education, etc.); materials and equipment (location of competitors, scope of supply area, etc.); transport (topography and transport facilities) (Ibid.). Finally, in the case of personal considerations, it is included the importance of non-monetary satisfactions, environmental preferences, etc. (Ibid.). Greenhut argues that the way in which companies select their location will depend on the benefits that arise from the combination of these three categories.

It is worth noting that the theories discussed so far seek to explain the location of companies (and therefore international investment) from a perspective that highlights the characteristics of the countries. On the other hand, Raymond Vernon (1966) tries to explain the location of international investment from a perspective, in which, without abandoning the conditions of each country, gives a primary role to the product and the phases it experiences during its cycle of production. Vernon suggests that a product goes through three stages: introduction, growth, and maturity; being in the latter when the product is fully standardized, that is to say, it has reached a wide diffusion internationally. This standardization implies that the local companies that import the product to satisfy the high national demand are frustrated before the lucrative opportunity that they would be missing (Vernon, 1966). In addition, local

governments concerned with generating employment, achieving economic growth and balancing their commercial accounts, will seek to promote the necessary conditions to reduce the volume of imports, thus encouraging local companies to produce the product that was originally imported.

Under the referential framework detailed in the paragraph above, it can be considered that Vernon (1966) refers to FDI by stating that in the face of the imminent emergence of competing companies, to prevent a company exporting a product from losing its market share in the importing country, the solution would be to make an international investment in the latter; However, it should be mentioned that what Vernon proposed is based on the assumption that countries have the same development condition. On the other hand, an author who considers the situation of developed countries compared to developing countries is Kojima (1973), who discusses how the location of FDI can be determined by the combination of the comparative advantages that each group has. In developed countries, production costs are high, so consequently the prices at which they are sold are also high; This is not convenient since it prevents prices from being competitive, which is why it is recommended that industries that demand abundant labor transfer the location of production to countries with low labor costs; It is here when it is possible to take advantage of the combination of comparative advantages that each country possesses (Kojima, 1973). The validity of this approach is based on how Japan locates its investments abroad; taking as a premise that the investments to choose should be those in which Japan is losing a comparative advantage, while developing countries acquire it.

Despite the complexity of the study on the determinants of FDI, many researchers and academics have been interested in delving into the aspects that determine the flow of foreign capital. One of the most prominent authors in this field is John Dunning (2001), a British economist who proposed the "Eclectic Paradigm" or "OLI Paradigm" (Ownership, Location & Internalization). Through this paradigm, he asserts that the scope, geography, and industrial composition of foreign production undertaken by multinational companies is determined by the interaction of three sub-paradigms (ownership, location, and internalization) and their respective components (Dunning, 2000). It is important to emphasize the location sub-paradigm to adequately explain the nature and destination of FDI; this is how the advantages of location emerge, an expression that refers to the use of resources or assets of a certain country abroad

and that a company can find valuable when combined with its own advantages (Hill, 2011). The advantages in the host country are related to costs, the availability of production factors, a more flexible political institutional system, a high or low presence of economies of scale (depending on what benefits the company the most), contribution of technology from innovative companies, among others (Villarreal, 2004).

The work developed by Dunning has served as a referential framework for other authors to make new contributions that deepen how foreign investment is located through international trade. This is the case of Elhanan Helpman, who develops a model that allows companies to analyze the circumstances in which it is beneficial to become multinationals. This occurs when due to the differences in the endowment of production factors in each country, it is convenient for the company to divide its operations; for example, locating its administrative activities in a country abundant in capital, but, its productive activities in a country with abundant labor; In this way, the company would be optimizing its resources according to the specific characteristics of each country, so it could be understood that the decision to invest abroad is explained by the need to access low-cost factors in foreign economies (Jiménez Giraldo & Rendón Obando, 2012). From traditional and modern theories of international trade, the theories of the location of industries, those of international investment, to the theories of location of FDI; all the explanatory approaches previously addressed have contributed greatly to the construction of an explanation on the behavior of FDI.

1.3. Compilation of literature related to the identification of the determinants of FDI

Almost in parallel with the interest of various investors around the world to invest in Latin America, since the 2000s it has been attractive to address as a research topic what are the possible variables that motivate the location of investments in this region. This is the case of Jesús Mogrovejo (2005), who developed a scientific article based on research carried out by prominent authors of the second half of the 20th century, such as: Bergstrand (1985), Krugman (1992), Markusen and Venables (1996) who agree that restrictions on the free movement of goods and factors of production,

proximity or distance from world economic centers, and cultural differences, are part of the determinants of FDI; Likewise, Mogrovejo (2005) used an analytical framework proposed by Dunning (1977) called the eclectic approach. These authors were the pillars that served him to raise certain determinants:

- Market size (inhabitants)
- Political and economic risk (country risk)
- Trade openness $\left(\frac{\text{Exports}+\text{Imports}}{\text{GDP}}\right)$
- Labor costs (minimum wage)
- Macroeconomic stability (US dollar / local currency exchange rate of 19 Latin American countries)
- Dummies (privatizations: sale of public goods in certain years)

After having collected information from different official sources and having developed an econometric model, the results corroborate that FDI in 19 Latin American countries among 1990-2003 is determined mainly by the size of the market, trade openness and country risk.

Jiménez & Rendón (2012) published an investigation in which they presented a review of literature about the impact that the determinants of FDI flows have on host economies, such determinants are the following:

- Macroeconomic stability (exchange rate volatility)
- Market size (number of inhabitants)
- Trade openness (number of commercial agreements in force)
- Labor costs (minimum wage)
- Tax policies (income tax rate)
- Property rights (fulfillment of contracts)
- Political stability (corruption perception index)

The authors of this article took as sources various researchers who have focused on a specific determinant, thus, their literary compilation would be much more profound. In general terms, they came to the conclusion that "investors seek to invest in countries that have a stable and secure political system that allows them to make long-term investments" (Jiménez Giraldo & Rendón Obando, 2012). On the other hand, they point out that the implementation of trade agreements by economies with

a small market can become a relevant factor in attracting foreign capital flows, mainly due to an increase in the size of the market.

Likewise, in a scientific article by Gil, López & Espinosa (2013) in which they compiled a series of variables that determine FDI, based on previous work of different authors, such as: Mogrovejo (2005); Buthe & Milner (2008); Ramírez (2010); among others. These variables are analyzed through certain indicators:

- Economic growth (GDP growth)
- Economic stability (change in GDP, unemployment rate)
- Trade openness (number of commercial agreements in force)
- Macroeconomic stability (inflation)
- FDI from the previous period

Subsequently, a simplified representation of FDI is carried out in 10 South American countries through the data panel technique during the period 1992-2011. Gil, López & Espinosa present as main findings the fundamental role played by macroeconomic indicators to attract FDI in a country, especially GDP growth.

Another research done by Rodríguez & Forero (2016), in which after having carried out a review of both theoretical and empirical literature, they highlight the modern portfolio theory introduced by Harry Markowitz (1991). This theory allows investors to base the diversification of their current portfolio on the risk and return model in order to increase the expected profitability for a certain level of risk. Thus, it can roughly be said that an investor will locate most of his or her capital in a country that presents a coherent balance between the risk that he or she is willing to assume, and the expected benefits. In a certain way, it can be considered that this criterion encompasses the others used by Rodríguez & Forero (2016) to establish the following determining factors of FDI that apply to 167 countries during 1994-2014:

- Market size (GDP per capita)
- Economic growth (GDP growth rate)
- Economic stability (inflation rate, US dollar / local currency exchange rate of 167 Latin American countries)
- Infrastructure (internet penetration rate)
- Political stability (intentional homicide rate)

- Human capital (labor force participation, literacy rate)
- Trade openness (average tariffs), $\left(\frac{\text{Exports+Imports}}{\text{GDP}}\right)$
- Attractiveness of the foreign labor market (minimum wage, unemployment rate)

The results of this research suggest that the factors that require more follow-up by investors are infrastructure, human capital, economic and political stability, and trade openness.

Economou, Hassapis, Philippas & Tsionas (2016) developed a scientific article in which they examine the determinants of FDI inflows; on the one hand in 24 member countries of the Organization for Economic Cooperation and Development, and on the other, 22 developing countries (8 Latin Americans); using a dynamic panel approach that collects data from 1980 to 2012. This publication makes a kind of comparison between both groups of countries in order to emphasize that the different conditions that each group experiences also imply a marked distinction between their respective FDI determinants. Thus, considering the purpose of this research, it is appropriate to focus specifically on the determinants of FDI in developing countries that were identified after carrying out a literary review:

- Market size (GDP per capita)
- Trade openness $\left(\frac{\text{Exports+Imports}}{\text{GDP}}\right)$
- Labor costs (unit labor cost index)
- Education level (number of people who have passed high school)
- Economic stability (inflation)
- Political stability (corruption perception index)
- Tax policies (income tax)
- FDI from the previous period

By contrasting what is theoretically suggested by Dunning (2001), Bevan & Estrin (2004), Bloningen (2005), Arbatli (2011), among others, with the findings of their research, the relevant results identified by Economou, Hassapis, Philippas & Tsionas were that FDI from the previous period, market size, labor costs, and political stability are the most influential determinants.

Castillo Cedillo, Cruz Vásquez & Pico González (2017) in their publication entitled "Main factors of foreign direct investment in some Latin American countries" carry out in-depth theoretical research to determine which variables may have an impact on the location of FDI in 19 Latin American countries, including Ecuador. Like the articles mentioned above, this research is based on the outstanding contributions made by Helpman & Krugman (1985), Bergstrand (1985), Dunning (1988), Mogrovejo (2005). Based on these and other authors Castillo, Cruz & Pico established the following determinants:

- Macroeconomic stability (external debt, US dollar / local currency real exchange rate of 19 Latin American countries)
- Trade balance residue
- Lending interest rate
- Market size (GDP per capita)
- Trade openness (imports, average tariffs)

Unlike previous articles, "this article uses cross-sectional data for the years 2005, 2010 and 2013" (Castillo Cedillo, Cruz Vásquez & Pico González, 2017), obtaining as a result that GDP per capita, imports, external debt and the trade balance residue have a bigger weight in attracting FDI in these Latin American countries.

1.4.   Selection of FDI determinants applicable to the Ecuadorian case

Once literature corresponding to the factors that determine the location of FDI in developing countries was reviewed, with special emphasis on Latin American countries. The factors mentioned in two or more articles from the six previously analyzed, were used to determine the variables that had a noticeable impact on the attraction of FDI by countries under study in each paper. Subsequently, it was verified the availability of data in Ecuador for the selected variables. The chosen factors in first instance are the following: market size, trade openness, macroeconomic stability, economic stability, political stability, labor costs, and tax policies. It is worth mentioning that for each of the aforementioned variables, a typical behavioral relationship with FDI can be identified; for example, in the case of the first five variables there is a direct relationship, this means that if one of such variables increases or decreases, FDI will change in the same direction. On the other hand, the

last two variables present an inverse relationship, which means that if they increase or decrease, the behavior of FDI will be the opposite.

CHAPTER 2: VARIABLES EVOLUTION REVIEW

## 2.1. Analysis of the FDI received in Ecuador

Since Ecuador began accounting for FDI in 1970, the country has not stood out as a great recipient of foreign investment. It is even worth mentioning that in 2000 capital outflows exceeded the income received in the country. This is why the Central Bank of Ecuador presents a negative balance of around $23 million for this year, being the lowest record of foreign capital in the history of Ecuador due to the great economic instability caused by an exchange rate that reached more than 20,000 sucres per dollar, which resulted in a dollarization of the national economy, without technical studies or preparation (Ayala Mora, 2008). Subsequently, between 2010-2015 Ecuador progressively became a country characterized by its protectionist government, imposing a large number of commercial barriers to avoid an imbalance of the trade balance; however, other consequences arose when taking these measures, the most important of them: for foreign investors, Ecuador began to be perceived as a bureaucratic and restrictive country in which it was really difficult to make any type of investment (Gómez Aguirre, Windler Muñoz & Massa Roldán, 2020). In addition, it should be noted that, despite a slight increase in the entry of foreign capital into the country, on average 92% of the income generated from such capital is accounted for as a debit (Central Bank of Ecuador, 2020).

Foreign Direct Investment income in Ecuador during 2007 to 2019 can be described as irregular; this considering that during this 13 year period there have been values lower than 166 million in 2010, as well as higher than 1,455 million in 2018. It is well known that the policies that a government adopts have a great impact on the incentive or disincentive for foreign capital to enter the country. For this reason it can be understood that in 2007 it was recorded a figure of FDI received that was barely 193 million dollars. This may be due to the fact that the country had a deteriorated international image after a political instability caused by the dismissal of the President of Ecuador in 2005, Lucio Gutiérrez (Ayala Mora, 2008). Rafael Correa won in the November 2006 elections, and in January 2007 officially assumed the presidency

promoting radical reforms that generated great expectations among Ecuadorians, thus, in 2008 there was an increase in FDI in 445.39% compared to the previous year. Unfortunately, during the next few years (2009-2010) the panorama worsened at the international level due to the enactment of protectionist economic policies that as a result limited foreign investment in the country. A clear example of this is the change of regulations in the oil sector, in which a leading role was given to the state-owned company Petroecuador, which led to the departure of several foreign oil companies (CEPAL, 2012).

As it can be seen in figure 2 that in the following years (2011-2013) the FDI received shows an upward trend, which motivated the development of an "Investment Promotion and Attraction Project" in 2013 with the aim of maintaining in the next four years an increase between 15% and 20% of the flows that the country receives (ECLAC, 2013). It can be considered that this project executed by the Ministry of Foreign Trade and Economic Integration met the expected projections during the first two years (2013-2014). However, for 2015 the increase in FDI exceeded any expectation due to the increase of 71 percentage points, with which for 2016 and 2017 an imminent fall in FDI was foreseeable. In 2018 FDI increased 122% compared to the previous year mainly due to the sectoral factors. Although for the year 2019 a drop in FDI can be observed compared to 2018, it can also be noted that this drop is not as prominent (just 31%) as in the case of previous years (2008 and 2015) in which after an increase of FDI that exceeded 1 billion, the falls were more than 40 percentage points. From a general perspective, the FDI received by Ecuador during 2013-2019 can be classified as relatively good since, as of 2013the registered values exceed 600 million dollars, which in certain way sets a new lower limit for the income of future investments if it is taken into account that during 2007-2012 the FDI received could not reach an average income of 500 million, besides being extremely irregular.

Figure No. 2 Annual evolution of FDI (2007-2019)
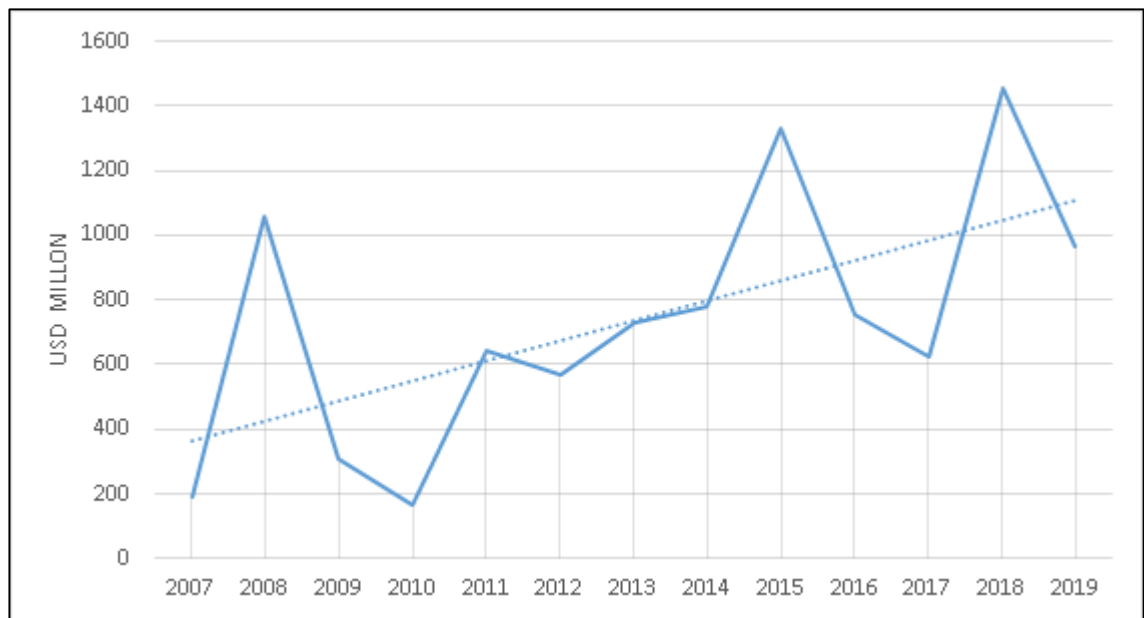
Source: Own elaboration based on data from the Central Bank of Ecuador.

2.2.   FDI allocated by sectors

Before analyzing allocated FDI by sectors, it should be noted that in the graphs presented below each sector receiving FDI in the country is represented by a number, as follows:

1. Agriculture, forestry, hunting and fishing
2. Trade
3. Construction
4. Electricity, gas and water
5. Exploitation of mines and quarries
6. Manufacturing industry
7. Community, social and personal services
8. Services provided to companies
9. Transportation, storage and communications

In 2007, the sector that received the highest income from FDI was the manufacturing industry, for more than 98 million dollars. However, the low total FDI that Ecuador received in 2007 is due, among other factors, to the sale of assets in Ecuador of the

Canadian natural gas and oil company "EnCana", which caused a collapse in the extractive sector (ECLAC, 2008), which registered a value of -102 million, the only negative one during the 13 years that are the object of analysis of this investigation. Furthermore, the transportation, storage and communications sector also registered a negative balance of 52 million dollars due in large part to the outflow of foreign currency to Mexico for 41 million dollars. With an outlook completely opposite to that of 2007, the high number of FDI in 2008 is justified by the presence of heavy investments in the transport, storage and communications sector, mainly driven by "América Móvil" y "Telefónica", Mexican and Spanish companies, respectively. In fact, these investments offset the drop in foreign capital inflows in natural resource sectors and public services such as, electricity, gas and water (ECLAC, 2009). Figure 3 shows the abysmal difference between these two years in this sector.

Figure No. 3 Annual FDI (2007-2008) by sectors

	1	2	3	4	5	6	7	8	9
2007	25,479	92,184	19,632	11,898	-102,7	98,960	16,667	84,591	-52,46
2008	20,487	119,97	49,818	-6,763	244,11	197,99	13,657	142,00	276,08
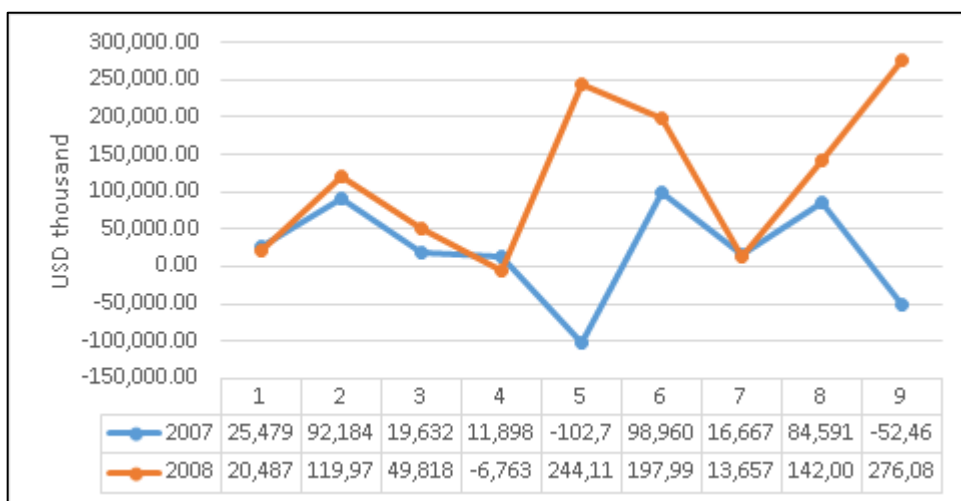
Source: Own elaboration based on data from the Central Bank of Ecuador.

In 2009 the FDI figures decreased compared to 2008 mainly due to a 174.36% decline in the mining sector and in the transport, storage and communications sector. On the other hand, although investment in sectors such as, agriculture, forestry, hunting and fishing increased by 155%, in general terms in 2009 FDI had a strong drop of around 70% compared to 2008. As of 2010 China has become an important source of investment for the country, especially in the hydrocarbon sector (ECLAC, 2011), registering an increase of more than 172 million dollars in this sector, nevertheless, due to the relapse of FDI in the transport, storage and communications sector that registered in 2010 a value of -349 million dollars; it can be observed a decline in the

balance of FDI by more than 46 percentage points compared to 2009. For 2011 FDI registered a value of around 646 million dollars, this mainly because of the mining and quarrying sector, which grew 114%, additionally in the construction sector an increase of about 79% can be seen. These percentages increases in FDI took place due to capital from companies such as "Holcim" (Switzerland) which made and investment of 120 million dollars, and "POSCO" (Korea), which, when buying the Ecuadorian engineering company "Santos" made an investment of 72 million (ECLAC, 2012). It is accurate to point out that in the agriculture, forestry, hunting and fishing sector there was a drop of around 95% compared to the previous period.

Figure No. 4 Annual FDI (2009-2011) by sectors

	1	2	3	4	5	6	7	8	9
2009	52,312	84,142	-13,43	3,008.	5,802.	117,75	18,253	-23,46	64,238
2010	10,676	93,608	28,240	-6,311	178,00	120,32	22,808	67,857	-349,3
2011	454.20	77,696	50,534	-10,82	381,20	121,92	27,824	44,883	-47,61
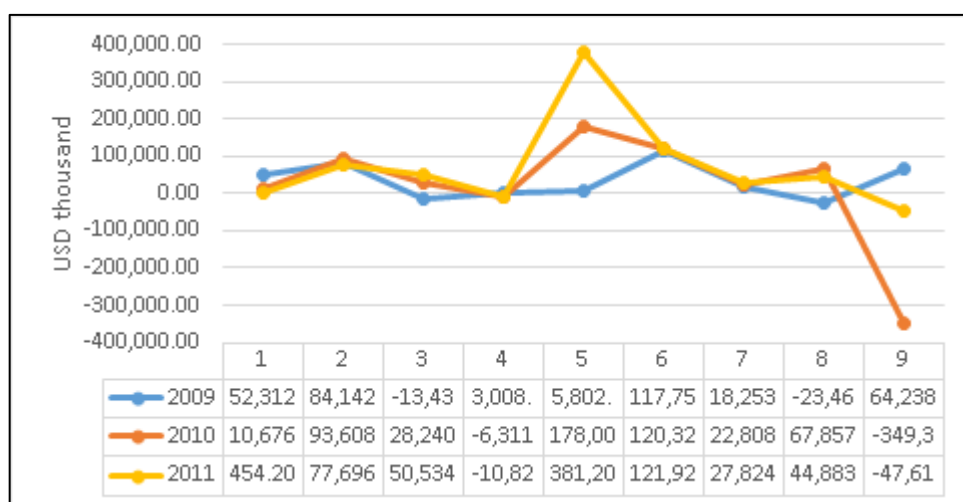
Source: Own elaboration based on data from the Central Bank of Ecuador.

The data registered in the Central Bank for the year 2012 reflect a fall in FDI of 12% compared to 2011; although there has been a progressive recovery in the agricultural sector, which for this year registered an increase of more than 17 million; the decrease in FDI in 2012 is mainly due to a 41% decline in the mining sector, which is related to new conditions issued for this year that force transnationals to operate in association with state-owned companies, limiting in practice the benefits they can obtain from their concessions (ECLAC, 2013). In 2013, FDI registered a value of more than 727 million, which implied an increase of 28% compared to the last year, at that time one of the highest figures in the last five years. During 2013 it can be highlighted the increase in FDI in sectors such as services provided to companies, and construction with 199.19% and 119.13%, respectively. The growth of FDI for 2014 is quite slight, with only 6.81%, even when the received in the mining sector presents an increase of $433

million, since oil exploration experienced a boom, which consequently allowed the awarding of various contracts to international companies to work on the exploration of new oil reserves (ECLAC, 2015). On the other hand, although since 2010 the registered figure of FDI in the transport, storage and communications sector has remained negative, 2014 a collapse can be noted that reaches a value of -247 million.

Figure No. 5 Annual FDI (2012-2014) by sectors

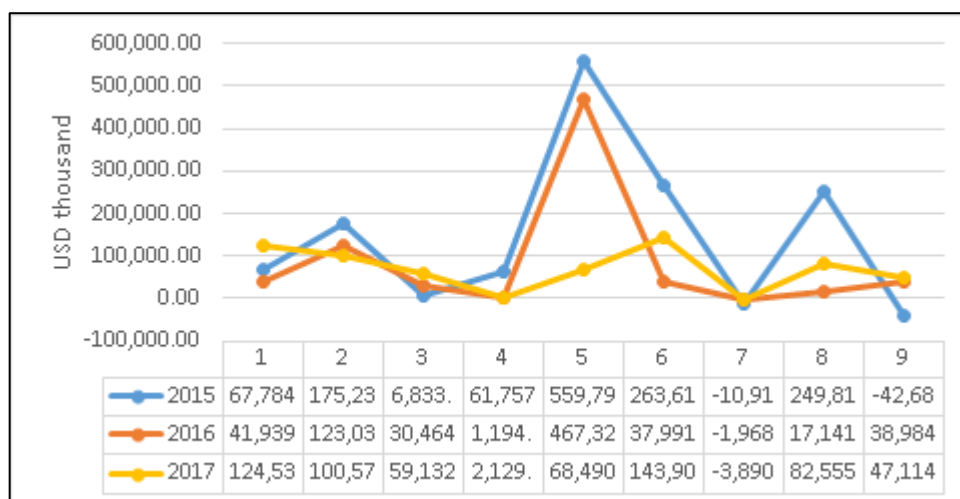|	1	2	3	4	5	6	7	8	9
2012	17,840	83,740	31,578	46,447	224,94	135,59	1,616.	39,132	-13,48
2013	20,756	109,85	69,196	29,201	252,88	139,01	-2,400	117,08	-8,530
2014	38,914	148,05	4,744.	-4,671	686,68	108,47	13,990	27,778	-247,3
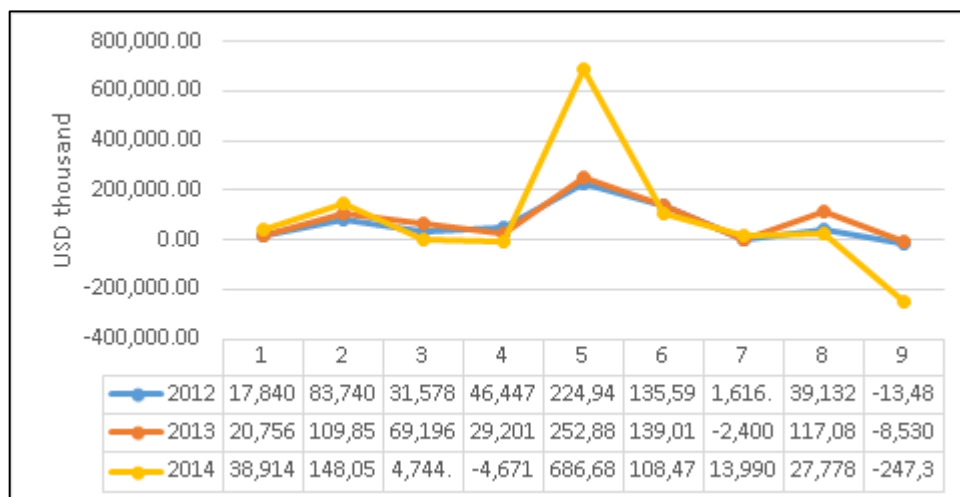
Source: Own elaboration based on data from the Central Bank of Ecuador.

In 2015 a value of more than $1,331 million was registered, at that time the highest inflow of FDI in the history of Ecuador. During this year, the mining and quarrying sector with almost 560 million presents a predominance in the entry of foreign capital. Likewise, the sector of services provided to companies increased its figure by almost nine times compared to the previous year. It is worth highlighting the recovery of the electricity, gas and water sector, which went from -4 million in 2014 to more than 61 million in 2015. For 2016 a value of 756 million was recorded, which implied a decrease in the entry of foreign capital approximately 43% compared to 2015; around 70% of the total registered value was of European origin. A relevant figure during this year was the result of the increase in the transport, storage and communications sector with more than $38 million, the first positive figure in this sector after six years. In 2017, FDI continued to decline, this time it felt by 17%; this is mainly due to the low levels of FDI registered in mining, which reached only around 68 million, a sector that since 2010 was the one that registered the most FDI. On the contrary, one of the sectors with the highest growth (278.77%) compared to 2016 was the manufacturing industry. Likewise, the agriculture, forestry, hunting and fishing sector went from 41

million to 124 million; in this sector the Danish company "Schouw & Co." acquired 70% of the Ecuadorian shrimp-producing company, "Alimentsa", for a value of $127 million (ECLAC, 2018).
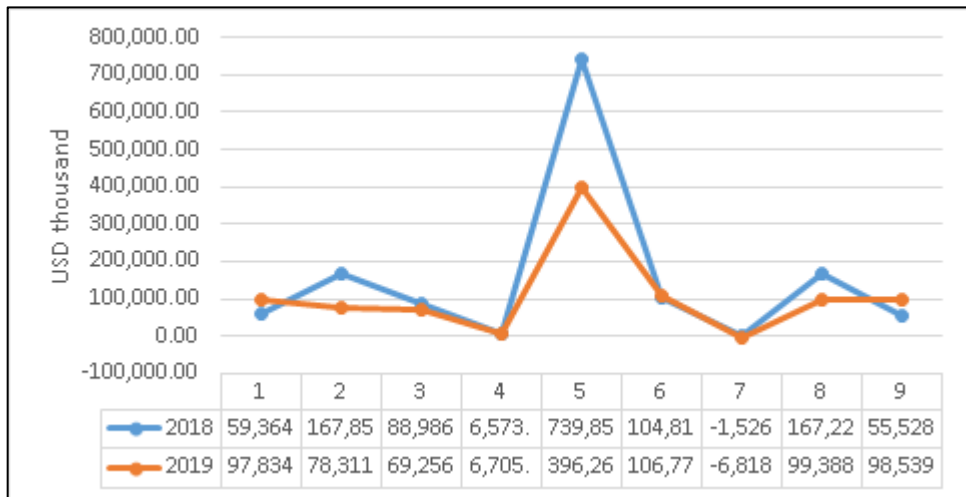
Figure No. 6 Annual FDI (2015-2017) by sectors

	1	2	3	4	5	6	7	8	9
2015	67,784	175,23	6,833.	61,757	559,79	263,61	-10,91	249,81	-42,68
2016	41,939	123,03	30,464	1,194.	467,32	37,991	-1,968	17,141	38,984
2017	124,53	100,57	59,132	2,129.	68,490	143,90	-3,890	82,555	47,114

Source: Own elaboration based on data from the Central Bank of Ecuador.

Since the 1990s, there has not been such a high FDI in Ecuador as in 2018; during this year a figure of around 1,400 million dollars was reached, which represented an increase of around 123% compared to the year 2017. During 2018 the mining and quarrying sector returned to take a leading role (739 million) with an increase of more than 671 million compared to the previous period; within this sector, important mining operations were paralyzed due to the opposition of local communities, nonetheless, a good period began for the oil activity with tenders awarded for more than 700 million dollars; in this sense, it is appropriate to highlight that the contribution of the oil sector to the national GDP is equivalent to more than seven times the mining sector (ECLAC, 2019). In figure 7, it can be seen that during 2019 the sectors in which the received FDI was mainly concentrated were those related to natural resources in the extractive industry and the agricultural, forestry and fishing sectors (ECLAC, 2020) which concentrated more than 52% of FDI, followed by the manufacturing industry with 11.28%. A significant investment was also achieved in the construction sector through an agreement with "Korea Airports Corporation" for the adaptation, construction and administration of the International Airport of the city of Manta, which was affected by the 2016 earthquake (Ibid.).

Figure No. 7 Annual FDI (2018-2019) by sectors

	1	2	3	4	5	6	7	8	9
2018	59,364	167,85	88,986	6,573.	739,85	104,81	-1,526	167,22	55,528
2019	97,834	78,311	69,256	6,705.	396,26	106,77	-6,818	99,388	98,539

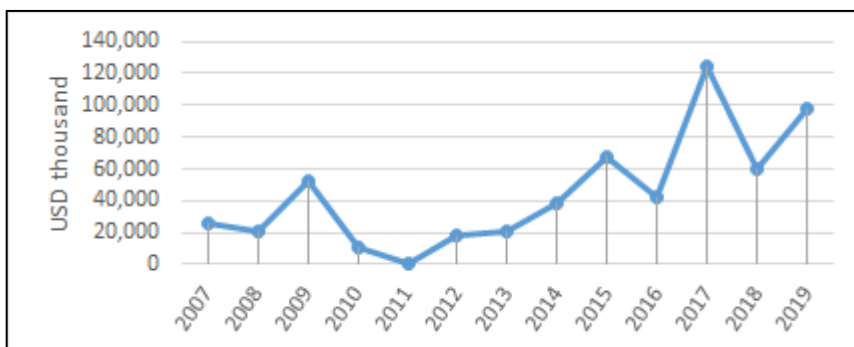Source: Own elaboration based on data from the Central Bank of Ecuador.

Years	Agriculture, forestry, hunting and fishing	Trade	Construction	Electricity, gas and water	Exploitation of mines and quarries
2007	13.12%	47.48%	10.11%	6.13%	-52.94%
2008	1.94%	11.35%	4.71%	-0.64%	23.09%
2009	16.95%	27.26%	-4.35%	0.97%	1.88%
2010	6.44%	56.44%	17.03%	-3.81%	107.32%
2011	0.07%	12.03%	7.82%	-1.68%	59.00%
2012	3.14%	14.76%	5.57%	8.19%	39.64%
2013	2.85%	15.11%	9.52%	4.02%	34.78%
2014	5.01%	19.06%	0.61%	-0.60%	88.42%
2015	5.09%	13.16%	0.51%	4.64%	42.05%
2016	5.55%	16.27%	4.03%	0.16%	61.81%
2017	19.94%	16.10%	9.47%	0.34%	10.97%
2018	4.27%	12.09%	6.41%	0.47%	53.28%
2019	10.34%	8.28%	7.32%	0.71%	41.88%
Years	Manufacturing industry	Community, social and personal services		Services provided to companies	Transportation, storage and communications
2007	50.97%	8.58%		43.57%	-27.02%
2008	18.73%	1.29%		13.43%	26.11%
2009	38.16%	5.91%		-7.60%	20.82%
2010	72.54%	13.75%		40.91%	-210.61%
2011	18.87%	4.31%		6.95%	-7.37%
2012	23.90%	0.28%		6.90%	-2.38%
2013	19.12%	-0.33%		16.10%	-1.17%
2014	13.97%	1.80%		3.58%	-31.85%
2015	19.80%	-0.82%		18.77%	-3.21%
2016	5.02%	-0.26%		2.27%	5.16%
2017	23.04%	-0.62%		13.22%	7.54%
2018	7.55%	-0.11%		12.04%	4.00%
2019	11.28%	-0.72%		10.50%	10.41%

Source: Own elaboration based on data from the Central Bank of Ecuador.

Table 1 shows the balances of FDI in the country through percentages that reflect the weight that each sector has in the reception of foreign capital, thus showing which sector has had the highest and lowest flow of FDI during each year. In general, the sector with the highest FDI flows is mining and quarrying, remaining from 2010 to 2019 (with the exception of 2017) as the predominant sector that receives foreign capital in the country with an average of 39.32%, followed by the manufacturing and trade sectors with 24.84% and 20.72%, respectively.
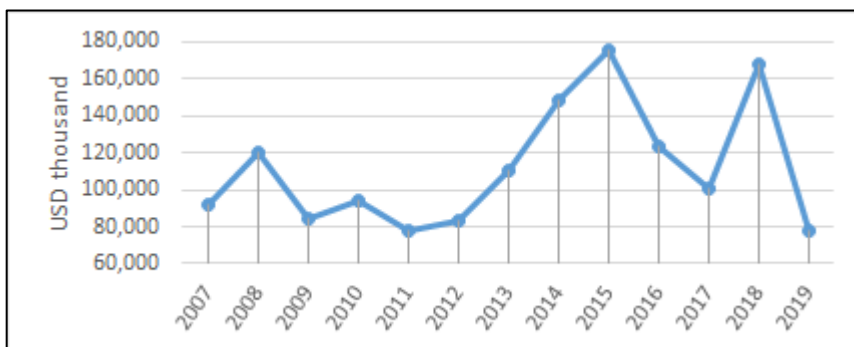
2.2.1. Annual FDI allocated by sectors (2007-2019)

Figure No. 8 Agriculture, forestry, hunting and fishing
Annual FDI allocated by sectors (2007-2019)
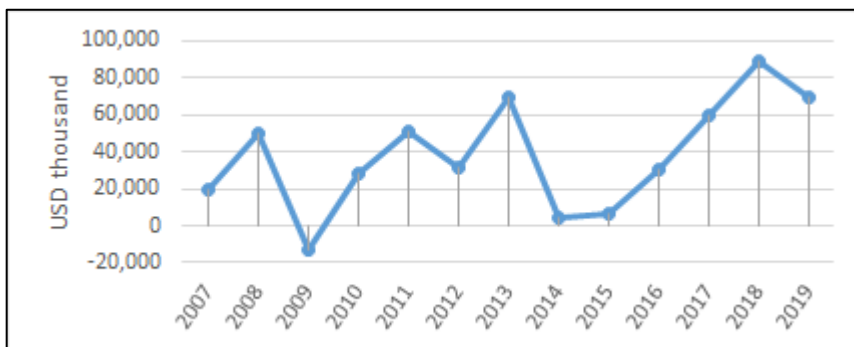

Source: Own elaboration based on data from the Central Bank of Ecuador.

Figure No. 9 Trade
Annual FDI allocated by sectors (2007-2019)

Source: Own elaboration based on data from the Central Bank of Ecuador.

Figure No. 10 Construction
Annual FDI allocated by sectors (2007-2019)

Source: Own elaboration based on data from the Central Bank of Ecuador.

Figure No. 11 Electricity, gas and water
Annual FDI allocated by sectors (2007-2019)
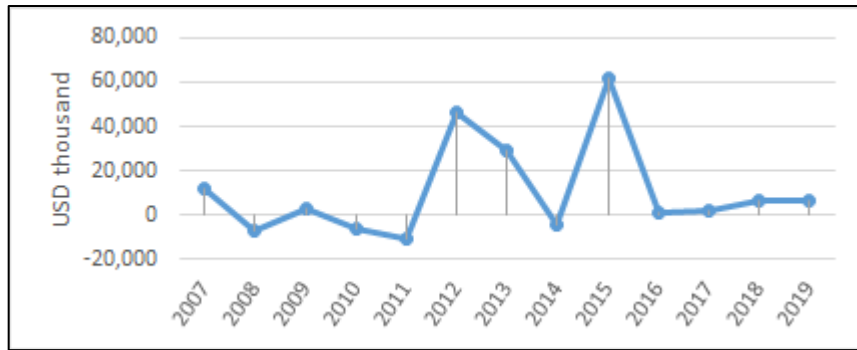
Source: Own elaboration based on data from the Central Bank of Ecuador.

Figure No. 12 Exploitation of mines and quarries
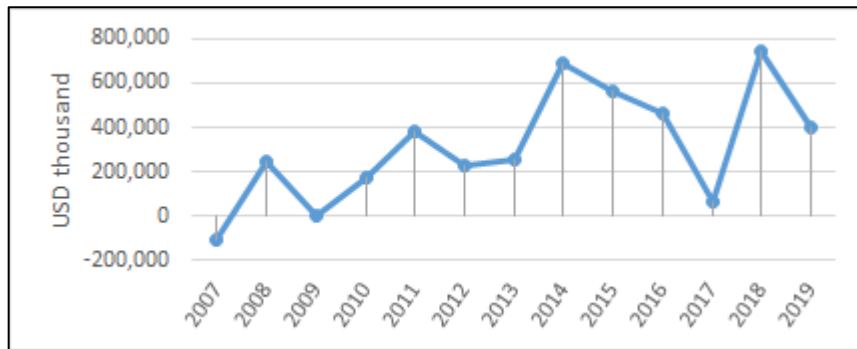**Annual FDI allocated by sectors (2007-2019)**

Source: Own elaboration based on data from the Central Bank of Ecuador.

Figure No. 13 Manufacturing industry
Annual FDI allocated by sectors (2007-2019)

Source: Own elaboration based on data from the Central Bank of Ecuador.

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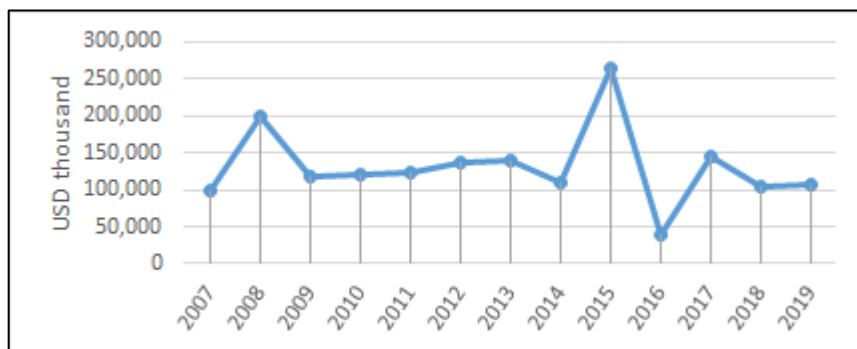
Figure No. 14 Community, social and personal services
Annual FDI allocated by sectors (2007-2019)
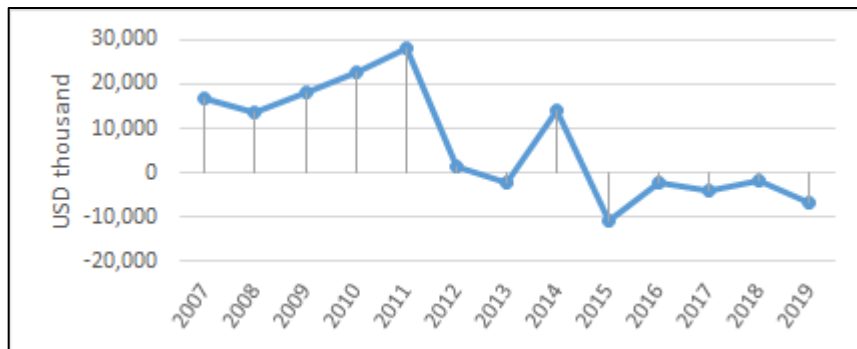
Source: Own elaboration based on data from the Central Bank of Ecuador.

Figure No. 15 Services provided to companies
Annual FDI allocated by sectors (2007-2019)
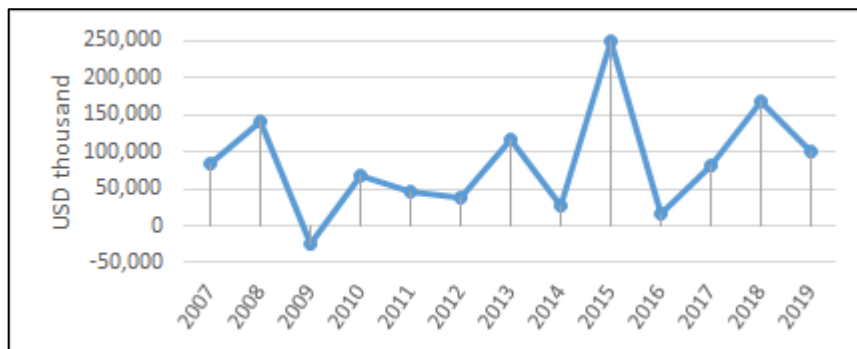
Source: Own elaboration based on data from the Central Bank of Ecuador.

Figure No. 16 Transportation, storage and communications
Annual FDI allocated by sectors (2007-2019)

Source: Own elaboration based on data from the Central Bank of Ecuador.

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2.3. Relationship between FDI and independent variables

The first variable considered to evaluate its level of incidence against the attraction of FDI in Ecuador is market size, which in this case will be analyzed through the indicator "Gross Domestic Product per capita" (GDP) that is calculated by associating the number of inhabitants with the national GDP. When observing figure 17 it can be seen that from 2007 to 2019 this indicator has shown an upward trend. It can also be seen that since 2014, the year in which GDP per capita reached its maximum point ($6,377.09), it has maintained a certain level of stability above $6,000. As previously mentioned, as of 2013 the FDI received is over 600 million, being this figure from which it can be suggested that the higher the level of GDP per capita, the greater the FDI received. The second variable analyzed is economic stability (figure 18), through GDP in terms of purchasing power parity (PPP); it can be observed a behavior similar to that which occurred in the case of market size, this is if GDP (PPP) is greater than $175 billion, what happens is that FDI exceeds 600 million dollars.

Figure No. 17 FDI and market size

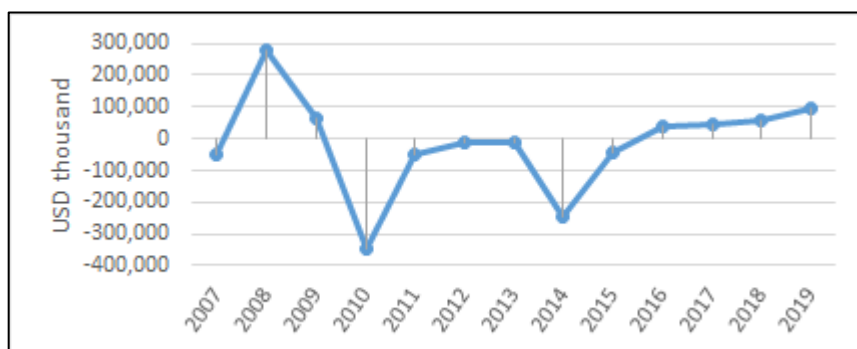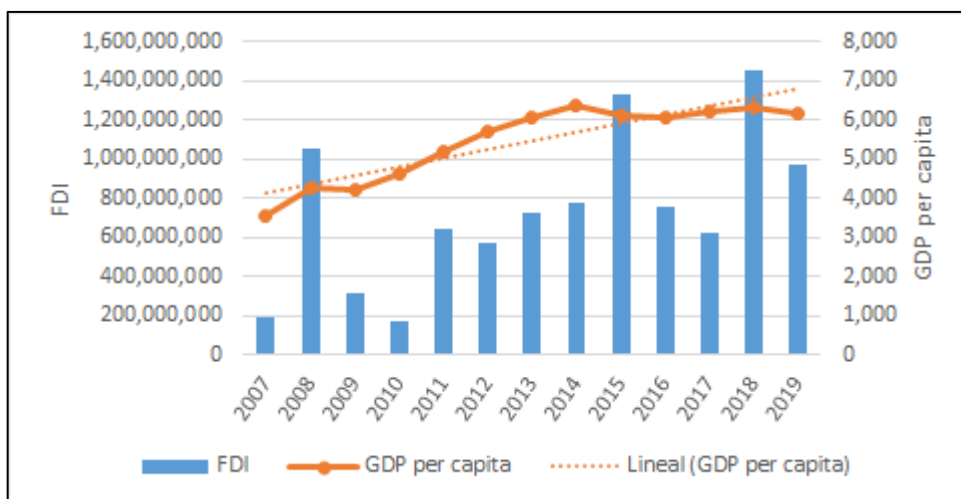Source: Own elaboration based on data from the Central Bank of Ecuador.

Figure No. 18 FDI and economic stability
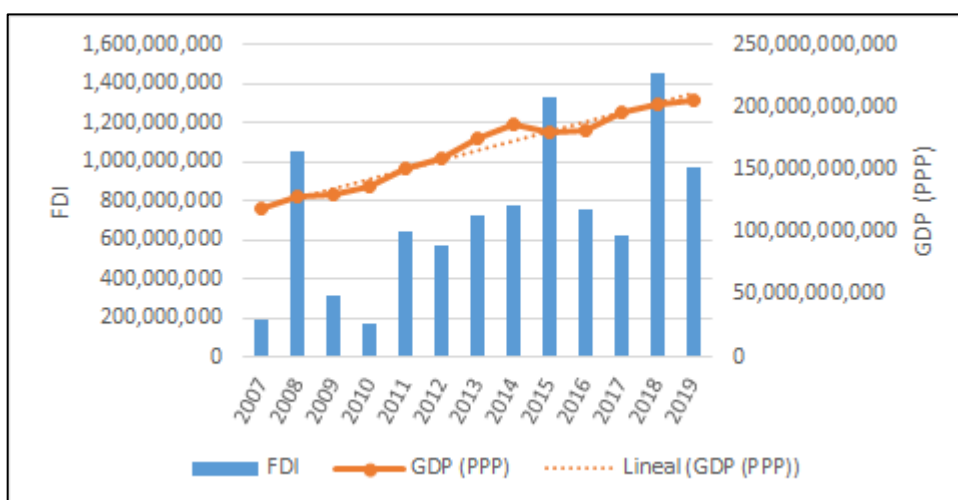
Source: Own elaboration based on data from the Central Bank of Ecuador.

In figure 19 two variables are analyzed, the first is trade openness, which takes as an indicator the percentage of Ecuadorian GDP that is occupied by international trade, that is: $\left(\frac{\text{Exports+Imports}}{\text{GDP}}\right)$, and the second is macroeconomic stability analyzed with the indicator "annual inflation". The trade openness curve shows a downward trend; this means that it cannot be found any kind of pattern that can help establish a link between this variable and FDI flows. In addition, as it has a downward trend, it is not fulfilled the relationship mentioned in chapter 1 for this variable, in which the greater the commercial opening, the greater the reception of FDI, so it can be understood that in the Ecuadorian case this variable has no effect on FDI. In the same figure with yellow color is the inflation indicator used to analyze macroeconomic stability, which for each year under analysis has shown an uneven fluctuation between -0.20% and 8.83%; however, inflation is an important variable when considering its declining trend, especially during the last six years, since from this premise it can be established that there is an inverse relationship between inflation and the level of FDI that Ecuador perceives, thus, the lower inflation, the higher the income of foreign capital.

Figure No. 19 FDI, trade openness and macroeconomic stability
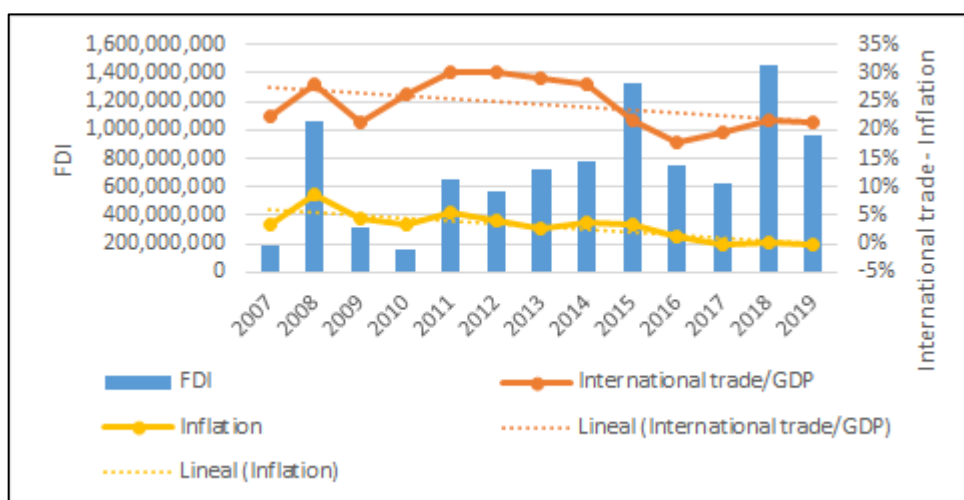
Source: Own elaboration based on data from the Central Bank of Ecuador.

The data of the following two variables analyzed are graphed through their rate of change, in order to note in more detail the relationship that can be found between the indicators of these variables and FDI (figure 20). The first of these variables is labor costs, which has as an indicator the minimum wage from 2007 to 2019, this begins with an amount of only $170, value that after progressive increases reached $394 in 2019 (Central Bank of Ecuador, 2020). The variation of this factor shows a downward trend because despite the fact that year after year increases have been registered, these have been minimal, especially during the last five years. Having this in mind, it could be interpreted that the evolution of the variable labor costs during these 13 years is not very significant to determine if it has any effect on the FDI received. In the case of the second variable, political stability, the corruption perception index (CPI) is used; which uses scores between 0 and 100, which represent high corruption or lack of corruption, respectively (Transparency International, 2020). From 2011 to 2012, the CPI increased from 27 to 32, which implies a variation of 18.5%; as of this year, the CPI remains above 30 points, registering minimal variations that range from -5.71% in 2014 to 11.76% in 2019, year in which it reached 38 points (Transparency International, 2019), the highest score ever recorded for Ecuador, which despite not being considered "good", generates the expectation that this score may improve in the coming years.
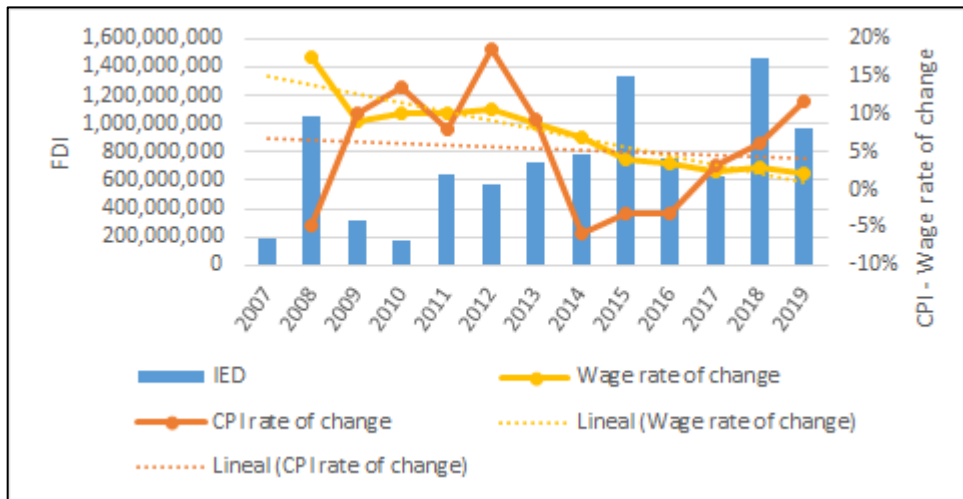
Source: Own elaboration based on data from Transparency International and
the Central Bank of Ecuador.

The last analyzed variable in this research is tax policies. In this case, the income tax
and the foreign currency outflow tax (FCOT) are taken as indicators. The first
mentioned tax is applied on those income obtained by natural persons, undivided
successions and national or foreign companies during a fiscal year; that is, from
January 1st to December 31st (Internal Revenue Service, 2019). Between 2007 and
2011, companies paid an income tax equivalent to 22% on their profits. As from 2012,
this tax was increased to 25%. In the case of the second tax, this came into effect in
2008 with a percentage of 0.5%, which in 2009 was increased to 1%, and to 2% in
2010 and 2011. Since 2012 the tax has a rate of 5% that is levied on the "transfer or
shipment of currencies, that are made abroad, either in cash or through the writing of
checks, transfers, money withdrawals or payments of any nature" (Internal Revenue
Service, 2019). Both taxes present a similar behavior with an increase in their tax rate
as of 2012, which is maintained until today. Although the usual thing should be that
an inverse relationship is found between this variable and FDI, in this case both taxes
have not had a sudden change, which indicates that the stabilization of tax policies
as of 2012 has led to a FDI average increase.
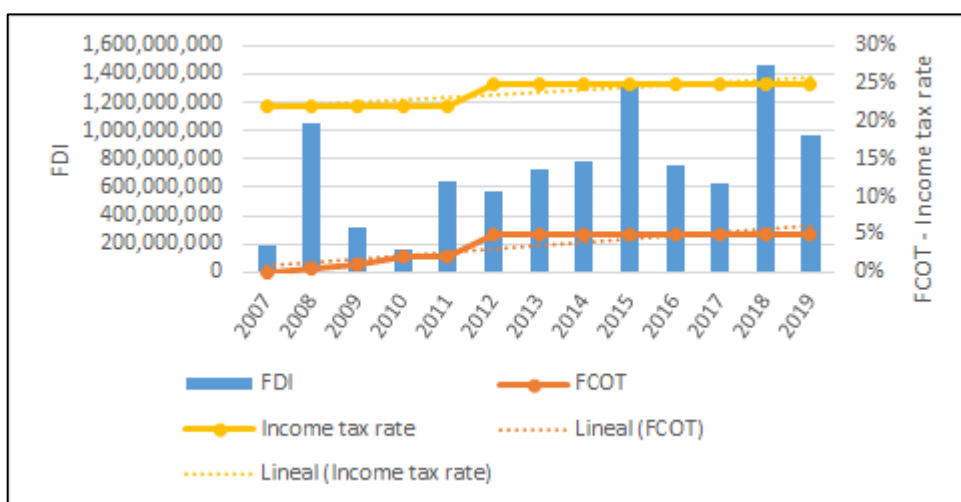
Source: Own elaboration based on data from the Internal Revenue Service (*SRI*).

2.4.   FDI effects on the balance of payments

As already mentioned in the first chapter of this research, the balance of payments records all the transactions of a country with the rest of the world; hence the importance of analyzing the impact that FDI has on the balance of payments focusing on certain benefits or damages that take place because of the entry of foreign capital into the country and the repatriation of profits generated from this investment. As it can be seen in figure 22, the higher the FDI received, the greater the residue of the financial account of the balance of payments. Thanks to the inflow of foreign capital in 2011, the balance of this account was positive, because if FDI would not have reached a figure higher than 600 million dollars, the residue of the financial account would have been -500 million dollars. Likewise, in 2015 and 2018, years in which it was registered the largest FDI country's history, the balance of the financial account reached $2 billion and $1.8 billion, respectively, being the highest figures reached in the residues of this account of the balance of payments of Ecuador. For this reason, it is essential that the country seeks to promote the attraction of foreign capital so that it increases and thus the financial account, besides registering a positive balance, helps to solve any financing need that the country may present.

Figure No. 22 Impact of FDI on the residue of the financial account of the balance of payments
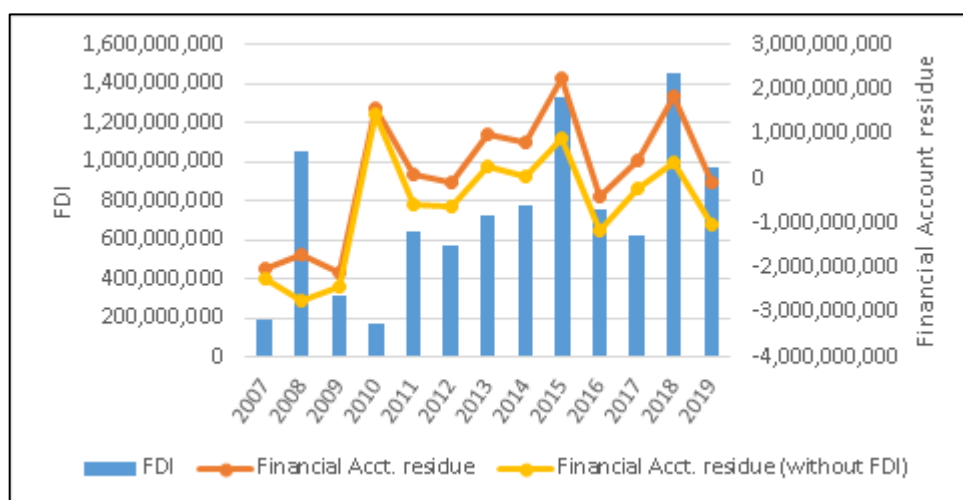
Source: Own elaboration based on data from the Central Bank of Ecuador.

It is worth mentioning that indirectly FDI also influences the current account of the balance of payments through the subaccount called primary income, in which it is recorded the income of the FDI that enters the country or leaves the country to be sent to the country issuer of capital. In the Ecuadorian case, the most part of the profits generated from FDI migrate to their origin country, which of course constitutes a serious detriment to the economy, since this implies that as a country the necessary conditions to encourage investors to reinvest their profits in the country are not being generated. A clear example of this can be seen in 2007, the year in which the income sent abroad exceeded $1.16 billion despite the fact that there was an inflow of FDI that did not even reach the $194 million. Nonetheless, not all the panorama is pessimistic since it can be noticed that the income of direct investment sent from Ecuador abroad has presented a declining trend, especially since 2015, in which a high FDI that bordered the 1,332 million dollars entered the country and the income sent was just over $601 million. For 2018 there is also a high FDI of more than $1.45 billion and the income sent remained below 460 million dollars (figure 23), a relatively low figure for such a high value of FDI.

Figure No. 23 Annual income from FDI sent abroad
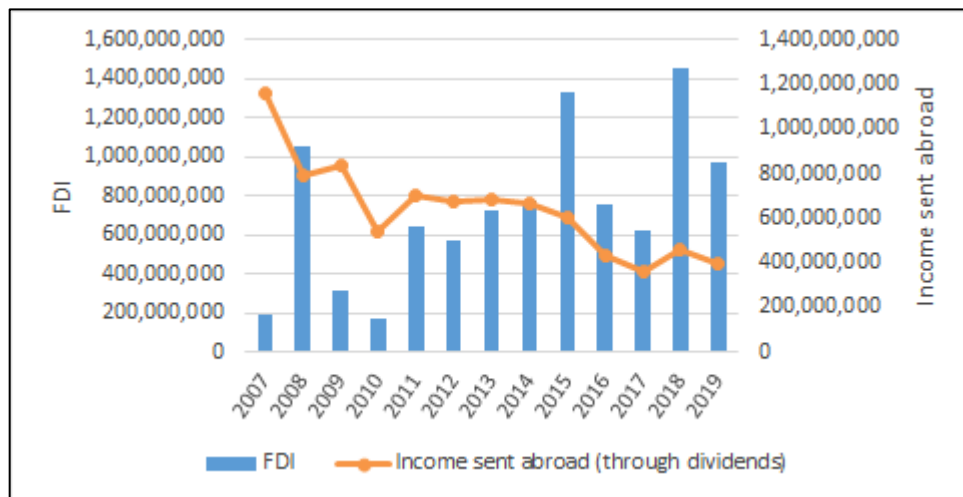
Source: Own elaboration based on data from the Central Bank of Ecuador.

What has been analyzed above suggests that besides receiving high amounts of FDI in order to get important benefits for the country, it is also necessary to focus much more on the creation of incentives that ensure that investment profits continue to circulate in the Ecuadorian economy as a result of continual reinvestments made by foreigners. Thus the disadvantage of an excessive outflow of income progressively becomes a positive factor that positions Ecuador as an attractive country for investment with the aim of achieving a greater capacity to pay, the reduction of external public debt, more income and with this a surplus in the balance of payments. It can be considered that at a structural level FDI has a direct impact on the financial account of the balance of payments, this means that a change in the flow of FDI in a given year could cause a change in the balance of this account. So, in case of being unfavorable, it will have as a consequence a negative impact on the Ecuadorian economy caused by a decrease in the residue of the balance of payments, which usually triggers the central government to consider as an immediate solution to borrow money that allow momentarily sustain the country's economy. Thus, the importance of encouraging foreign investment as an alternative way of financing can be noted, especially if it is considered that in the Ecuadorian case, a negative residue in the trade balance is usually common, which would have as a consequence a deficit in the current account, which could not be sustained if the income sent abroad would be registering increasing debts.

CHAPTER 3: EMPIRICAL DEMONSTRATION OF VARIABLES INFLUENCING FDI

3.1. Specification of the economic model

3.1.1. Dependent variable

As it has been noted throughout this document, this research focuses on FDI (refer to section 1.1, pp. 2-4), specifically FDI received by Ecuador. It is appropriate to emphasize that foreign direct investment is the result of an inevitable process of globalization that takes place when a company has the capacity to host its business activities outside the borders of its country of origin, thus contributing to the transfer of financial and technological resources to others. Countries recipients of foreign capital seek benefits derived from these transfers in order to achieve an improvement in their societies. This type of investment constitutes the dependent variable of the equation to be developed since it is a function of different indicators that explain to what extent FDI that a country receives is altered.

3.1.2. Independent variables

Table No. 2 Independent variables

Variable	Acronym	Indicator	Expected sign	Significant for the model?	Author/s
Market size	MS	GDP per capita	+	Yes	Rodríguez & Forero (2016); Economou, Hassapis, Philippas & Tsionas (2016); Castillo Cedillo, Cruz Vásquez & Pico González (2017)
Trade openness	TO	International trade / GDP	+	No	Mogrovejo (2005); Rodríguez & Forero (2016); Economou, Hassapis, Philippas & Tsionas (2016)
Labor costs	LC	Minimum wage	-	No	Mogrovejo (2005); Jiménez & Rendón (2012)
Macro-economic stability	MS	Inflation	-	No	Gil, López & Espinosa (2013)
Tax policies	TP	Foreign currency outflow tax	-	Yes	Jiménez & Rendón (2012)
		Income tax rate	-	No	Economou, Hassapis, Philippas & Tsionas (2016)
Economic stability	ES	Country risk	-	No	Economou, Hassapis, Philippas & Tsionas (2016)
Political stability	PS	Corruption perception index	+	No	Jiménez & Rendón (2012); Economou, Hassapis, Philippas & Tsionas (2016)

Source: Own elaboration.

The relationship between the dependent variable and the independent variables selected for the Ecuadorian case is represented as follows:

$$FDI_t = \beta_0 + \beta_1 MS_t + \beta_2 TO_t - \beta_3 LC_t - \beta_4 MS_t - \beta_5 TPI1_t - \beta_6 TP2_t - \beta_7 ES_t + \beta_8 PS_t + U_t$$

where,

U_t = error term

TP1 = foreign currency outflow tax

TP2 = income tax rate

3.2. Model estimation and hypothesis testing

The process carried out to verify which variable is significant in attracting FDI to Ecuador was a multiple regression analysis of variables in a log-linear model time series; a statistical process that allowed establishing the relationship between the dependent variable (FDI) and the set of independent variables detailed above (table 2) in order to predict the dependent variable through the formulation of an estimation equation that describes such relationship with a high level of precision (Levin & Rubin, 2010), which in table 4 is represented by R2, a coefficient of determination which it can be inferred that the variation in GDP per capita and the FCOT explain the variation in FDI received in Ecuador by 75.58%. Likewise, as this is a multiple regression composed of two independent variables, the interpretation of adjusted R2 contributed to the determination of the degree of effectiveness (70.15%) that these independent variables have to explain the dependent one. It is appropriate to point out that for the estimation of this model, natural logarithms (Nl) were used for each variable (table 3) in order to reduce the levels of the time series used without affecting its structure, which in turn facilitates the interpretation of the results obtained in the model. Table 3 shows a value of 0 for the FCOT in 2007, since this tax came into effect in 2008; Thus, the data analyzed were taken from this last year since there is no result for a natural logarithm of zero.

Table No. 3 Data of the variables in natural logarithms

Years	Y FDI	X₁ GDP per capita	X₂ Foreign currency outflow tax (FCOT)		NI(FDI)	NI(GDP)	NI(FCOT)
2007	193,872,526.90	3,567.84	0		NI(FDI)	NI(GDP)	NI(FCOT)
2008	1,057,368,020.15	4,249.02	0.50%		20.779049	8.354443	-5.298317
2009	308,610,890.11	4,231.62	1.00%		19.547592	8.350339	-4.605170
2010	167,866,320.36	4,633.59	2.00%		18.938679	8.441087	-3.912023
2011	646,077,358.69	5,200.56	2.00%		20.286430	8.556521	-3.912023
2012	567,410,300.86	5,682.05	5.00%		20.156593	8.645066	-2.995732
2013	727,064,206.26	6,056.33	5.00%		20.404525	8.708859	-2.995732
2014	776,601,946.09	6,377.09	5.00%		20.470438	8.760467	-2.995732
2015	1,331,260,337.31	6,124.49	5.00%		21.009392	8.720051	-2.995732
2016	754,651,868.12	6,060.09	5.00%		20.441767	8.709480	-2.995732
2017	624,567,412.26	6,213.50	5.00%		20.252570	8.734480	-2.995732
2018	1,455,930,145.24	6,295.94	5.00%		21.098911	8.747660	-2.995732
2019	966,153,269.50	6,183.82	5.00%		20.688833	8.729692	-2.995732

Source: Own elaboration.

Table No. 4 Execution of the model

```
Dependent Variable:  LFDI
Method: Least Squares
Date: 01/09/21   Time: 16:39
Sample (adjusted): 2008 2019
Included observations: 12 after adjustments

    Variable     Coefficient   Std. Error    t-Statistic     Prob.

    LGDPPC        9.707426      1.964184      4.942218       0.0008
    LFCOT        -1.582418      0.388569     -4.072425       0.0028
    C           -68.85116      18.21661      -3.779581       0.0044

R-squared            0.755813    Mean dependent var      20.33956
Adjusted R-squared   0.701549    S.D. dependent var       0.603458
S.E. of regression   0.329673    Akaike info criterion    0.830887
Sum squared resid    0.978159    Schwarz criterion        0.952114
Log likelihood      -1.985324    Hannan-Quinn criter.     0.786005
F-statistic         13.92849     Durbin-Watson stat       2.653995
Prob(F-statistic)    0.001757
```

Source: Own elaboration thorough the EViews software.

The results obtained were calculated based on a significance level of 5%, for this reason, the aforementioned level of precision of this econometric model is also derived from the fact that the P-values (Prob.) Are less than 0.05: 0.0008 for GDP per capita and 0.0028 for FCOT. This implies that both variables are statistically significant and therefore useful to explain the behavior of FDI. In addition, the critical value indicator of F, Prob (F-statistic) registers a value of 0.0017, which means that the proposed model as a whole is significant, since it is less than 5%. On the other hand, it should be noted that the regression coefficients (Coefficient) also present high percentages, which means that in the case of GDP per capita, for each percentage point that it increases, FDI increases by 9.70%; On the other hand, for each percentage point that the FCOT increases, there will be a fall in FDI of 1.58%. Once the most influential variables have been determined, the equation would be expressed as follows:

$$FDI_t = \beta_0 + \beta_1 MS_t - \beta_5 TP1_t + U_t$$
$$FDI_t = -68.85 + 9.71\, LogGDPPC_t - 1.58 LogFCOT_t + U_t$$

3.2.1. Unit root test

Each of the following tests carried out to validate the developed model has a null hypothesis, which if accepted, would be suggesting that there is not enough statistical evidence to reject it; or in case of being rejected, it would be understood that there is not the necessary statistical evidence to accept it (Levin & Rubin, 2010). The objective of the unit root test is to demonstrate that the variables do not have a relationship in the long term. This happens when considering as a reference criterion the same 5% that has been used throughout the estimation of this model; thus in this case the P-value is equal to zero (table 5), which is less than 5%, so it would be rejecting the null hypothesis of unit root; then, it could be said that the variables are cointegrated, which means that in the long term are altered in an almost parallel way.

Table No. 5 Unit root test

```
Null Hypothesis: RESID02 has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=2)
```

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.269522	0.0000
Test critical values:	1% level	-4.297073	
	5% level	-3.212696	
	10% level	-2.747676	

```
*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
         and may not be accurate for a sample size of 10


Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID02)
Method: Least Squares
Date: 01/10/21   Time: 22:10
Sample (adjusted): 2010 2019
Included observations: 10 after adjustments
```

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID02(-1)	-2.661764	0.287152	-9.269522	0.0000
D(RESID02(-1))	0.945673	0.175629	5.384488	0.0010
C	-0.067212	0.048587	-1.383331	0.2091

R-squared	0.937900	Mean dependent var	0.000550
Adjusted R-squared	0.920157	S.D. dependent var	0.536143
S.E. of regression	0.151496	Akaike info criterion	-0.693196
Sum squared resid	0.160656	Schwarz criterion	-0.602420
Log likelihood	6.465980	Hannan-Quinn criter.	-0.792776
F-statistic	52.86042	Durbin-Watson stat	2.064676
Prob(F-statistic)	0.000060		

Source: Own elaboration thorough the EViews software.

3.2.2. Heteroscedasticity test

An important assumption of the classical linear regression model is that the random variations of the regression data are homoscedastic, that is, they all have the same variance (Gujarati & Porter, 2010). The heteroscedasticity test allows to verify the reliability of the economic model by analyzing how wide the variability is in the data that compose it. In this case, it was established as a null hypothesis that the model has homoscedasticity, which was not rejected, since when the value (Prob. F) is more than 5%, it is understood that the data have a constant variance, so the alternative hypothesis of heteroscedasticity is rejected; Thus, in table 6 it can be observed that

such value reaches 46.59%, which recognizes the homoscedasticity of the data in this model.

Table No. 6 Heteroscedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.832528	Prob. F(2,9)	0.4659
Obs*R-squared	1.873471	Prob. Chi-Square(2)	0.3919
Scaled explained SS	0.550106	Prob. Chi-Square(2)	0.7595

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 01/10/21   Time: 22:12
Sample: 2008 2019
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.466503	4.881741	-0.095561	0.9260
LGDPPC	0.075363	0.526368	0.143176	0.8893
LFCOT	0.029279	0.104130	0.281176	0.7849

R-squared	0.156123	Mean dependent var	0.081513
Adjusted R-squared	-0.031406	S.D. dependent var	0.086991
S.E. of regression	0.088347	Akaike info criterion	-1.802777
Sum squared resid	0.070246	Schwarz criterion	-1.681550
Log likelihood	13.81666	Hannan-Quinn criter.	-1.847659
F-statistic	0.832528	Durbin-Watson stat	2.599477
Prob(F-statistic)	0.465862		

Source: Own elaboration thorough the EViews software.

3.2.3. Autocorrelation test

Autocorrelation or serial correlation refers to a mutual dependence between members of series of observations ordered in time (Gujarati & Porter, 2010), that is, the error term (disturbance) influences the time series for more than one period, thus becoming a drawback that usually occurs in econometric models. However, in this case the residuals are not self-correlated; This can be noticed when applying the Breusch-Godfrey serial correlation test, which, when presenting a P-value of 32% (Prob. F), clearly exceeds the 5% that is taken as a reference so as not to reject the null hypothesis of this test: that the model lacks autocorrelation, thereby rejecting the alternative hypothesis that the present model has serial correlation.

Table No. 7 Autocorrelation test

Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	1.083731	Prob. F(1,8)		0.3283
Obs*R-squared	1.431655	Prob. Chi-Square(1)		0.2315

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 01/10/21   Time: 22:12
Sample: 2008 2019
Included observations: 12
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDPPC	-0.359965	1.985453	-0.181301	0.8606
LFCOT	0.067576	0.392183	0.172307	0.8675
C	3.336572	18.41355	0.181202	0.8607
RESID(-1)	-0.351391	0.337544	-1.041024	0.3283

R-squared	0.119305	Mean dependent var		-9.46E-15
Adjusted R-squared	-0.210956	S.D. dependent var		0.298200
S.E. of regression	0.328150	Akaike info criterion		0.870511
Sum squared resid	0.861460	Schwarz criterion		1.032146
Log likelihood	-1.223063	Hannan-Quinn criter.		0.810667
F-statistic	0.361244	Durbin-Watson stat		2.423548
Prob(F-statistic)	0.782848			

Source: Own elaboration thorough the EViews software.

3.2.4. Multicollinearity test

"Multicollinearity designates a perfect or exact linear relationship between some or all the explanatory variables of a regression model" (Gujarati & Porter, 2010), that is, when the independent variables (in this case the GDP per capita and the FCOT) they are related to each other and therefore could not explain the behavior of the dependent variable (in this case FDI) individually. The criterion taken to determine the absence of multicollinearity in a regression model like this one is that the variance inflation factor (Centered VIF) is less than 10; a criterion that, as it can be seen in table 8, is fulfilled when registering a value of 9.47 for both GDP per capita and for the foreign currency outflow tax. Therefore, the hypothesis of multicollinearity among the model variables is rejected.

Table No. 8 Multicollinearity test

```
Variance Inflation Factors
Date: 01/10/21   Time: 22:14
Sample: 2007 2019
Included observations: 12
```

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LGDPPC	3.858020	31672.01	9.476283
LFCOT	0.150986	210.7201	9.476283
C	331.8449	36639.50	NA

Source: Own elaboration thorough the EViews software.

DISCUSSION AND CONCLUSIONS

After having developed an econometric model in order to identify which of the seven variables that made it up influence the attraction of foreign direct investment to Ecuador; it is important to contrast the results obtained with those of other authors who have developed similar investigations. It is accurate to start by mentioning that the findings of the econometric model and research in general highlight the impact of two variables, specifically the size of the market with its GDP per capita indicator and tax policies with its indicator foreign currency outflow tax, with positive and negative signs, respectively. This means that the higher GDP per capita, the higher the FDI (+) and the higher the FCOT, the lower the attraction of FDI (-). This expectation was fulfilled in the model obtaining a result of 9.71 for GDP per capita and -1.58 for FCOT. Based on these results, a consistency between them and the literary compilation made on the determinants of FDI can be noted (chapter 1).

In the case of the market size variable, different authors find GDP per capita as a useful indicator for the analysis of this variable. Thus, Economou, Hassapis, Philippas & Tsionas (2016) specify in the development of their econometric model the use of a fixed effects panel, with which for the GDP per capita variable a regression coefficient is obtained from which it can be interpreted that for each percentage point that this increases, FDI will increase by 3.88%; even when it can be noted that this value differs by more than 5 percentage points compared to the model applied in this research, this could be due to the fact that these authors used a significance level of 1%, which increases the level of precision of their model. On the other hand, it is appropriate to mention the peculiar behavior of the tax policies variable when taking income tax as an indicator, therefore, for Economou et al. (2016) this variable is significant for 24 OECD member countries, but not for the 22 developing countries under study, which shows a new coincidence between the data obtained here and those obtained by said authors.

In the research made by Rodríguez & Forero (2016), the size of the market is also considered through GDP per capita as a relevant variable since this indicator takes into account the total production and the purchasing power of the agents of the economy. However, when comparing other variables used between this study and

that of these authors, opposite conclusions can also be found. This happens with the variables of trade openness and macroeconomic stability, since in this study they were not significant, while for Rodríguez & Forero the degree of trade openness and the level of inflation that a country has is decisive. Another research that resembles the results obtained in this investigation was that of Castillo Cedillo, Cruz Vásquez & Pico González (2017), who despite having applied cross-sections, instead of time series, found that GDP per capita is one of the main attractions for the location of FDI.

Even when the three research works mentioned in the paragraphs above agree that GDP per capita is directly related to FDI, it should be mentioned that unlike what happened in this research, the indicator foreign currency outflow tax was not included in none of these three analyzes. However, there are authors who emphasize the influence that taxes have on the motivation or demotivation to allocate FDI in a given country. Thus, in the literary compilation carried out by Jiménez & Rendón (2012), an allusion is made to the inverse relationship that exists between tax policies and FDI, which of course coincides with the finding of this research when the FCOT was taken as an indicator for the analysis of the tax policies variable. Several authors refer to tax policies through taxes on profits. In the Ecuadorian case, this description of taxes could be associated with income tax, however, contrary to what was suggested by Economou, et al. (2016), this indicator was not relevant for this model, which is why FCOT was used as an indicator, which is levied on the profits that leave the country.

Variables such as economic stability, political stability and labor costs, which for other authors such as Mogrovejo (2005), Economou et al. (2016) and Jiménez & Rendón (2012) are determinants for the location of FDI flows, in the development of this model they did not meet the necessary criteria to qualify them in the same way. On the other hand, it is necessary to point out that all the investigations analyzed in chapter 1 for the development of this degree work obtained as a result that five or more variables are important to explain the destination of FDI; unlike what happened in this model, which resulted in only two significant variables. This may be due to the fact that all the authors have in common that their research was applied to a group of countries, not to just one, as in this case where it was applied specifically to Ecuador.

After having carried out an in-depth investigation in order to identify the main factors that explain foreign direct investment in Ecuador during the period 2007-2019, it was possible to identify those variables that had the greatest incidence in research by different authors who applied their analysis to groups of countries, either by random selection, countries from a certain geographical area, members of an organization or selected by some other specific criteria (as in the case of developing countries). The variables identified were market size, trade openness, labor costs, macroeconomic stability, tax policies, economic stability and political stability, which were used to note the behavior of FDI during the 12 years that were analyzed. This information was useful to observe that in Ecuador there has been an uneven flow of FDI received; for example, in 2010 an FDI of just $165 million and in 2018 a value of almost $1.5 billion; this, added to the high amount of money that leaves the country as a result of investment income, which in addition to causing imbalances in the Ecuadorian trade balance, can be understood as that the country is not attractive for reinvestment.

An analysis was also carried out of the economic sectors to which foreign investors allocate their money, obtaining as the predominant sector the exploitation of mines and quarries from 2010 to 2019 with the exception of 2017, in which the manufacturing sector, with 23.04%, exceeded the mining sector by 12 percentage points. Finally, with the annual data obtained from the seven variables mentioned above, an econometric model was developed that identified the relationship between each of these independent variables and the dependent variable, FDI. This model was executed through a multiple regression of variables in time series, for which the "Eviews" software was used, in which all the data were entered (table 3, chapter 3) for statistically discerning which were the most representative variables, even after having carried out different model validation tests. As a result, it was obtained that both the market size variable (GDP per capita) and the tax policy variable (FCOT) are those that explain FDI in Ecuador during 2007-2019.

Although the results of this model suggest that two out of seven are the most representative, it would be inappropriate to isolate the rest, since in practice improving the condition of a country regarding one of these will necessarily involve changes related to one or more other variables. However, given that market size and tax policies are the variables that make up this model, it is appropriate to make suggestions that take them as their axis. In the case of GDP per capita, an indicator

of the market size variable, the country should focus its efforts on achieving broad GDP growth, since population growth is a factor that cannot be controlled. One of the strategies that could be applied to achieve this goal is the promotion of national investment, for example, through the reduction of the interest rate on loans granted to MSMEs, since this would allow companies to finance the purchase of capital goods for its operation. Linked to the improvement of the conditions related to the GDP is also the simplification of procedures and the reduction of taxes, aspects that motivate the formation of companies. Of course, not by the simple fact of creating a company it can be taken for granted that it will be successful; for this to have a greater probability of happening, the company created must be the result of the creative and innovative way in which it can add value to raw materials, while minimizing costs in order to receive a higher profit.

Then, by motivating the establishment and registration of national or foreign companies through reducing bureaucracy and tax payments, indirectly the creation of employment in the country would be allowed. Thus, the generation of jobs is crucial for an economy since the income received by the workers would be promoting the consumption of various products. Regarding the reduction of taxes, it should be clarified that this should be applied to those that may have a negative rather than a positive impact on the country's economy; an example of this happens with the FCOT, which, according to the econometric model developed here, discourages the entry of foreign capital. Although this tax was established with the intention of reducing the outflow of foreign currency from Ecuador, this has not been achieved, since, as it can be analyzed through data taken from the balance of payments published by the Central Bank, when comparing the outflow of foreign currency for investment income in the period 2004-2011 compared to 2012-2019 (years in which the rate of this tax is 5%) there is an increase of more than 400 million dollars. Thus, according to what has been analyzed, the advisable thing would be to reduce such tax, but not eliminate it, since the tax collection that it generates collaborates with the financing of the state.

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