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Analysis of the determinants of Foreign Direct Investment (FDI) in developing countries

Specific case of Colombia

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For my loving ones, my dad, my mom, my grandmother, my aunt and my sister whom forged the person that I am today.

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Papá: Este triunfo te lo dedido a ti por todo el esfuerzo y empeño que pusiste para que yo pudiera estar aquí, el hecho de que yo esté finalizando esta maestría el día de hoy es gracias a ti.

Abstract:

Foreign direct investments have been on increase on the last few years; according to the United Nations Conference on Trade And Development (UNCTAD) although FDI flows for developing countries decrease by 12% to an estimated of US$616 billion, they accounted for 72% of the global FDI, the highest share on record (UNCTAD, 2021). Colombia, one of the so-called developing countries, and located in South America is well known for its biological diversity and different climates due to its location between the mountains, deserts, the sea and the ocean, but is also well known for its crime record and multiple security problems; despite this, the country had an inflow investment of US$14.4 billion coming from developed countries. (Pacific Alliance, 2020). The primary goal of this work is to identify the key factors that attract or discourage foreign investment in Colombia using statistical analysis, that uses some of the economic variables for each department of the nation as input. These variables, including the inflow investment of last years, crime rates, population, GDP, among others, were first selected; extracted from national statistical databases and then organized inside a single data set to be exported later to Stata, a statistical software. Once there, the conditional logit model (a location decision model) is applied in order to analyze the statistical relationship between the dependent variable, in this case, the choice or not to invest inside a specific department of Colombia during a specific time; and the independent variables that correspond to the economic variables mentioned before. The results show a positive relationship between the dependent variable choice with variables as the GDP, the college rate and the population; this means that these variables encourage positively a foreign investor to invest on a specific department. In a manner contrary, the economic variable measuring the number of homicides demonstrates a negative connection with the dependent variable, demotivating investors to perform a direct investment. Results are consistent with the performed investigation, because as it will be seen later, foreign countries prefer departments with high levels of GDP and college rates and in most cases, this coincides with their high values of population. These departments are also well recognized for having high homicide and crime rates; however, it is concluded that their economic strength as the nation's core and the downward trend in these crime variables over the past few years account for why international investors continue to invest in them.

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1. Introduction

Foreign Direct Investment is a well-known word in today's business world. Investing, creating new projects, and launching new facilities outside of borders will provide significant benefits to both the source and receiving countries. In simple terms, Foreign Direct Investment (FDI) is a cross-border investment aimed at establishing a long-term relationship that will lead to mutualism between the parties involved in the process. For developing countries, receiving an investment from an external economy means not only an injection of capital but also an expectation of growth and hope, new technologies, new business practices, employment increase and in general, country development. However, in order to be chosen for an investment, foreign countries must first assess the risks and benefits of doing so, as well as the host country's physical, social, and economic qualities. Also, before seeking for overseas chances, a firm in the foreign economy should build certain inherent advantages; this notion is known as the OLI paradigm, which will be discussed later in this text. With the positives, there may be certain negatives as a result of foreign investments in emerging countries. The goal of this document is to look at the primary factors that influence a foreign country's decision to invest in a developing country like Colombia. In the early chapters, the reader is introduced to the key terms of Foreign Direct Investment, as well as its determinants, benefits, and potential pitfalls. Then, starting with the current global scenario and progressing to the specific instance of Colombia, where the history and impacts of FDI are reviewed, an analysis of recent FDI patterns is carried out. An empirical analysis is performed at the end of the project using the statistical program Stata, and the results will explain what are the key drivers that lead a foreign country to invest in Colombia’s departments based on a certain set of economic variables.

2. Definitions and basic terminology

2.1. Direct Investment

According to the OECD, a direct investment “is a category of cross-border investment made by a resident in one economy with the objective of establishing a lasting interest in an enterprise (is resident in an economy other than that of the direct investor. The motivation of the direct investor is a strategic long-term relationship with the direct investment enterprise to ensure a significant degree of influence by the direct investor in the management of the direct investment enterprise.” (OECD, OECD Benchmark Definition of Foreign Direct Investment, 2008) The “lasting interest” is noticed when the direct investor has acquired at least 10% of the voting power or the ownership of the direct investment enterprise

2.2. Foreign direct Investor

An entity inside one economy that has acquired at least 10% of the voting power of another corporation or enterprise of another economy (directly or indirectly) is the so called foreign direct investor. A direct investor could be as follows:

- an individual
- a group of related individuals
- an incorporated or unincorporated enterprise
- a public or private enterprise
- a group of related enterprises

2.3. Direct Investment Enterprise

When an investor resident in another economy acquires (directly or indirectly) 10% or more of the voting power of an enterprise, this enterprise is called to be a direct investment enterprise. This acquisition determines the creation of a direct investment relationship between the foreign direct investor and the enterprise. An ownership of more than 10% is necessary to prove influence and effective voice of the investor inside the management; direct investors may have direct investments on enterprises of one or many economies.

2.4. Modes of Foreign Investment

There are different ways in which a Multinational Enterprise (MNE) or a foreign investor carry out the production process in the direct investment enterprise. There are three well known strategies, the greenfield investment, mergers and acquisitions, and joint ventures.

2.4.1. Greenfield Investment

According to Robert C. Feenstra and Alan M. Taylor a greenfield investment is defined is the construction of new plants abroad (Feenstra & Taylor, 2016). In greenfield investment, a parent company build new operational facilities and acquire new fixed assets in the foreign country. (Chaudhuri & Mukhopadhyay, 2014). Perform a greenfield investment usually means to build a new project starting from zero and requires extended periods of time of physical construction and organizational development (Eiteman , Stonehill , & Moffet, 2021)

2.4.2. Acquisitions

Mergers refers to the complete absorption of one firm by another. (Ross, Westerfield , & Jordan, 2019); the acquiring firm preserves its name and identity and acquires all the assets and liabilities of the acquired firm; the acquired firm quits to exist as a separate business entity. A consolidation is the same as a merger, except that a new completely legal identity is created i.e. the direct investor and the acquired firm end their previous legal existence and form a new firm.[1] When an acquiring firm decides to develop a merger to acquire a firm it may enjoy some benefits and face some disadvantages. For example, mergers are legally simple and are relatively cheaper than other forms of acquisition.[2] However in order to do a merger, this has to be approved by the shareholders of both firms, usually a specific quantity of share votes are necessary for approval[3]; getting this quantity of votes may be time-consuming and difficult. Opposite to greenfield investments where long time periods are required, a cross border merge (i.e.

[1] The rules for mergers or consolidations are the same, the main difference remains on the creation or not of a new firm. Both results in a combination of assets and liabilities of both; acquiring and acquired company.
[2] The main reason is because both firms agree to combine their operations.
[3] Usually two-thirds or even more.

a merge between two firms that are located in different countries) acquires an existing company shortening time to gain presence and entry to the market, at the same time eliminating a local competitor. The biggest risk or the biggest gain when carrying out a merge is always the blend between corporate cultures, the born of a new effective management and the creation of synergies is a challenge for the transition. [4]

2.4.3. Joint venture

A Joint Venture is a business entity with shared ownership, that shares the benefits and the risks in the business. Both parties create a new entity contributing their equity and share the revenues, expenses and control of the company; pursuing a joint goal. Developing countries see FDI as source of national growth and economic development, however these benefits could be enhanced and effectively absorbed if the Joint Ventures include a partner from the same economy (domestic partner). Domestic partners have less capital and experience to contribute to the Joint Venture but could bring an extensive and rare knowledge about business practices in their home country. FDI investments require a combination of skills, technology and competencies that many firms do not possess; a Joint Venture could provide these skills to each partner (foreign or domestic) in a complementary relationship that could lead to a success or a failure. Divergences between both parties about cash dividends, valuation of equity shares, opportunities of capital and their contribution to portfolio return and variance are the main potential challenges to address when a Joint Venture is agreed. (Eiteman , Stonehill , & Moffet, 2021)

[4] Address (Eiteman , Stonehill , & Moffet, 2021) pages 576-578

3. Determinants of FDI

3.1. The OLI paradigm

The OLI paradigm was stated by British economist John H. Dunning and attempts to explain the decision of a multinational enterprise to undertake Foreign Direct Investments (FDI). The OLI paradigm or OLI theory was first presented at a Nobel symposium in Stockholm in 1976, its origins date back to 1950. At that time, Dunning was writing his PhD. Thesis on US investments in the United Kingdom's manufacturing industry, earlier studies showed that the labour productivity inside the American manufacturing industry was on average 2 to 5 times higher than UK industry. Dunning reflect on this productivity gap and questioned himself if it was due to superior native resources of the US compared to the UK economy, or if it was due to more proficient way in which the managers of the US harnessed and organized these resources; according to Dunning this capability might be transferable across national limits. With the Above, Dunning posed his thesis' hypothesis: "If the higher productivity was entirely managerially related, US manufacturing affiliates in the UK should perform at least as their parent companies, and perform considerably better than its domestic competitors." (Dunning J. , 2001) This was identified as the Ownership-specific (O) effect. [5] If, However US subsidiaries in the UK were not showing significant better performances than their UK competitors, and then, much worst than their parent companies; Dunning hypothesized that this would be due to the native and non-transferable characteristics of the US economy, he called this the Location (L) specific component of any productivity differential.

As Dunning were expecting, he discovered that US affiliates were not as productive as their parent companies but were significantly more productive than their domestic competitors; this suggests that productivity differences were to some extent interpretable by Location (L) and Ownership (O) specific characteristics[6]. In 1976 during the Nobel symposium in Stockholm; Dunning extend the O and L advantages on his earlier research to include another group of variables related to the way companies administrate the generation and use of the resources and capabilities within their boundaries and those other that they could access in different locations. To fully explain the scope and

[5] The firm must have competitive advantages inside its home economy, these advantages should be firm specific, not easily copied and in a form that allows them to be transferred to its foreign subsidiaries. (Eiteman , Stonehill , & Moffet, 2021)
[6] At least in the British-American specific case, in the 1950's

pattern of foreign value-added activities of firms, it is necessary to explain why such firms opted to generate and/or exploit their specific “O” advantages internally rather than acquire or sell these in the open market. Such advantages Dunning called to as Internalization (I) advantages. If a firm meets having these three types of advantages, it can lead them to perform FDI over licensing or outsourcing.

3.2. Characteristics of the Host Country

In the book “Foreign Investments in Developing Countries” by H.S Kehal (Kehal, 2004) a list of important characteristics reviewed by foreign countries in order to select a host economy, are stated, these are:

- In order to establish an investment, foreign firms must consider the size of the host country's market. Countries having a larger market, better growth prospects, and more purchasing power are chosen.
- Multinational corporations are more likely to enter regions when entry is reasonably simple and host countries encourage foreign investment and financing through favorable legislation (relaxed regulations).
- When multinational firms aspire to service local markets in host nations, customer preferences play a major role in influencing FDI.
- The supply of raw materials, skilled and unskilled labor, as well as the cost and quality of labor, all play a role in determining FDI in host countries.
- Infrastructure input availability, quality, and cost are also essential determinants of FDI. Roads, seaports, railroads, and telecommunications are examples of physical assets, whereas accounting and legal services are examples of institutional development. Countries may have low-cost labor, but if they lack the requisite supporting services or infrastructure, MNEs will not locate there.
- The political risk includes many dimensions to be evaluated; the PRS Group publishes an overall political risk rating that agglomerates many of them as: government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religion in politics, law and order, ethnic tensions, democratic accountability and bureaucracy quality. (The PRS group, s.f.)

4. Positive and Negative effects of FDI on developing countries

John Dunning performs a very complete analysis about the positive and negative contributions of FDI inside host countries within his article called “Re-evaluating the benefits of foreign direct investment” published inside the Transnational Corporation journal in 1994 (Dunning J. H., 1994). For each positive contribution stated by Dunning, a negative scenario related to each of them is written; also, certain characteristics of the host country that might enhance the benefits of the investment are described. Hwy-Chang Moon, also include inside her book “Foreign Direct Investment: A Global Perspective” specifically in chapter 5 “FDI Impacts on Country: From Negative to Positive Perspective” some relevant points that were useful to complement the explanation of benefits and drawbacks of the FDI on host countries. (Moon, 2015)

4.1. Capital Investment

PROS

- The injection of new capital to developing countries by attracting foreign direct investment will help to their internal development. Foreign companies, usually with a high financial power, have access to many resources that are completely new to host countries; the introduction of these resources could lead to access to new practices and capabilities

CONS

- The foreign country could provide very few resources or could provide ones with the wrong kind. Also, a high capital contribution is followed by a high outflow of earnings bound for the foreign firm; local governments might intervene limiting the amounts of earnings that could be repatriated but, consequently, this could lead foreign economies to not to invest in these locations.

4.2. Technology Transfers

PROS

- According to the OECD, the transmission of new technologies might be the most important and large provider of positive externalities from the foreign country to developing economies. (OECD, Foreign Direct Investment for Development,

2002). When a foreign country starts operating in a developing country, the transmission and introduction of innovative and trending technologies lead to a stimulation of the economic development, acquisition of new practices and new skills.

CONS

- "Economic development is dependent on technological progress." (Patel, 1974) Technology or technical knowledge is not restricted for a single territory, rather, it has a very transnational behavior and its dissemination, adoption and adaption very broad and transmissible across frontiers. But it is the transmissibility of this knowledge the main factor causing interdependence between nations, especially for developing countries in order to exploit desirable benefits. The main trouble are the rigid obstacles that the transfer of information should face due to limitations on the market and the weak bargaining position of host countries. (as the transfer of technological information inside them flows only in one direction i.e. only as receivers but not as suppliers). "The more developed a poor country becomes, the greater the scope for increasing its technological dependence"[7]

4.3. Business Development

PROS

- Introduction of new technologies, new practices, new resources, enhancement of the quality of workers by the acquisition of new insights and new the recruitment of ones with high levels of training (attracted by higher wages) produces a significant improvement on economic efficiency inside companies. Expansion of sales, minimization of production costs, bigger profits.

CONS

- Sometimes when the acquisition of voting power is a major factor, foreign companies introduces also new changes in management and inside the corporate governance. Finding synergies with the previous board of directors is not an easy task to achieve and could lead to a decrease of the productivity of the company. In addition, multinational firms will not only introduce new business practices inside their subsidiaries in host countries, but also new and different

[7] Refer to (Patel, 1974) page 8.

kind of products. This results in a cultural change which may lead to frictions inside the society's members.

4.4. Competition

PROS

- Another big contribution is the creation of new industries inside the host economy, or the growth of local firms by the introduction of foreign ones (positive correlation). [8]

CONS

- Foreign direct investment (FDI) may hinder domestic companies from investing. If the domestic market's capital supply is curtailed or the cost of capital rises, this could happen. Because they do not receive capital injections, local enterprises' capacities are not completely realized. A deterioration of the balance of payments can arise as profits are repatriated.
- "Numerous case studies of FDI in manufacturing and extractive industries have revealed that foreign corporations' operations sustain a small oligarchy of local partners and suppliers, squeezing out other native producers. Foreign corporations' tight control over technology, higher management techniques, and export routes and hence, limits spillovers to local enterprises, create monopolies, and raise inequality in host nations." (Bayulgen, 2010)

4.5. Environmental Control

PROS

- New technologies introduced in the less developed countries are usually more modern and environmentally friendly, and cleaner than the ones that are used locally. According to the Pollution Halo Hypothesis, multinational enterprises transfer greener technologies to the host country.

CONS

[8] Local firms are forced to perform at higher levels to successfully compete with the direct investment enterprises i.e. enterprises benefited with FDI

- Competition between countries for attracting FDI produce that governments don't introduce new environmental of taxes regulations, Brian Copeland and M. Scott Taylor call this phenomenon as the Pollution Haven Hypothesis (PHH) where foreign enterprises will select countries with weak environmental policies to allocate operations. (Copeland & Taylor, 2004)

Foreign Direct Investment is a source of economic growth for developing countries. The impact of its introduction depends on the reach of certain conditions inside the local economy and the spillover effects are not always certain. However, all the benefits described above contribute to increase the economic capacity of a country which is the strongest tool to fight many problems inside developing countries (poverty, unemployment, social conditions). Despite of the possible negative effects that could arrive, FDI is seen as source of hope, and foreign enterprises and local governments know it clearly, the first ones studying possible places to invest and the last one, planning strategies to be selected.

5. FDI trends in the world

“In 2021, global FDI is expected to increase by 88 percent to US$1815 billion, representing a 37 percent increase above levels before COVID19. Globally, the United States was the most desired FDI destination, followed by China, Canada, and Brazil. With more than $100 billion in FDI outflows in 2021, the United States was also the largest source of FDI investments, followed by Germany, Japan, China, and the United Kingdom. FDI inflows into developing countries have increased by 30% to approximately $870 billion.” (OECD, 2022)

The effects of the pandemic appear to have long-term implications, according to Kearny, a global management consulting firm with offices in more than 40 countries worldwide; business leaders worldwide will remain cautious and less optimistic for the next three years, with only 57 percent expressing optimism for the future (Laudicina & Peterson, 2021). However, for other companies, the situation is actually good, as the pandemic may result in new economic prospects brought about primarily by government incentives (e.g. support to crucial sectors for competitiveness and growth).

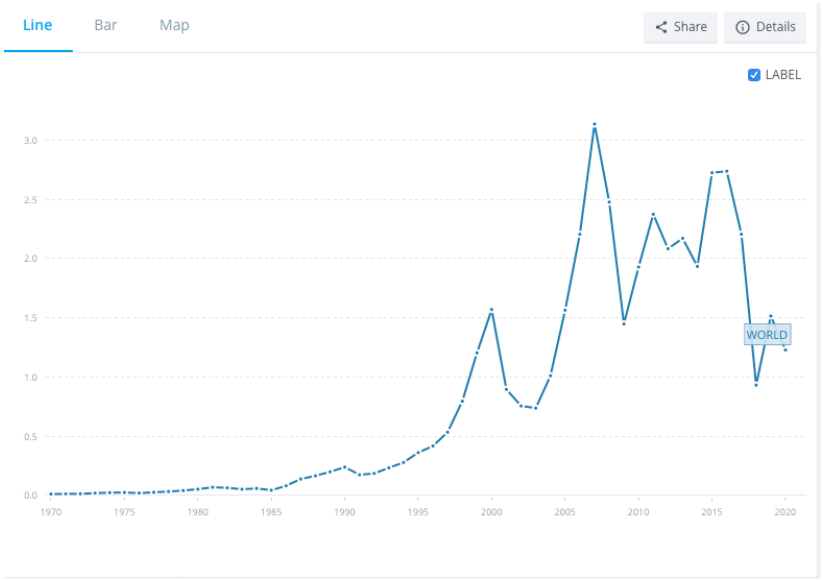

Figure 1 Global FDI trends since 1970 - 2020. Source: World Bank, International Money Fund

6. FDI in Latin American and the Caribbean

The COVID 19 pandemic in 2020 had a significant impact on FDI around the world. Inflows of foreign direct investment into Latin America and the Caribbean totaled US$105,480 billion, down US$56 billion from the previous year; this was the lowest level in a decade, and only similar to levels seen in 2009, when the global financial crisis was at its height. Except for the Caribbean's Bahamas and Barbados, South America's Ecuador and Paraguay, and Mexico, the whole area was seeing a downward trend. The most severely impacted economic sectors were those destined for the natural resources sector, which decreased by 47.9% in comparison to 2019; and those aiming at manufacturing, which fell by approximately 37%. FDI inflows to services accounted for over half of all FDI inflows. (ECLAC, 2021)

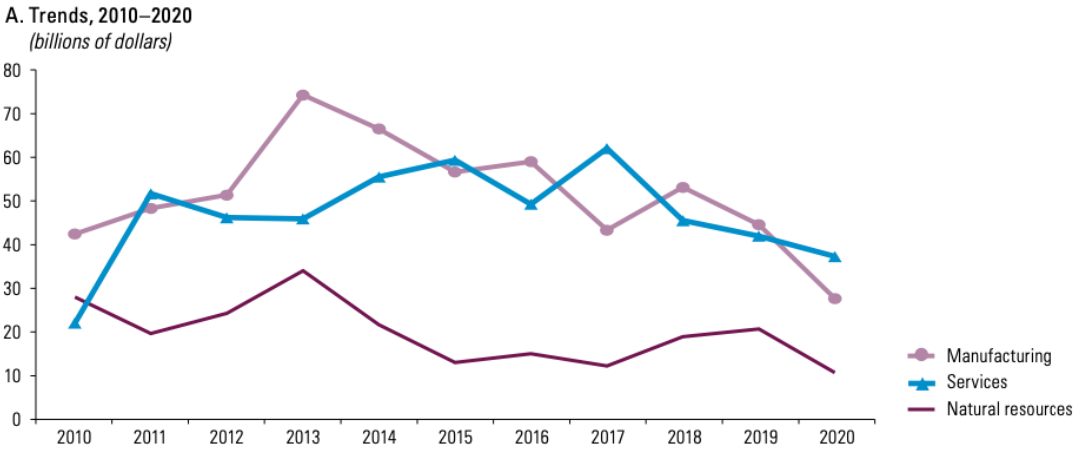

Figure 2 Trends on FDI on Latin America and the Caribbean

The value of cross-border mergers and acquisitions, which had dropped dramatically in 2019, fell even more in 2020, to US$475 million; nevertheless, this drop was less pronounced than the one seen the previous year.

7. Foreign direct Investment in Colombia

According to the National Bank of Colombia ("Flujos de inversiones directas en la economía colombiana", Subgerencia de Política monetaria e información económica; 2022), Colombia has been characterized for constantly receiving IED flows to all economic sectors uninterrupted. In the year 2021, total IED flows amounted US$9402 million, equivalent to the 3% of the national GDP, this value was US$1944 higher than the 2020 mark. (US$ 7459 million). (DTIE, 2022)

In Colombia, Multinational Enterprises develop a huge role, as they represent 17% of total investment on fixed assets of all enterprises on Colombia in 2018 and in average, MNE even exceed the Colombian enterprises concerning employment creation and efficiency as they are bigger, more intensive on capital and more productive; they hire 9 times more, produce 10 times more, and invest on fixed assets 9 times more. FDI has given to Colombia technology, administrative and operational abilities, access to markets for export, and in other hand, has helped to finance the current deficit of Colombian economy. (Li & Aranda Larrey, 2021)

Another important fact about foreign investment is its improvement to the performance of host companies, increasing productivity and employment and hence, increasing the salaries; this improvement is leaded by the injection of experience, knowledge and technology. However, firms with FDI are not significantly more profitable than domestic ones. (Fundación para la Educación Superior y el Desarrollo FEDESARROLLO, 2007)

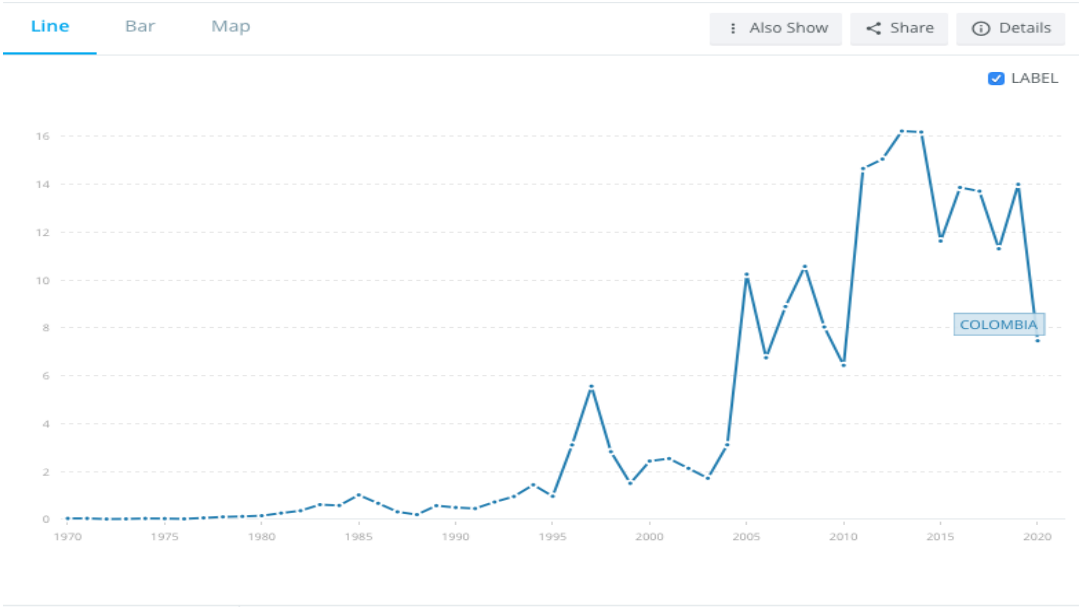

Figure 3 Foreign Direct Investment, net Inflows (BoP, current $US) - Source: Databank, International Money Fund

During 2021, the FDI was mainly aimed to economic activities of financial and business services, mining and petroleum, manufacturing, transport and communications.

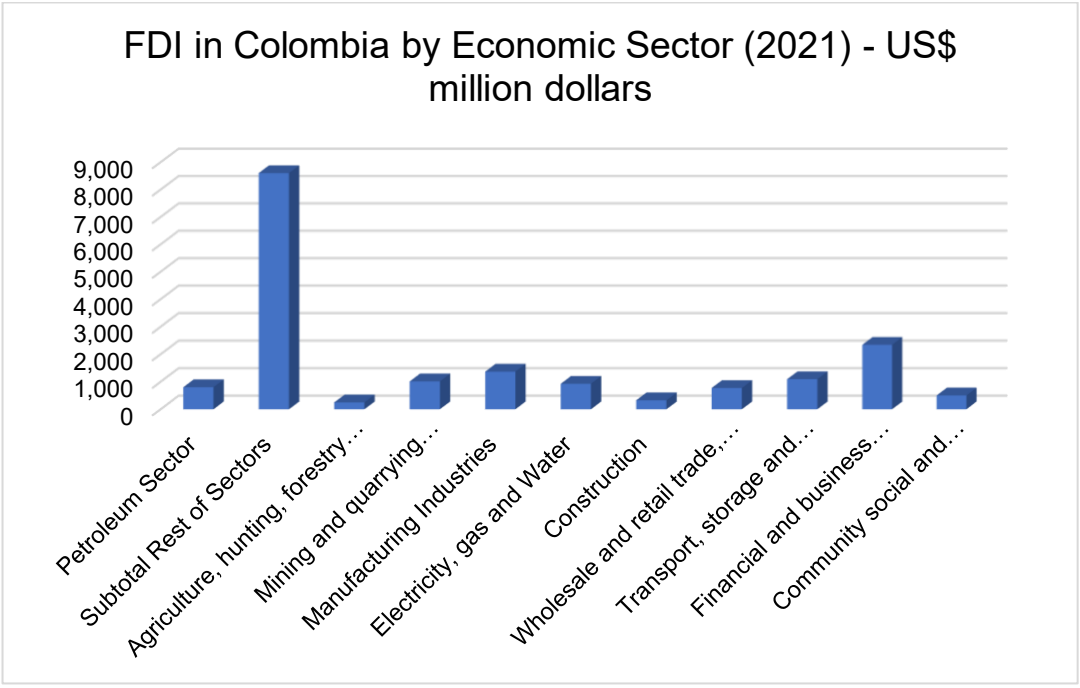

Figure 4 FDI in Colombia by Economic Sector (2021) Source: Banco de la República de Colombia

In the 2021 accumulate of flows, United States (US$1709,1 million dollars), Spain (US$1442,2 million dollars) and the Netherlands (US$1399 million dollars) were the countries that contributed the most.

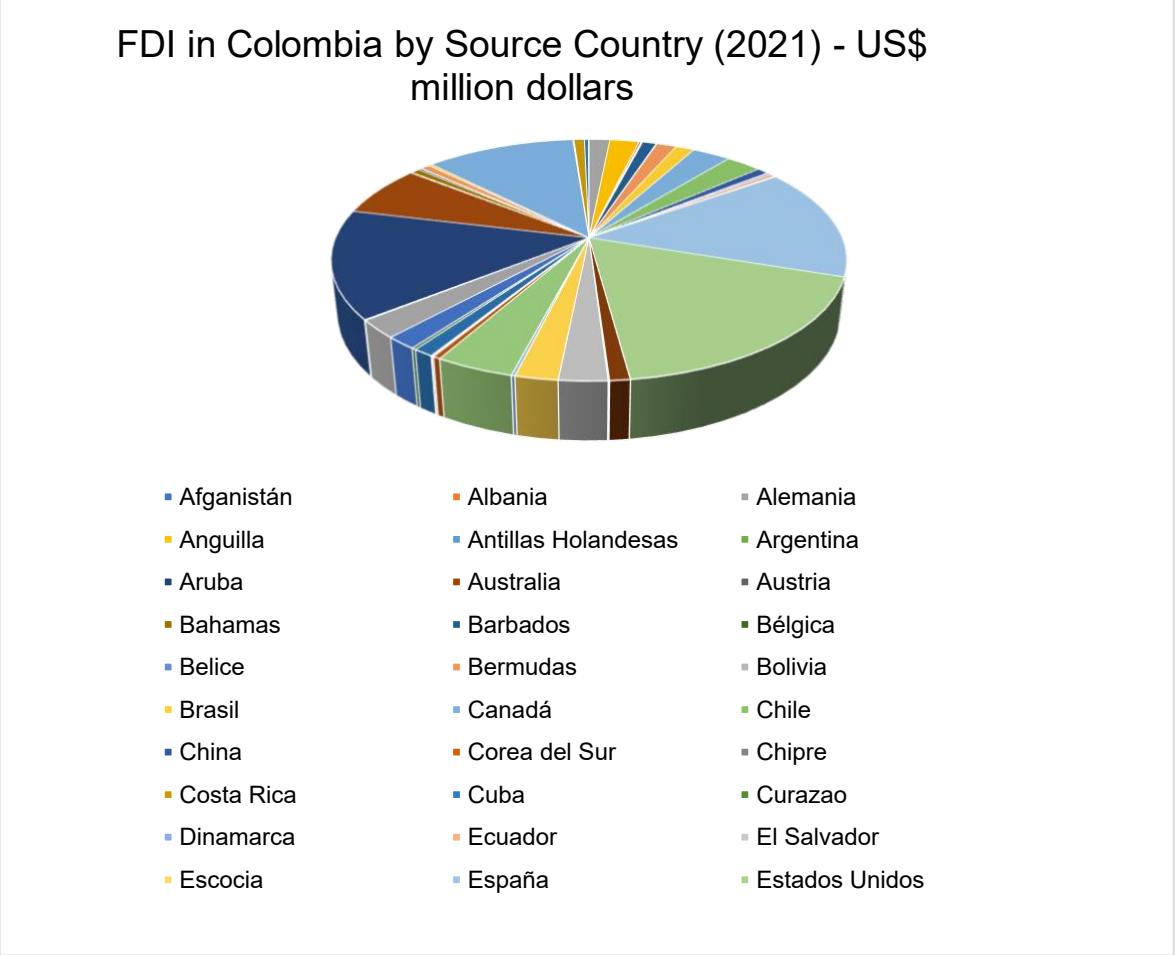

Figure 5 Foreign Direct Investment by Source Country. Source: Banco de la República de Colombia

The introduction of the FDI in the country can be separated in 3 stages, the first one starts from the end of 1960 until early 90's. During this time FDI legislation was especially restrictive (Fundación para la Educación Superior y el Desarrollo FEDESARROLLO, 2007) according to national legislations on the time, which promote productive development mainly from domestic resources, hence there were multiple constraints on sectors receiving FDI and on the capital and utilities transferences. The second stage starts with the economic opening at the beginning of 1990, where internalization of the

economy was introduced trough a reform package; at this point FDI was recognized as an important factor for the national develop and then bases for attract foreign investments to the country were settled, as restrictions on FDI to majority of sectors were erased (free transfer of capital and utilities). The third stage, starting on 2000 until present days, is characterized by the deepening the reforms to the FDI searching for simplicity and better conditions for investments, looking for attract foreign capital.

8. Competitiveness of Colombia

The international Institute for Management Development (IMD) prepares yearly the World Competitiveness Yearbook (WCY), a report and worldwide reference point on competitiveness of countries. ((IMD), 2021) It analyzes and ranks countries according to how they manage their competencies to achieve long-term value creation (IMD.org) inside the political, social and cultural dimension. The yearbook coverage 64 countries and based on 334 criteria and analyses and qualifies individually each country inside the ranking according to international, national and regional data alongside with Executive Opinion Surveys (i.e. measurement of competitiveness perceived by market participants) the inside social-economic performance of country. Specifically, for the purposes of this work, only Colombia will be analyzed.

The Overall ranking places Colombia in the 56th place in 2021, two positions lower in compared to previous year (54th) and according to yearbook Colombia should face some important challenges as support the execution of the infrastructure projects, generate employment and income for the most vulnerable population, promote development of the digital economy, strengthen public finances and carry out the vaccination plan talking about the pandemic situation.

The report made by the IMD also highlights the improvements and declines inside the overall performance of the economy; for example, for the year 2021 indexes as health infrastructure, consumer price inflation, total expenditure on R&D, current account balance, gasoline prices, number of internet users, growth of population and high-tech exports experienced a positive behavior. In the other hand, indexes as unemployment rate, real GDP growth per capita, youth employment, exports of goods, government subsidies, exchange rate stability and labor force growth in the long term suffer a decay compared to previous year. All the mentioned indexes were measured in their respective units.

As mentioned above the WCY prepare a political, social and cultural analysis for each of 64 countries. The report divides these complex economic variables inside three categories: competitiveness ranking, digital competitiveness ranking and talent ranking. Inside each of them, the countries will be ranked from number 1 to 64, it means, from the best to the weakest performance. Higher positions in the rank will mean a key strength of the country inside a certain category and lower positions will mean top weaknesses. These top strengths and weaknesses are single out for the digital competitiveness and talent rankings and for the specific case of Colombia are:

8.1. Talent competitiveness ranking

8.1.1. Top strengths

- Apprenticeships (overall rank 14): paid long-term experiences are well and sufficiently implemented.
- Employee training (overall rank 33): is a high priority inside companies.
- Cost of living index (overall rank 4): based on the basket of goods and services and housing.
- Collected personal income tax (overall rank 6)

8.1.2. Top weaknesses

- Pupil-teacher ratio on secondary education (overall rank 60): ratio of students to teaching staff.
- Attracting and retaining talents (overall rank 57)
- Justice inside the country (overall rank 55)
- Language skills (overall rank 64)
- Student mobility inbound (overall rank 58)

8.2. Digital competitiveness ranking

8.2.1. Top Strengths

- Investments in telecommunications (overall rank 3)
- E-participation (overall rank 26)
- Entrepreneurial fear of failure (overall rank 15)
- Public-private partnerships (overall rank 29)
- R&D productivity by publication (overall rank 18)

8.2.2. Top weaknesses

- Enforcing contracts (overall rank 64)
- Mobile broadband subscribers (overall rank 58)
- Wireless broadband (overall rank 62)
- High tech patent grants (overall rank 62)
- Smartphone possession (overall rank 58)

Finally, the IMD prepares a section called “Key Attractiveness Indicators” where from a list of 15 indicators the respondents of the executive opinion survey were asked to select 5 that they perceived as the key attractiveness factors of their economy. The indicator with the highest percentage of responses were skilled force followed by dynamism of the economy, effective labor relations, business friendly environment and open and positive attitudes. According to the report; Colombia is in overall rank 41 on skilled labor, overall rank 33 on employee training, overall rank 32 on graduates on sciences and overall rank 33 in management practices. These ranks are some of the highest of the country, which may explain why skilled force is the major attractive according to the market participants perspective.

9. Development of the analysis

During the theoretical framework the basic terminology of Foreign Direct Investments was introduced, the parties, the benefits and disadvantages and the determinants, all focused on developing countries, which are the main actors for the purpose of this report. How was explained above, there are multiple reasons why developed countries focus their gaze on developing countries to invest, expand operations, open facilities or buy shares; also, there are many advantages for the economy of the host country that motivate government to prepare incentives to foreign investments. The main determinants on which the decision to invest or not varies for each country, according to its economic, social and cultural characteristics; some of them may affect positively or negatively the decision and may carry a different weight. In order to analyze these scenarios, a specific host country with its economic variables will be analyzed to understand which of them may affect the most the decision of foreign economics to invest or not on it. This host country is Colombia.

9.1. Methodology

The first phase is to gather statistical and economic information on Colombia; official sources such as the National Statistics Department and other governmental data sources will be checked. A collection of economic variables will be called to be part of the study in order to delimit all of the information (these all are explained later) They will be grouped in double-dimensional matrices, which means that measurements for each variable should be accessible for each department and for a set period of time (years). After all of the data has been extracted and organized in a common database, it will be sent to Stata ®, a statistical software developed by StataCorp, which will do the statistical analysis, including data manipulation and visualization of the results within the study. The basic data set is then imported into the software, which fits the data properly, looking for anomalous data and blank spots, and removing them if necessary. Following all of these procedures (described below) will result in the final data set, which is, in a nutshell, the study's major and unique source of analysis. Descriptive statistics will be used to understand the main characteristics of the economic variables used, and then the conditional logit model will be used to answer the study's main question: which of the variables mentioned has a greater impact on a foreign direct investor's decision to invest in Colombia, and to what extent?

9.2. Economic Variables per department

The main economic variables selected to be part of the study are:

9.2.1. Population per department

This variable was estimated according to a population projection developed by the national statistics department of Colombia (DANE) since the last national census of population was on 2018. The data is available from 2005 to 2017. (Departamento Administrativo Nacional de Estadística DANE, 2020)

9.2.2. Gross Domestic Product (GDP) per department

According to Banco de la República de Colombia, the market value of all finished goods and services produced over a specific time period utilizing the production factors available in a nation is known as the gross domestic product, or GDP. (Banco de la República) The data is extracted from Colombia's National Statistics Department (Departamento Administrativo Nacional de Estadística DANE, 2022)

9.2.3. Education

Main indicators of the levels of preschool, basic, medium and college education. In Colombia the education is composed as follows: (Ministerio de Educación Nacional, 2020)

- Preschool: a mandatory year
- Basic primary education: has a duration of 5 grades
- Secondary education: has a duration of 4 grades
- Medium education: has a duration of 2 grades (the last 2)
- College education (Superior education): made up by undergraduate and postgraduate programs. Undergraduate programs last 5 years on average and postgraduate programs can last from 3 to 5 years.

To each level of education, the following indicators will be used inside the analysis:

- **Primary gross attendance:** ratio between the number of enrolled students on primary education respect to the population of the theoretical entrance age for this level. (6 to 10 years). Sometimes, social demand is higher than the

theoretical entrance age for the primary level, i.e. overage students, therefore the indicator may take values greater than 100%. (Available from 2011 to 2020)

- **Secondary gross attendance:** ratio between the number of enrolled students on secondary education respect to the population of the theoretical entrance age for this level. (11 to 14 years). Sometimes, social demand is higher than the theoretical entrance age for the primary level, i.e. overage students, therefore the indicator may take values greater than 100%. (Available from 2011 to 2020)
- **Medium gross attendance**: ratio between the number of enrolled students on medium education respect to the population of the theoretical entrance age for this level. (15 to 16 years). Sometimes, social demand is higher than the theoretical entrance age for the primary level, i.e. overage students, therefore the indicator may take values greater than 100%. (Available from 2011 to 2020)
- **Gross attendance**: ratio between the number of enrolled students on preschool, primary, secondary and medium education respect to the population of the theoretical entrance age for these levels. (5 to 16 years). Sometimes, social demand is higher than the theoretical entrance age for the primary level, i.e. overage students, therefore the indicator may take values greater than 100%. (Available from 2011 to 2020)
- **Enrollment rate from 5 to 16 years:** Proportion of population between 5 and 16 years that are actually attending the educational system. (Available from 2011 to 2020)
- **Number of enrolled college students:** number of enrolled students inside all cohort and inside all superior education institutions. (Available from 2010 to 2018)

9.2.4. Crime:

Data extracted from the Police Department of Colombia; two types of crime will be used inside the analysis: (Ministerio de Defensa, 2022)

- **Homicides**
- **Robbery to people**

Both measured by number of cases by department, for each year. Data available from 2010 up to 2020.

9.2.5. Innovation

In Colombia, innovation is measured mainly by the Departmental Index of Innovation for Colombia (IDIC) which measures comparatively the capabilities and systemic conditions for innovations for all departments of the country, identifying strengths and improvement opportunities. (Departamento Nacional De Planeación, 2022)

IDIC is comprised by two main components, subindex of inputs for innovation (institutions, human capital and investigation, infrastructure, market sophistication, business sophistication) and subindex of results from innovation (production of technology and knowledge, creative production). These subindexes are averaged in order to get the final index (IDIC) and this varies between 0 and 100, being 100 the best possible result.

9.2.6. Exports and Imports

Developed by Colombia's departments from 2013 up to 2017 measured on US$ dollars. (Unidad Administrativa Especial Dirección de Impuestos y Aduanas Nacionales DIAN , 2022)

9.2.7. Foreign Direct Investments received by department

Data about foreign investments done in Colombia as host country since the year 2009 up to 2018. These data include the name of the investing company, the country where is located (also state and city) the department of destination inside Colombia, the total amount of capital investment in US$ million dollars, project type, number of jobs created, among others. (fDi Markets, 2022)

9.3. Additional Important Information

Department Code: According to the National Statistics Department of Colombia (DANE) The first-time department's codes were considered was in 1938 given the necessity of stablishing a unique identifier to each department in order to be able to compare statistical information generated inside of each of them. Since then, the national statistics department has released periodically printed publications of the politic-administrative division of the country listing the number of departments. The last version of 2007 is still used currently. (DANE, 2022)

The codes and the names of the departments are listed next:

Table 1 Colombia's Departments Codification

Colombia's Departments Codification	
Name	**Code**
Amazonas	91
Antioquia	05
Arauca	81
Atlántico	08
Bogotá D.C.	11
Bolívar	13
Boyacá	15
Caldas	17
Caquetá	18
Casanare	85
Cauca	19
Cesar	20
Chocó	27
Córdoba	23
Cundinamarca	25
Guainía	94

Colombia's Departments Codification	
Guaviare	95
Huila	41
La Guajira	44
Magdalena	47
Meta	50
Nariño	52
Norte de Santander	54
Putumayo	86
Quindío	63
Risaralda	66
San Andrés	88
Santander	68
Sucre	70
Tolima	73
Valle del Cauca	76
Vaupés	97
Vichada	99

9.4. Notes

As mentioned, for each variable was a specific range of years for which the information was available i.e. it was not possible to have all data on the same timeline/range of years, which was, at the beginning, a relevant fact for the statistical analysis. The search for information is a difficult and time-consuming task, but also the most important; its correct development guarantee the quality of the main input and hence the veracity of the

conclusions; particularly for Colombia, this task process was even harder. Some data were available only for 3 years, some other were recently years, and some others were available only for a group of departments. This implied a challenge for the development of this investigation work; where a common timeline had to be found, integrating most variables. As consequence, some departments had to be erased from the analysis, they are departments 94, 95 and 99; Guainía, Guaviare and Vichada respectively.

Another common problem found during the analysis was the inclusion of Bogotá and Cundinamarca as separate departments inside some governmental data reports, but not in some others. Cundinamarca is considered to be a department inside the Colombian Politic-Administrative Division and Bogotá is called to be the capital of Cundinamarca, but also the capital of the country; this grants Bogotá the distinction of district, (capital district D.C) and at the same time, special characteristics inside its administration. Also, it has to be considered as an independent department, even if it is a city in fact. Going back to the above, some data reports take into account this separation but others don't; this was another challenge that was correctly solved thanks to the disaggregation of information.

9.5. Introduction of Data to Stata

Once the excel file is done, it is imported to Stata; once there, a process of shaping and cleaning of the data is performed. Additional information for each economic variable that will not be used is dropped, and blank spaces are erased; then each one of them is renamed in order to use them effectively and easily inside the program. These new names will be used from now throughout the report, for which they shall be mentioned below:

Table 2 Renaming process of economic variables

Economic variable name	**Name used on Stata**
Primary gross attendance	*gross_attendance_pri*
Secondary gross attendance:	*gross_attendance_sec*
Medium gross attendance	*gross_attendance_med*
Gross attendance	*gross_attendance*
Enrollment rate from 5 to 16 years:	*enrolment_rate*

Economic variable name	**Name used on Stata**
Number of enrolled college students:	*college*
Homicides	*hom*
Homicides rate	*hom_rate*
Robbery to people	*robb*
Innovation	*IDIC*
Exports	*Exports*
Imports	*Imports*
Department Code	*dept_code*
Department name	*dept*
Population	*pop_final*
GDP	*gdp*
GDP per capita	*gdp_pc*

The files concerning the Foreign Direct Investments made in Colombia are also imported to Stata, providing information as:

Table 3 FDI variables used on Stata

FDI variable	**Name used on Stata**
Project Date	*ProjectDate*
Investing Company	*InvestingCompany*
Source State	*SourceState*
Source City	*SourceCity*
Industry Sector	*IndustrySector*
Sub Sector	*SubSector*
Cluster	*Cluster*
Industry Activity	*IndustryActivity*

FDI variable	Name used on Stata
Capital Investment	*CapitalInvestment*
Number of Jobs Created	*JobsCreated*
Type of Project	*ProjectType*

After this initial process of data entry is finished, a merge of all files is done obtaining a single data set that will be used for the analysis.

9.6. Descriptive Statistics

Understanding the data that has been gathered comes next once the complete data set has been obtained. The FDI files contain a lot of useful information about Colombia's investment trends, the foreigners' favorite departments, the most popular industry sectors for investment, and the foreign nations that invest the most there. The other variables in the data set accurately describe Colombia's internal characteristics and its economic behavior over the previous years. It is crucial to initially grasp this data as it will complement additional research and aid in comprehension of the findings.

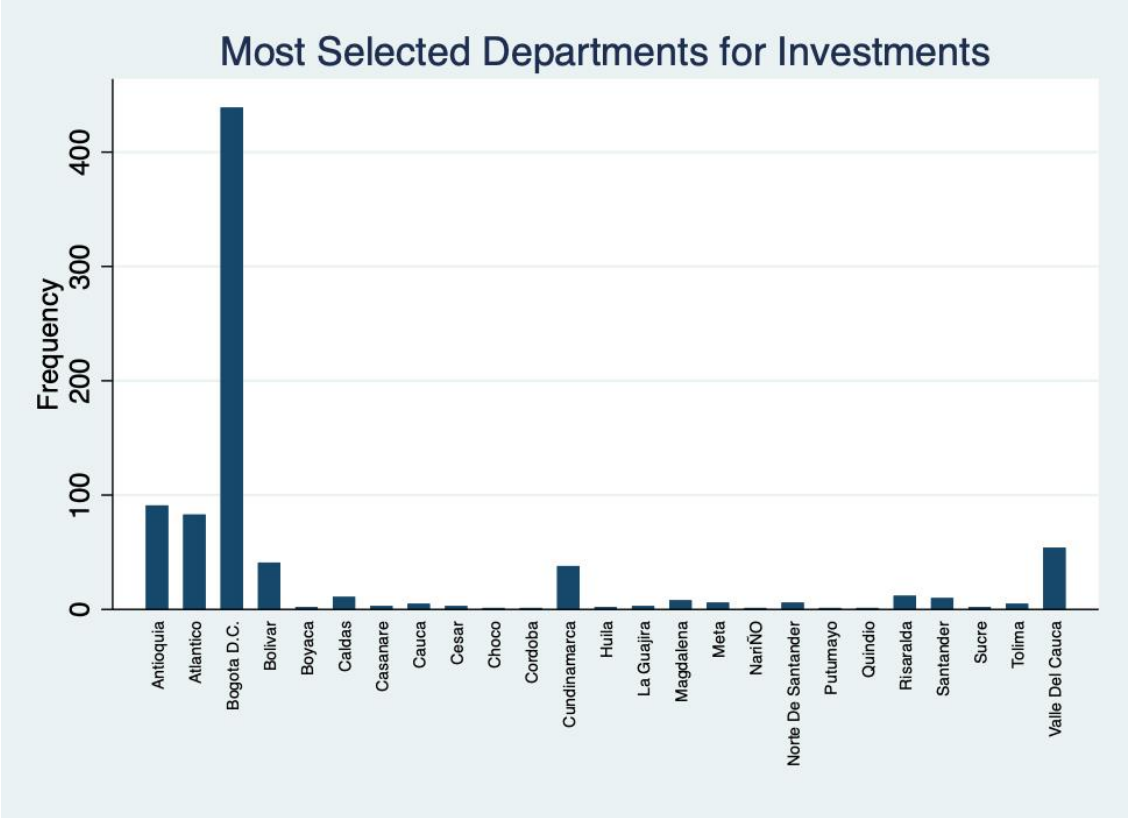

Figure 6 Most Selected Departments for Investments. - Source: Own development

The start points to develop the analysis is to know which departments are the most selected by the foreign countries on Colombia. The main purpose of the work is to study what are the main characteristics or qualities that are decisive or eye-catching for a country in order to do an investment.

The favorite city to develop investments is Bogotá, that is exactly the capital of the country. Antioquia, Atlántico and Valle del Cauca are next. These four departments compose the core of country and lead the most of the indexes of competitivity and innovation.

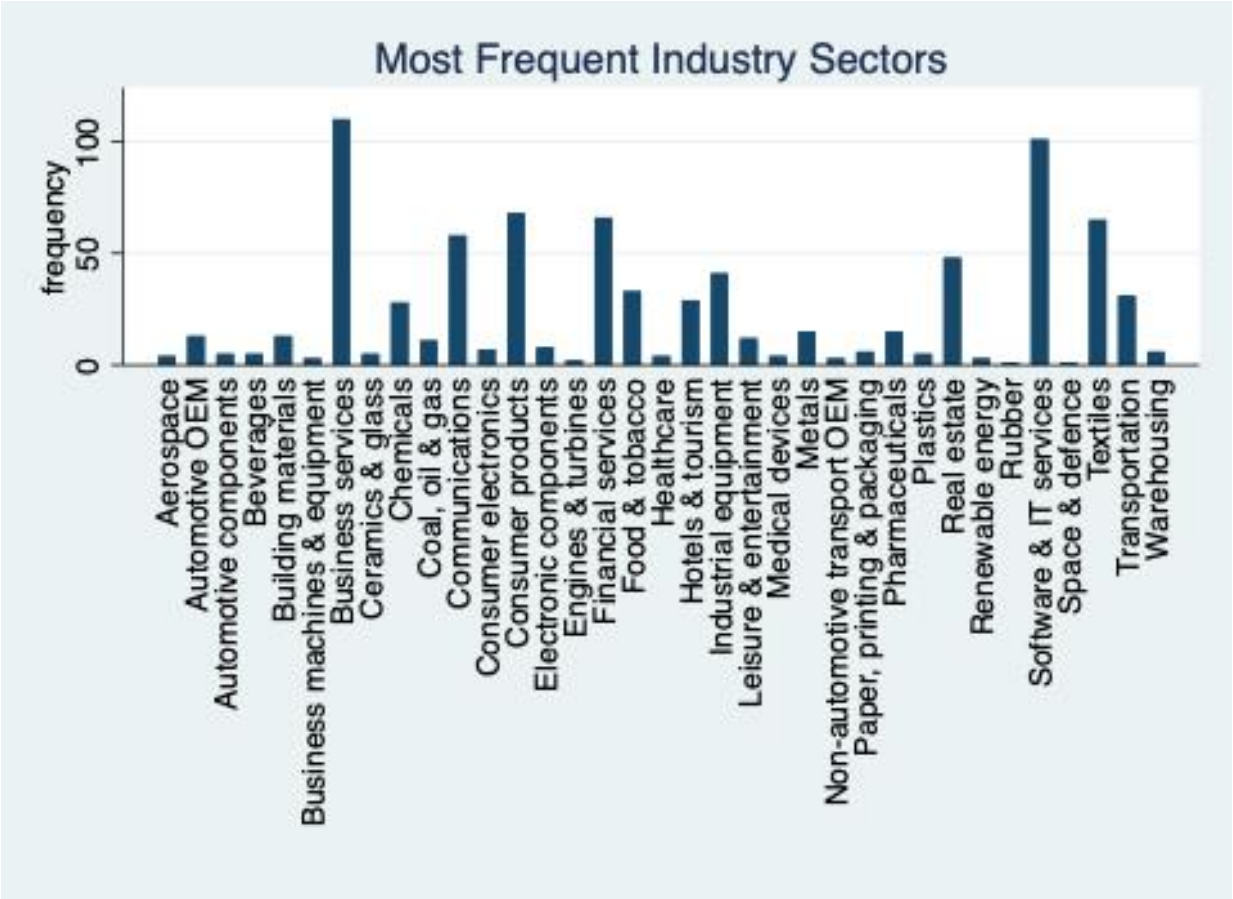

Figure 7 Most Frequent Industry Sectors. Source: Own development

The most frequent sector selected for investments in Colombia is the one of Business and services, followed by Software & IT services, Consumer products and Textiles.

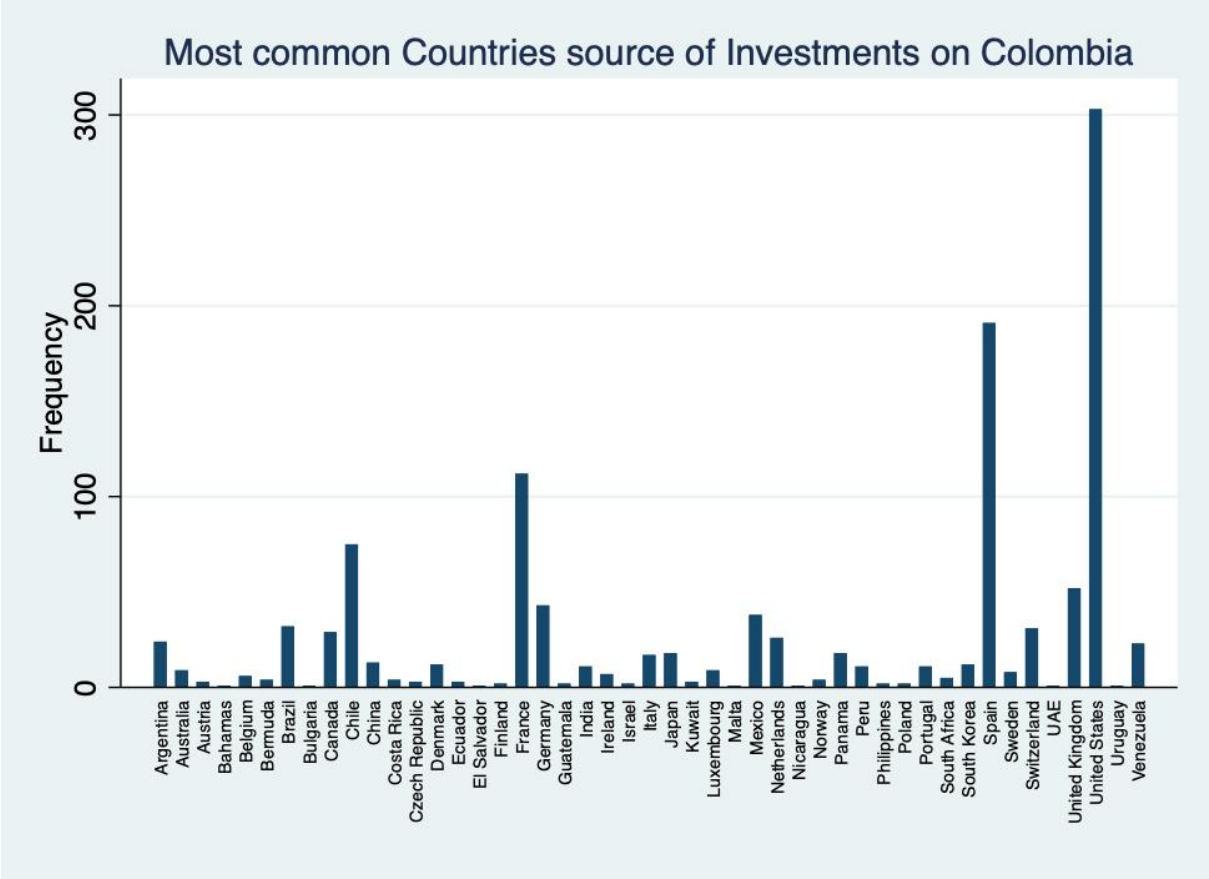

Figure 8 Most Common Countries source of Investments in Colombia. Source: Own development

It is also important to understand from which location are arriving the investments on the country. United States lead the countries that invest the most on Colombia by a huge difference; followed by Spain, France, Chile and Germany.

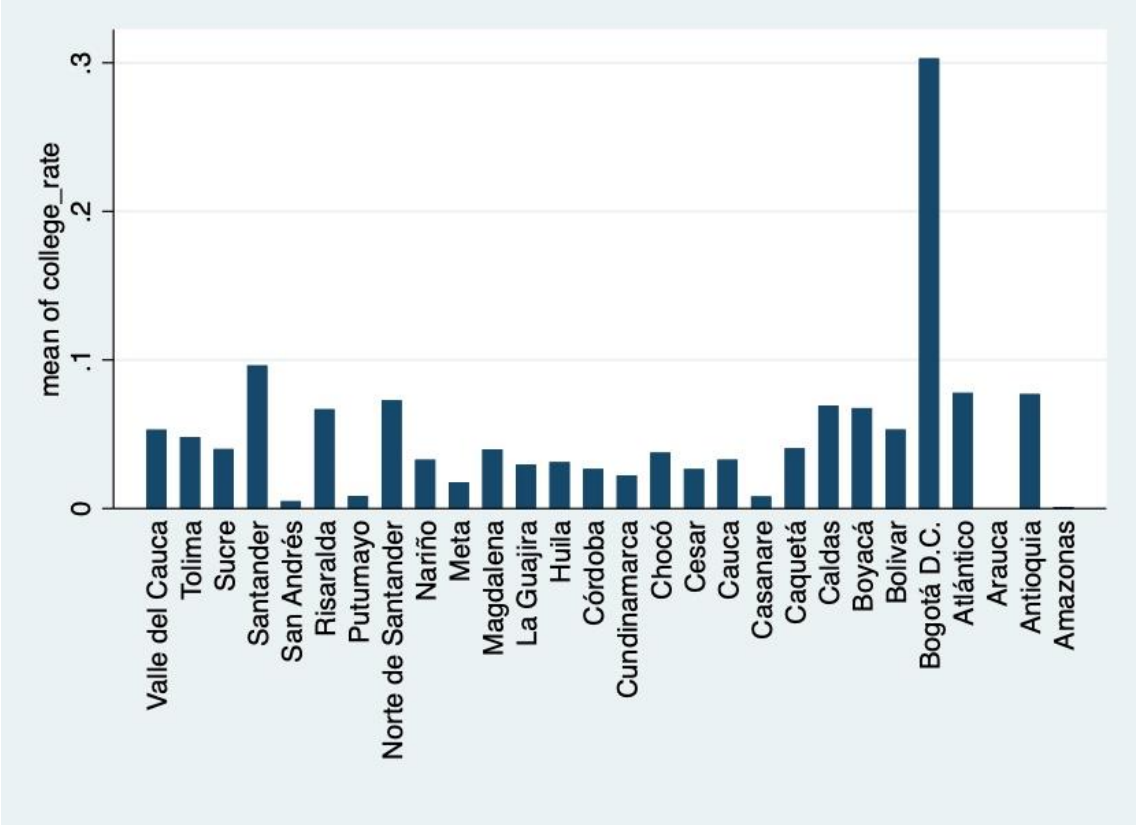

Figure 9 Mean of College rate by Department. Source: Own development

Having seen the most selected departments of the country to do investments, now question which characteristics influence the most on foreign countries in order to take this decision. The first aspect to be analyzed is the level of education. As it can be seen, Bogotá has the highest mean of college education of all the country, followed by Santander, Antioquia, Atlántico and Valle del Cauca.

Crime rates will be analyzed on two main types of crimes, the most common ones in Colombia: homicides and robbery.

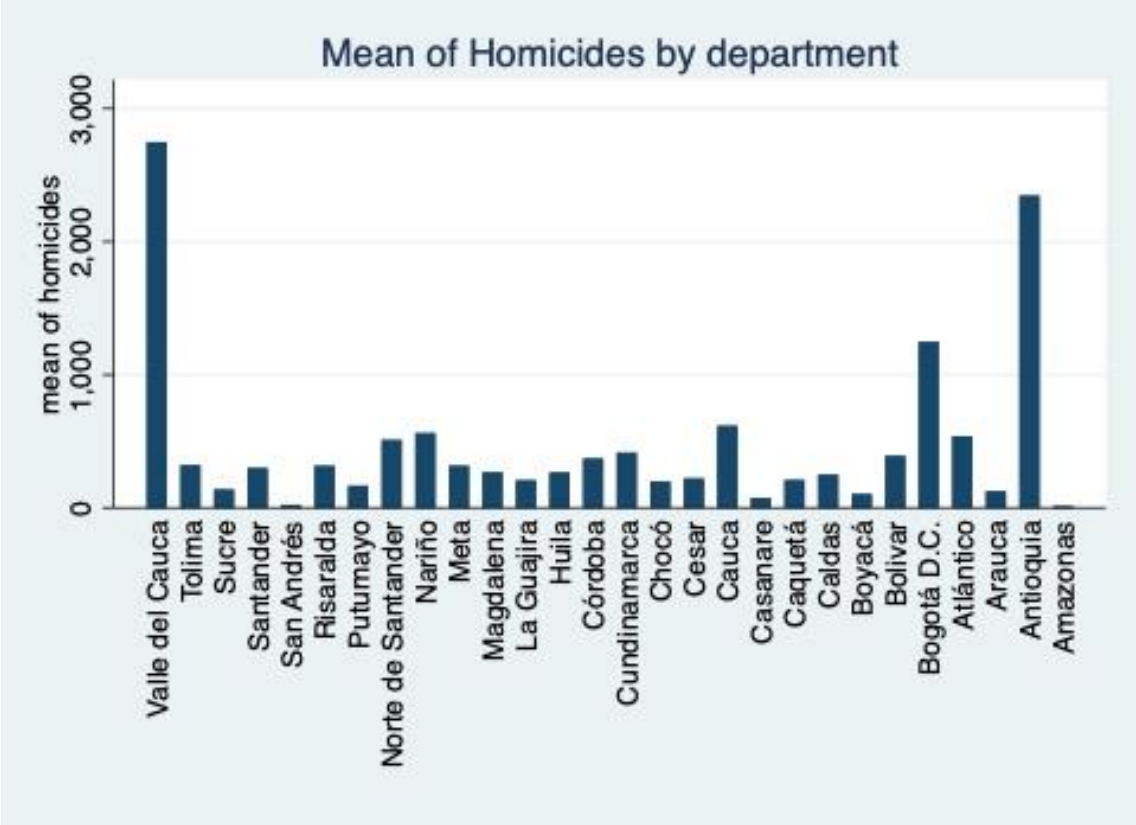

Figure 10 Mean of Homicides by Department. Source: Own development

Valle del Cauca leads the list of departments with most homicides, followed by Antioquia and Bogotá. These three departments are part of the most selected for investments.

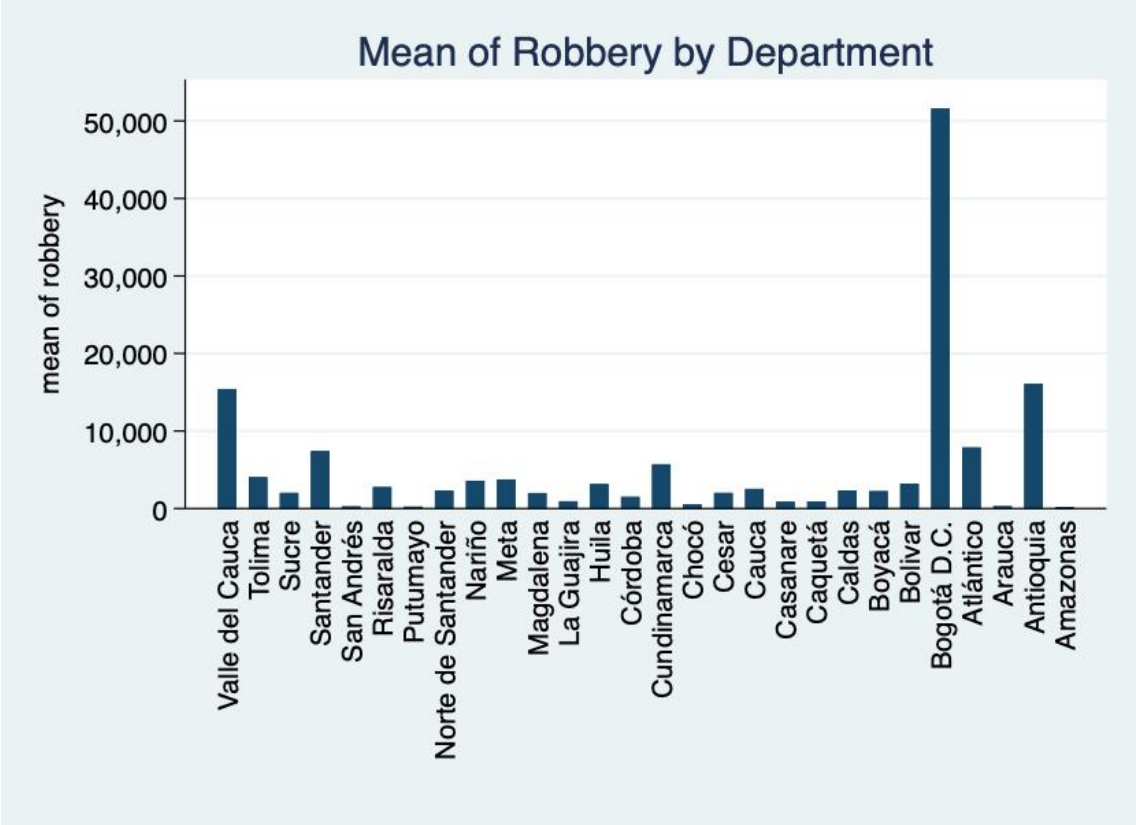

Figure 11 Mean of robbery by department. Source: Own development

In terms of robbery, Bogotá leads the country with a mean of more than 30,000 events. Is followed by Antioquia and Valle del Cauca.

Figures 12 and 13 show the mean of Exports and Imports respectively, by department. In terms of exports, Antioquia takes the first place in the country, followed by César and Bogotá. The group of products that contributed the most to the exports of the nation are fuels and products of extractive industries, that is why is not a surprise to find César in the top 3 as its main export product is the coal[9]. The behavior of imports is entirely different from that of exports because many fewer departments contribute to the overall amount of the nation in the same proportions. Bogotá leads the country by far, followed by Antioquia, Cundinamarca and Valle del Cauca. The main imported products are raw materials, intermediate products and industrial product[10]; again, this is not a surprise as the mentioned departments belong to the industry and productive core of Colombia.

[9] Refer to DANE Exports Report (DANE, 2022)
[10] Refer to DANE Imports Report (DANE, 2022)

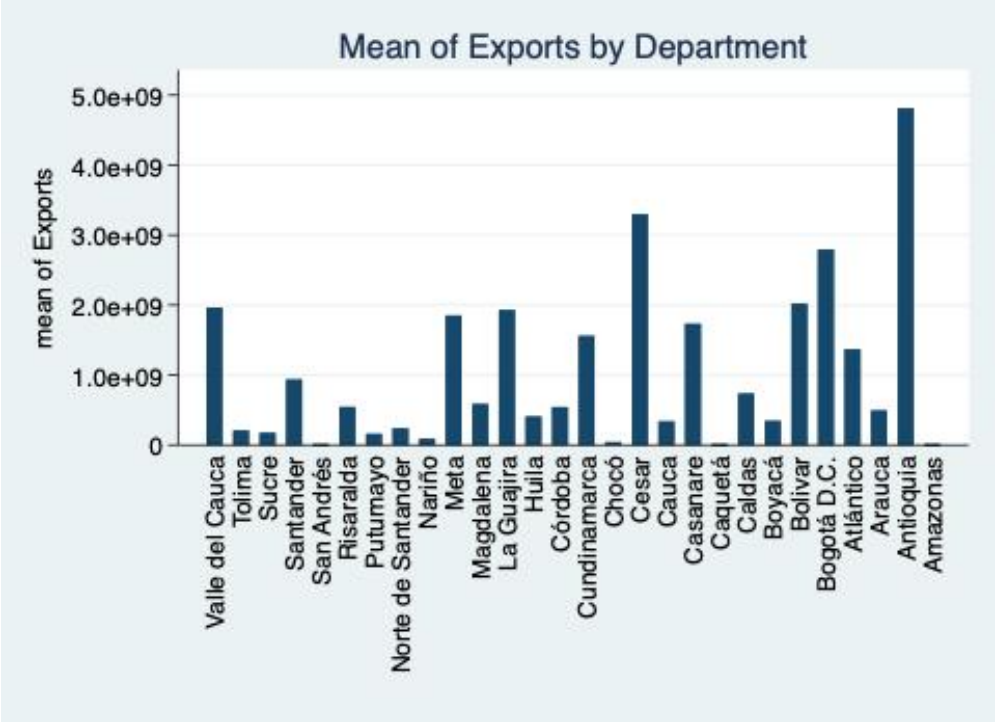

Figure 12 Mean of Exports by Department. Source: Own Development

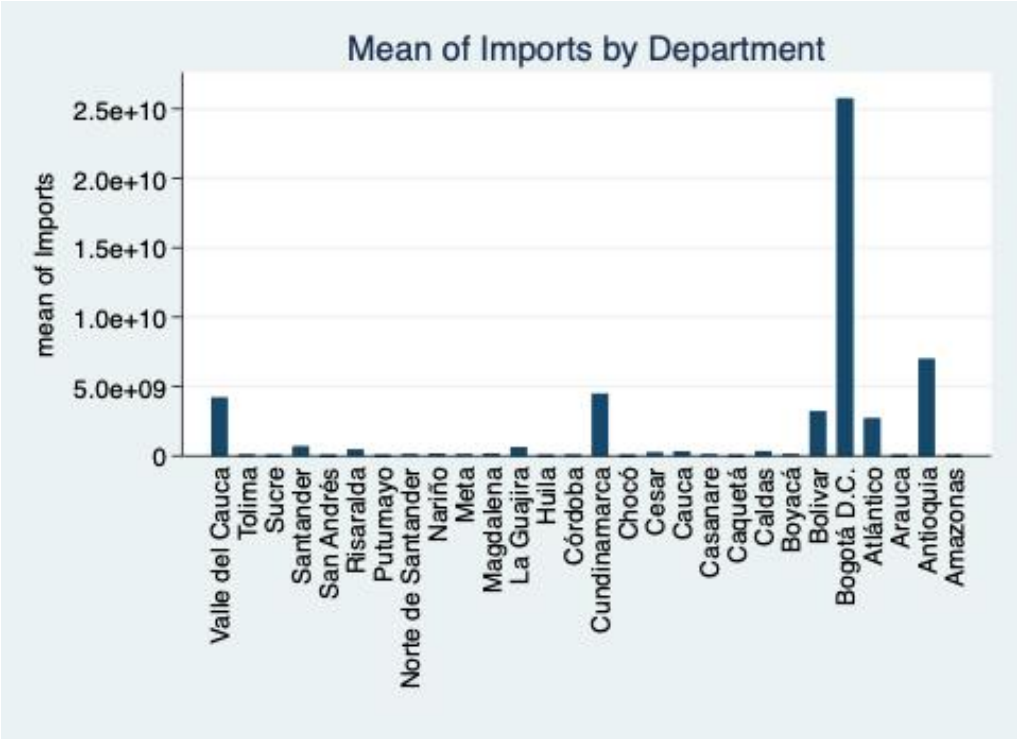

Figure 13 Mean of Imports by Department. Source: Own Development

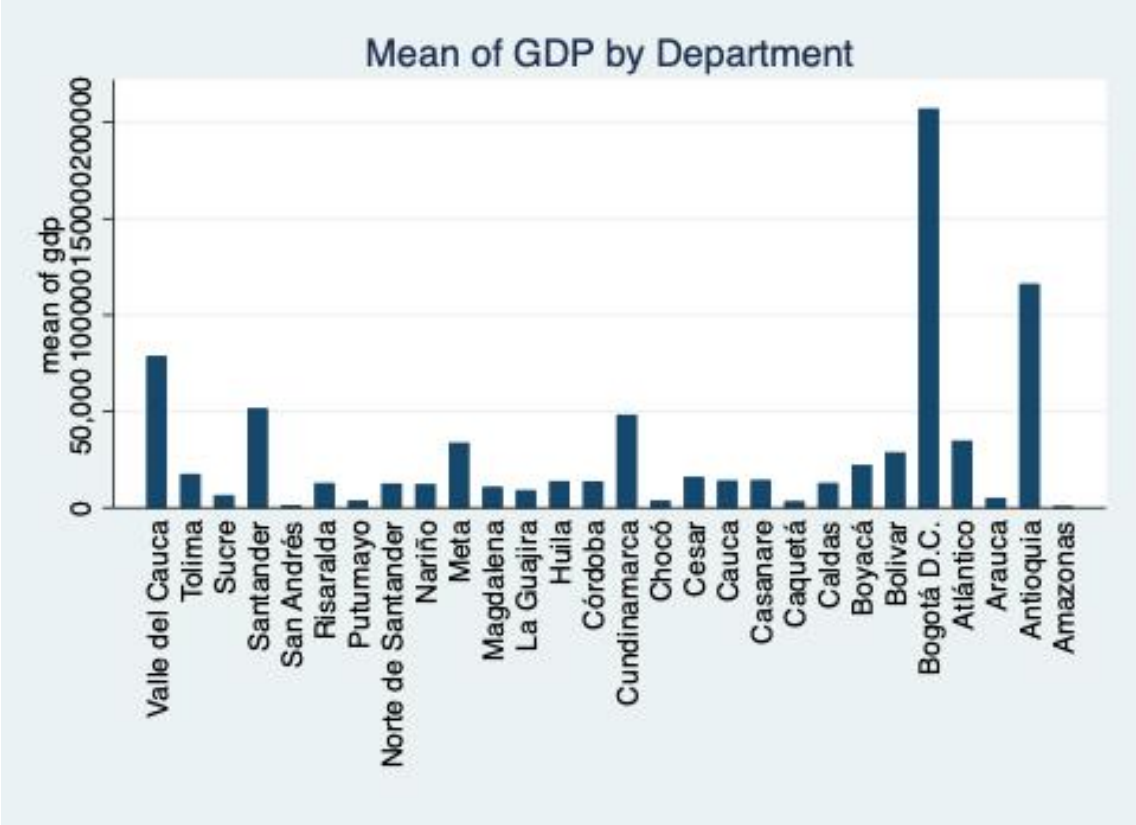

Figure 14 Mean of GDP by Department. Source: Own Development

The mean of GDP is another important fact and a particular topic that foreign countries may take into account before doing an investment as this index is very related to the productivity of a single region. Bogotá leads the country in terms of GDP, followed by Antioquia and Valle del Cauca. At a glance, is very noticeable how the GDP is concentrated in a few departments of country made up of 32. For the year 2022, is expected that Colombia would be the country with the highest growth In the region according to the OECD, the GDP will grow 6,1% this year and 2,3% in 2023, being on top of countries as Argentina, Brazil and Chile (Hernández Bonilla, 2022).

In addition to the crime statistics above, the World Databank presents the general crime situation of the country and provides a glance to the overall situation in the last years. Figure 15 shows the evolution of the number of homicides per 100,000 people since 1990 up to 2019. The trend has been decreasing and according to the journal “EL TIEMPO” in 2020, Colombia reached the lowest homicides rate in the last 46 years. (EL TIEMPO, 2020)

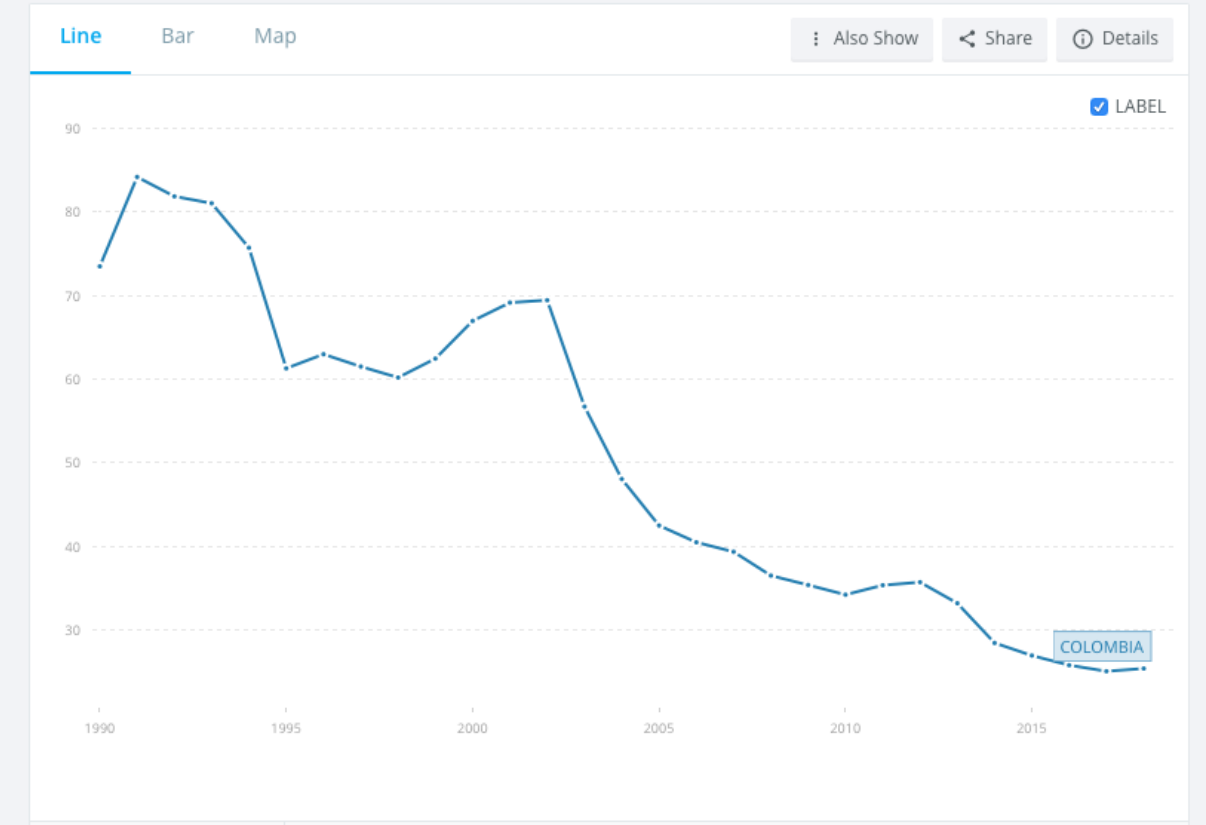

Figure 15 Intentional Homicides per 100,000 people. Source: World Databank

Again, from the World Databank, an overall glance of the work force situation of the country is extracted and analyzed. The total labor force of the country has been rising in the last years, excepting year 2020 due to the COVID19 emergency. This goes hand-in-hand with the top strengths set forth in chapter 8[11] where the labor force is considered to be one attractive to invest in Colombia. (The World Bank, 2022)

[11] Chapter 8 sets out top strengths of Colombia perform on the WCY.

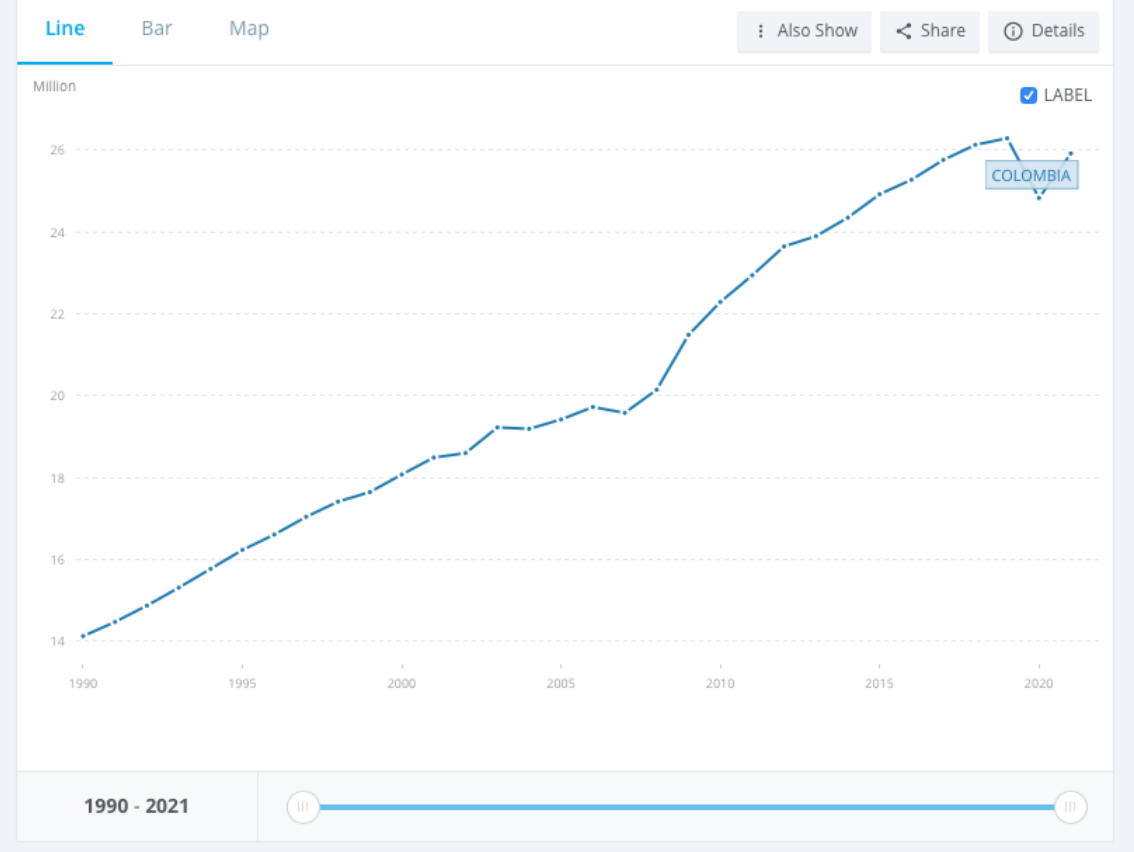

Figure 16 Total Labor Force in Colombia 1990 - 2021. Source: The World Databank

9.7. Conditional Logit Model

A location choice via conditional is performed through the conditional Logit Model (Train, 2009) Investment *n* from a foreign country *o* locates in a Colombian department *i* at time *t* if the utility received by locating in department *i* exceeds that of locating in all other Colombian' departments $j \neq i$. If the unobserved component of the utility is iid extreme value, the resulting choice probability is:

$$P_{nit}=P(choice_{nit}=1|x,y)= \frac{e^{\propto' x_{it}+\beta' y_{oit}}}{\Sigma_j e^{\propto' x_{it}+\beta' y_{oit}}}$$

24041 FDI investments were considered, locating into 29 departments (as 3 were deleted) from 44 origin countries around the world from 2009 up to 2018. The binary dependent variable *choice* equals 1 if investment *n* locates in country *i* and zero otherwise. Factors that may affect the utilities of potential locations are also taken into account, these are: *gdp_pc, college_final, college_rate, pop_final, gdp, enrolment_rate, gross_attendance, gross_attendance_pri, gross_attendance_sec, gross_attendance_med, IDIC, Exports, Imports, robbery* and *homicides*

Owing the problems stated on section 9.4 "Notes" where the time-availability of the variables did not coincide in the majority of cases, the variables used inside the analysis had to be shortened in order to obtain consistent results. Four variables coincide through a long set of years i.e. had a wider availability inside Colombia's statistical reports; these variables were *college_rate*, *pop_final*, *gdp* and *hom_rate*.

9.8. Results

The conditional logit model, which was run in Stata, yielded the following results. The obtained coefficients will explain the statistical relationship between the dependent variable, in this case the decision of a foreign country to invest or not in a Colombian department in a specific year, and the independent variables, which are the college rate, population of each department, gdp, and homicide rate. According to the findings, the college rate is very important for a foreign firm looking to invest in a specific department because its coefficient shows a positive relationship with the dependent variable choice; additionally, this result is statistically significant because the p value equals 0, indicating that the null hypothesis stating that there is no statistical relationship between this specific independent variable and the dependent variable can be rejected.

This same situation occurs with the population variable expressing a positive relationship with the dependent variable choice. The homicides rate variable is statistically significant as its p value is less than 0.05 and it shows a negative relationship with the dependent variable, as expected. The p value for the gdp variable is 0.227, which suggests that the positive association with the dependent variable obtained is not statistically significant, since it is not possible to reject the null hypothesis Ho that there is no statistically significant relationship.

```
. clogit choice lcollege_rate lpop_final lgdp lhom_rate , group(id_investment)

Iteration 0:   log likelihood = -1607.0953
Iteration 1:   log likelihood = -1565.3298
Iteration 2:   log likelihood = -1563.2046
Iteration 3:   log likelihood = -1563.1991
Iteration 4:   log likelihood = -1563.1991

Conditional (fixed-effects) logistic regression

                                                Number of obs     =     24,041
                                                LR chi2(4)        =    2456.58
                                                Prob > chi2       =     0.0000
Log likelihood = -1563.1991                     Pseudo R2         =     0.4400
```

choice	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lcollege_rate	3.776267	.7573529	4.99	0.000	2.291883	5.260652
lpop_final	1.417368	.2327214	6.09	0.000	.9612427	1.873494
lgdp	.2094354	.1732529	1.21	0.227	-.1301341	.5490048
lhom_rate	-.3636848	.1212704	-3.00	0.003	-.6013705	-.1259992

Figure 17 Conditional Logit Regression Results. Source: Own development

With the obtained results it is clear that foreign companies will look for departments with the highest numbers on college students enrolled, this could mean that they will search for departments with high skilled labour potential, young new graduates ready to start industrial – corporate life. The population variable result plays a significant role as well, because this contrast on why the investments are highly concentrated on the most crowded departments. In most cases, the most densely populated departments are the ones with the highest rates on education, innovation, infrastructure and are called to be

the economic engine of the country. Homicides rates variable shows a negative relationship with the dependent variable, meaning that departments with high homicides rates are less attractive for foreign companies.

10. Conclusions

At present, global economy still recovering from the dark economic panorama suffered at the expense of the COVID19 health emergency. Foreign Direct Investments flows are slowly rebounding as investors still cautious and little optimistic for the new horizons.

Colombia is still a country with a long way to go, competitiveness of the country still far for being comparable with the ones of the most developed countries, chapter 8 serves as proof for this hypothesis; low ranking positions on many categories demonstrate a big challenge for improvement. As it has been explained alongside this document, Foreign Direct Investment serves an injection for developing and growth for recipient countries and Colombia is not the exception; adoption of best business practices, technological and operational advances, increase on the employment rates and access to new markets, numerous studies have proven these benefits[12], and the government is very concerned about it establishing politics for attraction of foreign investments inside the country.

Colombia demonstrates a high effort on improving quality of skilled force and education. On 2021 the budget of $47,3 billion of Colombian pesos was the highest on the history of the sector, and the highest for third consecutive year. (Ministerio de Educación Nacional, 2020) This contrast with the prioritization of employee's training and the increase of labor force (despites the decrease on 2019 and 2020 because of COVID pandemic) This fact illustrates Colombia's government's keen interest in improving educational quality and, as a result, increasing the availability of skilled workers inside the country. And this makes sense, because one of Colombia's most appealing features to foreign investors is its skilled work population[13]. As a consequence, the government is encouraging new investments to come in, which will boost the country's internal development. In chapter 9, the behavior of the labor force was revised and the positive trend of the last years goes according the effort made by the nation.

Crime rates inside the country continue to be an issue, particularly in the country's most important departments, which, despite this, are the most frequently chosen by foreign investors; this is contradictive. The results of the conditional logit model represent a

[12] Analysis of the impact of FDI on economic Variables (Fundación para la Educación Superior y el Desarrollo FEDESARROLLO, 2007) page 39
[13] ((IMD), 2021)

negative relationship between the choice of foreign country to invest or not on a certain department and the crime rates of the country, specifically the homicides rate; thus, departments with high crime rates are less attractive for foreign countries, but this is not the case.[14] There are many reason why foreign countries still prefer these departments in spite of their homicides rates. These departments represent the economic engine of the country as are the ones with the highest rates of GDP inside the country (Figure 14), some of the biggest exporters and importers of products (Figures 12 and 13) among those with the greatest rates of education.

As a result, despite the high crime rates in certain areas, other countries might assess other economic aspects that can help to balance the decision-making process. This may also be seen in the conditional logit model's results, where the population and college rate indicate a significant attractiveness for foreign economies. As complement, the homicides rates in the country have been going on a declining in recent years, according to the UN Office' on Crime and Drugs (on the specific case of intentional homicides per 100,000) thus, although still high numbers on crime inside the country that should be battled, the tendency shows a slight improvement that is being valued and observed by foreign economies. (Figure 15)

In general, FDI represents for Colombia an important source of development and for its economic growth, the foreign injections of capital represent a stimulator for the country, new practices and technologies are adopted and absorbed by subsidiaries present within thanks to the transmissibility of the knowledge. As comment before, in order to correctly and fully get all the benefits of the spills of FDIs, the host countries should first meet certain basic conditions. The majority of investments done in Colombia are concentrated on the most important departments, the ones with higher levels of education, technology, infrastructure and innovation, hence, a big portion of the FDI spillover benefits are submerged on these preferential group of departments that are called to be the core of the country. Three departments of the country had to be erased of this study because they didn't get any foreign investment in the last years, also they represent a challenge because of their lack of registered information inside the national databases. This says a lot about the current situation of the country and a big source of opportunities. Peripheral departments need to get more prominence, investments on these zones are required in order to lead them to compete with the most invested departments. But to

[14] Address to Chapter 9 "Development of the analysis"

boost their visibility and prominence, they should grow economically, and since they do not get FDI, the government should provide the majority of their funding. It is difficult to encourage the growth of each department of the nation equally, but doing so will improve the country's overall outlook to the rest of the world. As a result, Foreign Direct Investment will safely arrive and contribute to the expansion of Colombia's economy, a developing nation that faces challenges on a yearly basis and is making efforts to move forward.

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