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ANALYSIS OF ECONOMIC GROWTH AND COMPETITIVENESS IN SANTANDER: CHALLENGES AND OPPORTUNITIES

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***Summary*:**

Economic growth and competitiveness are essential pillars for the prosperity of a region. In this context, Colombia faces significant challenges, ranking 64th in the global competitiveness ranking and showing GDP growth rates below 4% in recent years. This research aims to analyze the relationship between the competitiveness and economic growth indicators of Santander in the period 2013-2020. To do so, a non-experimental methodology of a longitudinal, transversal, descriptive and correlational nature is used, with a quantitative approach, using secondary data such as the departmental competitiveness index of the Private Competitiveness Council.

The statistical tools include the mean, standard deviation, minimum and maximum values, the Shapiro-Wilk normality test and Pearson and Spearman correlation coefficients as appropriate. The results show a slowdown in Santander's economic growth in recent years, although its GDP per capita exceeds the national average and that of departments such as Antioquia. In terms of competitiveness, Santander stands out compared to Antioquia in areas such as ICT, environment, secondary education and labor market. It is concluded that some competitiveness indicators, especially in public service, health, education, business, labor market, financial sector, domestic market, exports and innovation, are related to Santander's GDP. Keywords: Competitiveness, GDP

***Keywords**: Competitiveness, GDP, economy, Santander, public policies.*

INTRODUCTION

Economic growth, represented by GDP, is essential to understand a region's capacity for a certain level of development. Although GDP is not a measure of social prosperity, the higher the GDP, the greater the chance of having positive productivity, employment and tax collection figures. Colombia's economic growth has been below 4% for the past few years, which is problematic, since this means a slowdown in the productivity of its entire economic apparatus, the causes of which are multidimensional. The departmental competitiveness index measures the level of development of each department in Colombia based on 13 pillars that address aspects such as public management, infrastructure, ICT, the environment, health, education, business, the labor market, the financial system, exports and innovation, which together address most of the fundamental aspects for the full development of society. Through this, the main objective of this study is to understand which of these aspects are related to GDP growth.

METHODOLOGY

The present research, considering its particular characteristics, is included within the non-experimental types, since, for the collection and analysis of the results, variables are not manipulated nor are they influenced in any

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way, therefore, the research is limited to the observation and analysis of information already existing in databases, where it is not expected to see the reaction of the dependent variable to intentional stimuli, but its behavior based on the variations in the independent variables (Hernández Sampieri et al., 2014).

The research design corresponds to a mix between longitudinal and cross-sectional studies, since information has been selected from various variables in a period of time between 2013 and 2020, which are analyzed at two different times; first, a review is made of the evolutionary behavior of the variables selected for the study, in order to analyze their fluctuations during the last years; Secondly, a general description of that single period of time is made in order to know the way in which the Santander region is developed in terms of competitiveness and economic growth, for which reason, said description makes it necessary to use the transversal design (Hernández Sampieri et al., 2014).

The scope of the research is of a correlational-causal type, given that, in accordance with the specific objectives designed for the project, it seeks first of all to statistically describe the study variables, to subsequently use correlation models that allow understanding the association between the variables of competitiveness and those of economic growth, which allows identifying those variables with statistical significance that allow establishing the association between any of the independent variables with the dependent variable (Hernández Sampieri et al., 2014).

The research approach is quantitative, given that all the variables are expressed numerically, mainly through indicators ranging from 0.00 to 10.00, which requires a statistical treatment of quantitative variables and therefore, it is necessary that the focus of the present research be limited to the treatment and presentation of the results from this perspective (Hernández Sampieri et al., 2014).

The study population is made up of 104 variables, 26 sub-pillars, 13 pillars and 4 factors for a total of 147 variables measured by the private competitiveness council, which are subtracted from the 8 reports published from 2013 to 2020 and for which, in addition, three departments have been selected in order to make the respective comparisons, which have been selected according to their position in the competitiveness ranking, thus selecting Santander as the object of study and position number 4 in the ranking, Antioquia as first place and La Guajira as one of the departments located in the last places on the list, which means the consolidation of 3 databases with around 1,176 indicators each.

For the selection of the sample, the departmental competitiveness index 2020-2021 has been taken as a basis, since, at the time of carrying out this research, it is the one that contains the most recent information on the competitiveness of the regions. Based on this, a series of exclusion criteria have been applied so that the variables to be used meet the requirements necessary for their use in statistical correlation models. These criteria are: 1) that the name of the variable is the same or similar in the reports published from 2013 to 2020, 2) that the variable has been measured in the 8 reports published between 2013 and 2020, 3) that the variable appears in the 3 selected departments in the reports published between 2013 and 2020

THEORETICAL REFERENCES

Next, a series of topics relevant to the development of this research are addressed, within which it has been determined to expose and expand the theoretical constructions around the economy, its components and types, given that, the understanding of the indicators of economic growth is necessary for the approach of these as the dependent variables of the present study; likewise, it has been established to delve into the constructs on competitiveness and its indicators, as important factors to develop theoretically, given that this corresponds to the group of independent variables to relate to the growth of the local economy.

ECONOMY

At a general level, the economy can be defined as the study of the behavior of society in relation to the way in which it manages the scarce resources that it has at its disposal, understanding that these are distributed through the collective decisions of households and companies that make up a society that constantly interacts and is affected by aspects such as income, unemployment, population growth, savings, investment and the increase in prices (Mankiw 2012; Weber 2002). For the study of economic aspects, this discipline is oriented on a series of principles, which address from the decisions that individuals face to those things that motivate their own decisions.

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Firstly, there is the principle of the dilemmas faced by people, which are nothing more than the decision-making to which individuals are subjected by the existing limitation between the amount of money they have and the products and services available to them, based on concepts such as efficiency, where citizens seek to obtain the greatest benefit with the least amount of resources possible; and concepts such as equity, which refers to the distribution of economic wealth equally among all members of a society (Mankiw 2012; van Megen, Bürer, and Patel 2019).

Secondly, there is the principle that the cost of something is what is given up to obtain it, in other words, the opportunity cost, seen as the sacrifice of something for the purpose of obtaining something else; However, in all cases it is not so easy to calculate, since some decisions require aspects that cannot be calculated in money, such as knowledge, time, personal growth, among others (Karanfil and Pierru 2021; Mankiw 2012). The third principle speaks of people thinking in marginal terms, where it is fervently believed that people are rational and seek to achieve their goals within their possibilities, for which they do not limit themselves to making decisions in terms of yes or no, but rather make small adjustments in a spectrum of possibilities, which is known as marginality (Kim 2021; Mankiw 2012). The fourth principle mentions that people respond to incentives, which induces rational behavior in individuals and can be configured both in the form of reward and punishment, based on the premise that these people always compare the costs versus the benefits of things (Laplane and Mazzucato 2020; Mankiw 2012).

ECONOMIC APPROACHES

Normative Economics

Normative EconomicsFirst of all, it is important to talk about normative economics, which seeks to describe from a scientific point of view how the world should be, but it does so considering value judgments from approaches such as ethics, religion and philosophy, to analyze how the assigned functions are being fulfilled (Carlino 2015; Diduch 2021; Mankiw 2012). To evaluate normative statements, both data and ethical or moral values must be considered, since the data by themselves do not have the capacity to represent the aspects that this type of approach requires for its analysis. Thus, when deciding whether an economic policy is good or bad, value judgments are integrated from the aforementioned approaches (Mankiw 2012; Otten et al. 2021).

Positive Economics

Positive economics is not based on or integrates value judgments into its analysis, but rather focuses on studying the way in which the economic mechanism is integrated and composed, where the economic consequences of laws are analyzed without referring to their ethical or moral content (Carlino 2015; Mydland et al. 2020; Wickström 2020). The claims made from this approach are refuted through the analysis of evidence that demonstrates what reality is like, as well as how the positive approach is based on various quantitative variables that are analyzed from macroeconomics to understand how a country's economy is developing and what to do to achieve the best possible figures (Malikov, Hartarska, and Mersland 2020; Mankiw 2012; Nechifor et al. 2020).

Macroeconomics

Macroeconomics is the study of phenomena that occur at the level of the entire economy in general, that is, the economy seen as a whole, where the focus of attention is concentrated on inflation, unemployment and the growth of the economy itself, in the search to explain the fluctuations that simultaneously affect households, families and markets (Branger, Flacke, and Gräber 2020; Carlino 2015; Gueye 2021; Li and Wang 2020; Mankiw 2012).

In order to better understand economics, it is important to correctly define what is meant by variables and data, since the former are those that in some way influence consumer decisions, while the latter are the main facts or features that provide information about the variables, commonly expressed in figures (Çakır Melek, Plante, and Yücel 2021; Carlino 2015; Churm et al. 2021; Kapinos, Kishor, and Ma 2022).

Some of the most relevant variables in macroeconomics are: a) inflation, defined as the general and sustained increase in prices; b) unemployment, which refers to the number of people who can work but are out of work;

c) interest rates, understood as the remuneration that a person receives for not consuming in the present but in the future; d) the public budget deficit, which is the difference between what is supposed to be the revenue collection of the public sector, and the assumption of what will be spent from said resources; e) the international trade deficit, known as the record of international transactions, between the residents of a country and the rest of the world; f)

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economic growth, which is the measure of the growth of wealth produced by a country during a given period of time, compared to another similar period (Carlino 2015), the latter being the reason for the present research and for which economic growth is further explored in the following section (Alburquerque, 2004; Bossone, 2021; Carlino, 2015; Z. Chen et al., 2021; Kitao & Mikoshiba, 2020; Stähler, 2021).

Economic Growth

As mentioned above, economic growth is the measure of the growth of wealth produced by a country during a given period of time, compared to another similar period (Alburquerque 2004; Carlino 2015). Accordingly, economic theories initially hold that sustained and self-sustaining economic growth, measured by the wealth of a nation divided by the number of inhabitants, is necessary to sustain or improve the quality of life of a population that grows every day, given that economic growth must translate into greater multidimensional well-being (Carlino 2015; Dahlum, Knutsen, and Mechkova 2022). A country's economy can grow based on the increase in production factors (land, capital, labor, companies) and the progress of technical knowledge, such as innovation in processes that make production more efficient (Carlino 2015). This growth is usually expressed in indicators such as GDP, GDP per capita, imports, exports and, at the regional level, royalties, since these indicators are usually measured statistically and, therefore, allow us to understand the efficiency with which decisions have been made and thus compare them with respect to competitiveness and their growth in parallel (Chen and Xu 2022; Mankiw 2012).

Thus, when studying the GDP, it can be understood that it measures two things simultaneously, on the one hand, the total income of people and, on the other hand, the total expenditure on goods and services, which, expressed with the letter (Y), is made up of four main components: consumption (C), investment (I), government purchases (G) and net exports (XN), which is represented by the following equation (Mankiw 2012):

$$Y = C + I + G + XN. \quad (1)$$

Consumption is the expenditure generated by families in the demand for goods and services, which includes perishable and non-perishable products and excludes the acquisition of new homes; investment is the purchase of goods that have the capacity to produce more goods and services, which does include spending on new homes; government purchases are the expenditure that the government generates on goods and services necessary for the maintenance of the central government and local governments, which includes the salaries of public servants and public works; finally, net exports are the difference between purchases made by foreigners of goods produced in the country, less purchases made by national citizens of foreign goods, that is, exports less imports (Mankiw 2012).

The above is of vital importance, given that, as already mentioned, economic growth is a measure that is related to the well-being of citizens and its composition is formulated around spending or production, based on the double entry of said terms. The latter allows us to understand that GDP not only reflects the quantity of goods and services produced in the economy, but can also be the result of the competitiveness of a territory, which is why the theoretical references around competitiveness and its components are addressed below.

Competitiveness

When speaking about competitiveness, it is important to discern the different connotations that this concept can acquire, depending on the perspective from which it is approached. For example, Guerrero (1995) argues that competitiveness seen as an aptitude or as competitive capacity, is a subjective quality that depends on the qualities and capacities of each organization, which may or may not be better equipped to face its competitors depending on the particular case; however, this same author argues that competitiveness seen as a state is a relationship between two subjects or the competitive battle itself, regardless of whether one of them may be better or worse prepared for said confrontation, so, in this second approach, competition and competitiveness are the same, and refers to capitalist or market economies at the country level, regardless of whether their companies are competitive or not, which would be what the first approach of the term competitiveness refers to. Similarly, from the perspective of the Andean nations, competitiveness is defined as the capacity of a country to achieve high growth rates in a given period of time, which implies that a country will become more competitive in proportion to the development of a good economic environment and excellent political and social management (Alburquerque 2004; Araoz, Carillo, and Ginhoven 2002).

Thus, in a globalized economic environment, competitiveness is a concept that is important for all economies, both in developed and developing countries, which is why it has been studied in depth and various interpretations

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have been developed, such as traditional thinking, where competitiveness refers to a country's export results and the increase in participation in the international and local market or, as more recent thoughts, which consider commercial results as a consequence of aspects such as prosperity and economic growth, which is why competitiveness is understood as productivity and GDP per capita, since they are structural aspects that expose the real situation and well-being of a society, reflected for example, in the quality of life, better salaries, better capital returns and social development, beyond its commercial results (Tugores Ques 2006).

Although, in order to generate quality of life, it is necessary to be competitive, said competitiveness is usually temporary, because rivals have the ability to quickly replicate the differential characteristics existing in the market, therefore, it is relevant to have public institutions that work together for the creation and improvement of new specialized factors, with an innovative and internally competitive industry, demanding clients and dynamic suppliers that take advantage of the differences in values, culture, economic structure and history, to identify what the nation or region is best at, given that it is not possible to be competitive in everything and therefore, something unique must be offered, generated by a value chain based on efficiency, translated into less waste, less environmental pollution, social development and greater progress designed to develop in harmony with competitiveness (Porter 2017). For its part, the World Economic Forum (2018), which has been measuring the competitiveness of various countries since 1979, defines competitiveness as a set of institutions, policies and factors that together determine the level of productivity of a country, highlighting productivity as one of the key concepts of this definition.

The above definitions make it clear that competitiveness is a multidimensional and dynamic aspect, complex in itself and requiring the inclusion of various aspects that together allow us to measure and understand whether a country or region is competitive or not. Therefore, the World Economic Forum (2018) uses 114 indicators that somehow influence productivity, which in other words is measured by GDP. Below is how these 114 indicators are grouped at a global level, taking as a reference the Global Competitiveness Report (World Economic Forum 2019) and at a regional level the Departmental Competitiveness Index (Private Council of Competitiveness 2021).

Dimensions of Competitiveness

When addressing the issue of competitiveness, it is important to clarify whether it refers to business competitiveness or national competitiveness, since, depending on the level at which it is addressed, different variables may intervene.

For this research, it is necessary to delve deeper into the dimensions that are considered to measure the competitiveness of a country or region beyond the organizations that comprise it. This is how the Global Competitiveness Report has measured competitiveness based on 12 dimensions or also called pillars, which are: 1) Institutions, 2) infrastructure, 3) macroeconomic environment, 4) health and primary education, 5) Higher education and training, 6) Efficiency of the goods market, 7) efficiency of the labor market, 8) development of the financial market, 9) technological preparation, 10) market size, 11) Business sophistication and 12) Innovation, which in turn, are made up of a series of variables that allow to know the level of competitiveness by dimension and at a general level of each country or region studied (World Economic Forum 2019). Similarly, the private competitiveness council measures competitiveness through pillars, however, to measure competitiveness by department in Colombia, 13 dimensions or pillars are used as follows: 1) institutions, 2) infrastructure, 3) ICT adoption, 4) environmental sustainability, 5) health, 6) basic and secondary education, 7) higher education and training for work, 8) business environment, 9) labor market, 10) financial system, 11) market size, 12) sophistication and diversification, 13) innovation and business dynamics (Private Competitiveness Council 2021).

Pillar 1 Institutions.

This pillar covers indicators of both public and private institutions, since this is a fundamental determinant for the development of competitiveness, given that those societies in which their institutions provide guarantees of protection to private property, have fair and transparent control bodies, and a State concerned with preventing and punishing exemplary acts of corruption, invest in the common good, are considered societies with greater competitiveness and greater potential for long-term economic growth (Aguirre Unceta 2021; Awasthi, Nagarajan, and Deininger 2021; Benkraiem et al. 2021; Consejo Privado de Competitividad 2021; Hao, Zhang, and Wei 2022; Merino and Prats 2020; Raikov 2021; Yu and Fang 2022).

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Pillar 2 Infrastructure.
Infrastructure is another pillar that a region must develop, since it is not possible to be competitive without having a good physical plant for transportation and logistics, which allows maintaining low levels of transportation costs, lower costs in the supply chain and distribution channels, which facilitate the integration and dynamic flow of goods

between regions and countries; likewise, the infrastructure of public services is necessary to maintain the quality, expansion and continuity of business productivity (Arakpogun et al. 2020; Consejo Privado de Competitividad 2021; Dunlap and Laratte 2022; Kaliszewski et al. 2021; Kokkaew et al. 2022; Saunavaara, Laine, and Salo 2022).

Pillar 3 ICT Adoption
For its part, the adoption of information and communication technologies significantly improves the connectivity and functioning of the various economic sectors that operate in a society, since with it, the information necessary for business is accessed more quickly and efficiently, the costs of monetary transactions are reduced and the exchange of information is streamlined, which improves efficiency and encourages the adoption of innovation (Acheampong et al. 2022; Cuevas-Vargas and Parga-Montoya 2021; World Economic Forum 2019).

Pillar 4 Environmental sustainability
Environmental sustainability is the fourth pillar that measures the investment by territorial organizations in issues such as environmental management and disaster prevention and response, since this supports the development of competitiveness, understanding that the ultimate goal of this is to improve the quality of life of people in the long term, which is impossible if the sustainability of life in the future cannot be guaranteed, which is why industries themselves must be environmentally friendly (Castro-Castro et al., 2021; Dalalah et al., 2022; Housni et al., 2022).

Pillar 5 Health
Health is the pillar that measures the way in which the departments perform in terms of coverage, care and quality of health services, especially for the early childhood population, given that, when this population is healthy, it allows the competitive development of a region in the long term, which, in conjunction with an economically active population with good health, increases productivity levels (Consejo Privado de Competitividad 2021; Nayak, Bhattacharyya, and Krishnamoorthy 2021; Rodríguez Rincón and Jorge E. Chaparro Medina 2018; Sarabia, Crecente, and del Val 2021).

Pillar 6 Basic and Secondary Education
The sixth pillar focuses on measuring performance in terms of coverage and quality of basic and secondary education, which, if developed appropriately, can encourage the economic growth of a country, given that its economically active population improves its performance and acquires the ability to perform tasks of greater complexity and with greater value for the market, which also translates into greater purchasing power and a higher quality of life (Consejo Privado de Competitividad 2021; Lazaro-Mojica and Fernandez 2021; Madureira, Popovič, and Castelli 2021).

Pillar 7 Higher Education and Training for Work
Higher education and training for work make up the seventh pillar, which measures the results in terms of coverage, quality and mastery of the second language in higher education, technical, technological and training for work programs, given that these competencies and skills allow to increase the sophistication of the available workforce in an economy, which ultimately contributes to the development of innovation (Consejo Privado de Competitividad 2021; Miotto, Del-Castillo-Feito, and Blanco-González 2020; Soares et al. 2021).

Pillar 8 Business Environment
This pillar measures variables related to various macroeconomic aspects such as the efficiency of the goods, labor, and financial markets, where the degree of commercial openness, the tax burden, the conditions for opening a company, the unemployment rate, the underemployment rate, labor formality, coverage of financial institutions, and the use of financial products offered by banks are analyzed, given that competitiveness and productivity are closely related and depend on the correct arrangement of physical, human, financial, technological capital, the interaction of supply and demand, the absence of monopolies, regulations, taxes, the flexibility of productive factors, etc. (Ando and Matsumura 2020; Bruton and Chen 2022; Consejo Privado de Competitividad 2021; Galindo-Martín, Castaño-Martínez, and Méndez-Picazo 2021; Veiga et al. 2020).

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Pillar 9 Labor Market
This pillar measures the flexibility that exists to manage and reorganize human talent within organizations, given that, for the development of an efficient industry, the correct matching of workers with the most suitable jobs according to their hard and soft skills must be guaranteed, which must be within the basic rights of workers that guarantee decent work, but that allow companies to use their staff more efficiently (Neumark and Munguía Corella 2021; Pantea 2020; Peretto 2021; Salau et al. 2020; World Economic Forum 2019).

Pillar 10 Financial System
The tenth pillar of competitiveness is the financial system, which measures the level of penetration of the system, the amount of credit, capital, debt, insurance and other financial products available to society, which in turn translates into the analysis of the stability of the financial sector, given that all of the above allows for greater flows of money which, in turn, encourages the productivity of companies, consumption by households and investment by surplus holders in capital market products with greater potential that encourage and enhance the availability of resources for the development of an economy (Amissah et al. 2021; Botta, Caverzasi, and Russo 2020; Chester 2020; Schydlowsky 2020; World Economic Forum
2019).

Pillar 11 Market Size
Market size is the eleventh pillar, which measures the potential demand for products and services by internal and external consumers of the region in question, that is, the capacity of the country or department to absorb the goods produced in it and the capacity to export said goods and services to other regions or countries, which, when developed correctly, allows reaching productive levels such that allow the implementation of concepts such as economies of scale (Giménez 2022; Nieto-Barthaburu 2021; World Economic Forum 2019).

Pillar 12 Sophistication and Diversification
This pillar measures the sophistication and diversification of exports and investments made by government entities to encourage exports to different destinations, where the success or failure of those initiatives that seek to reach new markets is analyzed with particular attention, such as the case of clusters as a unit of productive forces, given that the development of a sophisticated and diverse economic environment can generate sustained economic growth, greater prosperity, and lower poverty rates in the long term (Bottega and Romero 2021; Consejo Privado de Competitividad 2021; Laborda, Salas, and Suárez 2020; Rueda Galvis 2008; Sato et al. 2020).

Pillar 13 Innovation and Business
Dynamics Given the growing technological development in society and the infinite variety of applications that information and communication technologies (ICT) have been shown to possess, pillar number 13 specifically analyses the capacity of regions to develop quality R&D activities and investment in science, technology and innovation (STI) activities, among other aspects such as the protection of intellectual property, given that these activities are considered essential for the generation of added value, the improvement of productivity, the development of a more sophisticated industry and the production of goods and services with differential technological characteristics (Alvarez-Melgarejo & Beltrán Díaz, 2021; Luìs et al., 2020; Ortigueira-Sánchez et al., 2022; Robertson et al., 2021; Romero-Martínez et al., 2017).

RESULTS

Correlation Models
Regarding the correlation models, it is important to mention that, in the first instance, normality tests were performed, since, as all variables are quantitative, this allows defining the type of correlation model to be used; in the case of this research, the Shapiro Wilk normality test was used (Amat Rodrigo 2016), which can be seen in Table 2., in the Prob>z column and whose values reflect that those variables with a value greater than 0.05 have a normal distribution and those with values below 0.05 have a non-normal distribution (Camacho-Sandoval 2008). In the case of Santander and Antioquia, the dependent variable GDP has a Prob>z greater than 0.05, so its distribution is normal and therefore, for the correlational analysis, in the independent variables with normal distribution the Pearson correlation coefficient must be used, while those independent variables with non-normal distribution (highlighted in bold in the table), are analyzed using the Spearman correlation coefficient (Amat Rodrigo 2016); in the case of La Guajira, the dependent variable GDP is non-normal, therefore, all are analyzed using the Spearman correlation coefficient.

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The results shown in the Pvalue column of Table 2., are the correlation coefficients calculated with the Pearson or Spearman coefficient as appropriate, which allow us to know 3 fundamental things; first, the significance, represented by an *, therefore, only those coefficients accompanied by this symbol are significant and therefore, they are the only ones that have a correlation with the dependent variable; second, the direction of said correlation, which can be inverse (negative coefficients) or direct (positive coefficients); third, the strength of said correlation, which can be null (coefficient = 0) weak (coefficient close to 0) or very strong (coefficient close to 1). The above allows us to understand that, if a coefficient is exactly -1 the correlation is perfect and inverse, which means that for each unit that decreases in the independent variable, one unit increases in the dependent variable and vice versa; If the coefficient is exactly 1, then the correlation is perfect and direct, meaning that for every unit increase in the independent variable, there is also a one-unit increase in the dependent variable and vice versa; when the coefficient is equal to 0, it is said that there is no correlation at all.

Having said this, in Table 2, it is possible to see that, for the department of Santander, there are 22 variables that show a significant correlation with the GDP. In particular, it can be seen that the variables INS-2 Fiscal management and INS-2-2 Local collection capacity have a coefficient of 0.7693* and -0.8789*, which means that fiscal management has a significant, positive and strong relationship with GDP growth, while collection capacity has a significant, negative and strong correlation, which means that, as Santander increases its score in its fiscal management, it can also increase its GDP; however, if said fiscal management is oriented towards a greater capacity to collect taxes, which is money that companies give to the State, it will have a negative impact on GDP growth. Similarly, Pillar 2 Infrastructure has a significant, negative and strong correlation with a coefficient of -0.7302*, which means that the more road infrastructure, the lower the GDP growth, which makes sense if two aspects are considered; the first is that the road infrastructure in which the department invests is concentrated on improving urban mobility, while intermunicipal mobility, especially in the country-city connection, has not received major improvements, which clearly does not impact business growth because it is not directly connected to the logistics chain; the second is that for the development of road projects, tax collection must be increased and investment in other aspects that probably do contribute to GDP growth must be decreased.

For its part, the variable SAL-2-2 Life expectancy at birth, has a positive, significant and strong correlation with GDP growth, reflected by a coefficient of 0.8427*, understanding that, if newborns have a higher quality of life, this means greater consumption of goods and services related to the development of newborns and also, greater labor force in the future, two important aspects for the development of GDP according to the economic theory addressed above. Similarly, the variable EDU-2-1 Saber 11 test scores 0.8797*, on secondary education, has a significant, positive and strong correlation coefficient with GDP growth, which means that the greater the growth in the score of this variable according to the CPC scale, the higher the GDP of the department, which is logical if one considers that the main source of work for Santander is recently graduated high school students.

Now, Pillar 7 Higher education and training for work, has a coefficient of 0.7190*, which means that this pillar, as a whole, is significant, positive and strong for the improvement of the departmental GDP, which makes sense, given that collaborators with university training, particularly from institutions such as SENA, which also train in operational techniques, add knowledge and technical training to the available workforce in the department; however, within this pillar a phenomenon occurs with the variable EDS-2-3 Coverage of higher education institutions with high-quality accreditation, which has a coefficient of -0.7305*, which means that the more institutions with such certification, the lower the department's GDP. This may be logical if one considers that, probably, graduates of these institutions, due to lack of opportunities, decide to leave the department and put their labor force and knowledge at the service of companies outside the local or national territory. On the contrary, variables such as EDS-2-4 Second Language Proficiency, has a positive, significant and very strong correlation with GDP growth, in fact, its coefficient is 0.9818*, the highest for the department of Santander, which means that the greater the number of people with mastery of two languages, the higher the GDP, almost in a perfect 1 to 1 relationship. This is logical if we consider that bilingual collaborators play a key role within organizations, such as communication with foreign companies, which translates into greater effectiveness when developing export processes.

On the other hand, Pillar 8 Business Environment has a coefficient of 0.7509*, which means that this variable has a significant, positive and strong correlation with GDP growth, which is reasonable, given that, depending on how easy it is for an entrepreneur to develop his activity, his business may grow and contribute more and more to the regional GDP. Within this pillar, there is the variable NEG-1-1 Ease of opening a company, which, like the pillar, has a positive, significant and strong correlation with GDP, as evidenced by its coefficient of 0.7884*; this is

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logical, given that if in a region, the process to open and formalize a company is simple, this motivates the birth of new businesses that contribute positively to the GDP and to job creation. Despite the above, it is observed that the variable LAB-1- 3 Labor Formality, has a coefficient of -0.7548*, which implies that the relationship between labor formality and regional GDP growth is significant and strong, but inverse, that is, as labor formality grows, GDP decreases. This can be answered by understanding that informality also represents cheaper labor, which considerably improves the capacity of companies to produce, therefore, by improving formality, from another point of view it means that in some way the costs for companies increase and therefore, their capacity to produce decreases. Under this logic, it can be inferred that the GDP of the department is based in part on the job insecurity that exists in the region and not only on the efforts of its entrepreneurs.

Regarding Pillar 10 Financial System, a coefficient of 0.8285* can be seen, which implies a positive, significant and strong correlation with Santander's GDP, which is understandable, given that the financial system has useful resources for the growth of the business sector. The latter is reflected in the variable FIN-1-2 Banking Index with a coefficient of 0.7898* which, like Pillar 10, has a positive, significant and strong relationship with GDP growth, given that, the higher the level of banking, the more productive money there is in the economy and therefore higher GDP. Likewise, when reviewing the indicators that make up pillar 11, it is observed that the subpillar and variable TAM-1/TAM-1-1 Size of the domestic market and TAM-2-2 Degree of trade openness, have a positive, significant and strong correlation with GDP growth, expressed in their coefficients of 0.7636* and 0.8129* respectively, which implies that, the larger the size of the domestic market and trade openness, the larger the size of the GDP. This is possible, given that, as mentioned above, most of Santander's production is consumed within the national territory, given its difficulties in exploring foreign markets, and with greater trade openness, it is possible to enter other markets.

Regarding Pillar 12 Sophistication and diversification, a correlation coefficient of 0.7289* can be seen, which allows us to understand that there is a positive, significant and strong correlation with GDP growth, which is reasonable when considering that the diversity of foreign markets and products to be exported is key to the growth of exports, which, ultimately, are a key ingredient in the GDP formula. Finally, regarding Pillar 13 Innovation and business dynamics, it is possible to see that this has a coefficient of 0.8534*, which means a positive, significant and strong correlation with GDP growth. This is even clearer when reviewed at the sub-pillar and variable level, where the sub-pillars INN-1 Research and INN-3 Business dynamics and the variables INN-1-1 High quality research and INN-3-2 Business density, obtained coefficients of 0.8088*, 0.7200*, 0.8224* and 0.7333* respectively, which means that all these indicators correlate strongly, significantly and positively with GDP growth. This is interesting, since it allows us to understand that, in the case of the department of Santander, the variables related to scientific research and the number of companies in the area, contribute positively to the economic growth of the region.

Board 1.

Correction Models

	Santander				**Antioquia**				**La Guajira**			
Variable	**Media**	**Desv**	**Prob>z**	**Pvalor**	**Media**	**Desv**	**Prob>z**	**Pvalor**	**Media**	**Desv**	**Prob>z**	**Pvalor**
PIB	59,00	9,00	0.13009	10.000	112,00	26,00	0.67035	10.000	8,00	1,00	**0.00256**	10.000
Pilar 1	5,90	0,38	0.47902	-0.1365	6,93	0,50	0.10354	-0.7636*	3,53	0,92	0.15379	-0.3593
Ins-1	6,27	1,03	0.31987	-0.0777	7,66	0,81	0.31704	-0.3443	4,04	2,65	0.70510	-0.4311
Ins-2	4,44	0,45	0.99198	0.7693*	5,98	0,62	0.31857	-0.0583	2,78	1,82	0.10096	-0.8264*
Ins-2-1	5,08	0,68	0.10139	0.2788	5,13	1,90	**0.03057**	0.7904*	3,38	3,72	**0.02941**	-0.5663
Ins-2-2	2,17	0,72	0.62197	-0.8789*	5,61	1,77	0.08879	-0.9286*	0,68	0,81	0.07892	-0.7533*
Ins-2-3	6,08	1,80	**0.03203**	0.5150	7,20	0,91	0.95592	0.2356	4,28	2,62	0.85251	-0.6467
Ins-3	6,08	1,36	0.30811	-0.5418	7,69	2,11	0.38902	-0.9205*	2,63	2,23	0.39373	0.2755
Ins-4	6,77	0,66	0.64862	0.4492	6,39	0,83	0.10657	0.8790*	4,22	1,21	0.23733	0.5988
Ins-4-1	8,90	0,20	0.64797	-0.4878	5,04	0,68	0.92658	-0.7561*	7,44	0,82	0.51886	-0.7425*
Ins-4-2	9,21	0,61	**0.00586**	0.0958	8,45	1,05	0.20898	0.4282	6,77	2,43	**0.03815**	0.7066
Ins-4-3	8,78	0,90	0.75383	0.4481	7,63	1,25	0.42568	-0.5213	7,35	1,47	**0.03185**	-0.2994
Pilar 2	5,27	0,49	0.58562	-0.7302*	5,67	0,71	0.66170	0.2038	2,79	1,02	**0.00337**	0.4431

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Inf-1	7,17	0,70	0.14135	0.5599	7,44	0,95	0.52714	0.3729	4,34	1,76	0.74968	0.2275
Inf-1-4	6,05	1,53	0.75897	-0.5409	6,33	1,40	0.79426	-0.3311	6,21	3,56	0.45880	-0.1928
Inf-2	4,12	0,66	**0.04177**	0.2036	4,57	1,57	0.92345	0.9184*	3,22	0,86	0.79930	0.9701*
Inf-2-3	5,86	1,10	0.27111	0.6056	5,53	3,03	0.19122	0.8971*	5,25	3,63	0.97908	0.7590*
Pilar 3	5,71	1,86	**0.02212**	-0.1317	5,71	1,74	0.19365	-0.1954	0,88	1,22	**0.00932**	0.3713
Tic-1-1	6,61	0,29	0.16435	0.5471	7,27	0,37	0.44505	0.4644	1,04	1,44	**0.00986**	0.0723
Tic-1-2	4,56	3,45	0.68758	-0.5833	5,10	3,75	**0.00609**	-0.2771	1,25	1,70	0.71221	0.3879
Pilar 4	5,55	1,84	**0.00222**	0.5868	5,20	0,92	0.95949	-0.2673	3,79	1,61	0.34505	-0.0958
Pilar 5	5,98	0,23	0.71706	0.1423	6,31	0,41	0.18824	0.6845	3,25	0,96	**0.02705**	0.6826
Sal-1	6,01	0,71	0.79048	0.2907	4,91	1,05	0.61848	0.9126*	4,48	1,07	0.40636	0.1205
Sal-1-1	5,31	2,13	0.89582	0.1914	6,20	2,54	0.29341	0.6474	6,26	1,52	0.67890	0.5879
Sal-2	7,13	1,26	**0.01353**	0.2229	8,00	0,83	0.14243	0.8022*	2,18	2,22	**0.00420**	0.3713
Sal-2-1	9,48	0,34	0.27900	0.6585	9,07	0,34	0.18349	0.7877*	3,25	2,44	0.67355	0.4458
Sal-2-2	6,45	0,38	0.98469	0.8427*	6,50	0,66	0.98469	0.6677	4,86	0,29	0.98469	0.2535
Sal-3	4,89	1,04	0.24180	-0.3681	5,68	1,02	0.63093	-0.5342	3,30	0,78	0.22805	0.0719
Pilar 6	7,84	0,50	0.30835	0.1556	5,91	0,57	0.50288	-0.4964	2,55	1,49	0.42321	0.7785*
Edu-1	8,47	0,40	0.28629	0.2538	7,28	0,92	0.34703	-0.4642	2,67	2,23	0.31554	0.6467
Edu-1-1	7,69	0,97	0.61139	0.2493	7,95	1,64	0.46299	-0.4889	3,85	3,17	0.61048	0.7711*
Edu-1-2	8,89	0,44	0.48860	0.1069	7,11	1,33	0.13600	-0.4064	2,21	3,23	**0.01070**	0.8222*
Edu-1-3	9,70	0,40	0.11684	0.3919	7,94	0,59	0.84052	-0.0662	0,95	1,88	**0.02054**	0.7683*
Edu-1-4	9,13	0,72	0.31406	0.4701	7,34	0,23	0.99049	0.2848	0,84	1,40	**0.00945**	0.5488
Edu-1-5	6,94	1,06	0.67911	-0.2650	6,06	1,64	**0.04832**	-0.4671	5,52	2,70	0.16832	0.3593
Edu-2	7,36	0,82	0.72004	-0.0119	4,88	0,56	0.67093	-0.6514	2,36	1,04	0.43380	0.8743*
Edu-2-1	8,71	0,71	0.54293	0.8797*	5,81	0,65	**0.01782**	0.8383*	2,26	0,78	**0.02042**	0.3713
Edu-2-3	6,84	2,48	0.05298	-0.3797	3,52	2,83	0.15436	0.1900	1,80	3,24	**0.00042**	0.3436
Edu-2-5	4,80	1,29	0.76038	-0.3074	6,16	2,85	0.30174	-0.8644*	2,91	1,68	**0.00270**	0.1437
Pilar 7	6,39	0,42	0.23613	0.7190*	6,87	0,76	0.90835	0.4338	1,71	0,70	**0.01342**	0.1557
Eds-1	6,55	0,56	0.78124	0.3087	4,81	0,61	0.24432	0.5636	1,82	0,96	0.06523	-0.0958
Eds-1-1	4,61	0,21	0.73981	0.4693	4,03	0,52	**0.00768**	0.9341*	1,39	0,96	0.21162	0.3614
Eds-1-2	7,89	1,56	0.07849	-0.0452	3,51	0,80	0.30916	0.7600*	0,15	0,22	**0.00315**	0.4096
Eds-1-3	7,94	0,65	0.64370	0.0368	6,51	0,43	**0.00365**	-0.1677	1,95	0,71	**0.00465**	-0.0240
Eds-2	6,18	0,55	0.23178	0.6376	7,93	0,77	**0.02921**	-0.1078	1,83	0,72	0.47247	0.0838
Eds-2-1	8,83	0,58	0.43793	0.0019	9,09	0,40	0.25204	-0.0641	2,06	1,74	0.33267	0.0843
Eds-2-2	4,68	1,22	0.09662	0.3452	8,70	1,26	0.70944	-0.1800	3,55	1,31	0.15414	0.5150
Eds-2-3	5,11	0,43	0.27185	-0.7305*	6,18	0,80	0.60365	-0.2458	0,12	0,18	**0.00808**	0.6189
Eds-2-4	5,99	1,43	0.07577	0.9818*	6,95	2,39	**0.01193**	0.8144*	0,54	0,53	**0.04561**	0.3434
Pilar 8	5,60	0,74	0.42492	0.7509*	5,92	0,90	0.98520	0.9627*	4,53	1,32	**0.00520**	0.3373
Neg-1-1	6,77	1,08	0.79108	0.7884*	7,12	2,21	0.57190	0.7857*	3,72	2,78	0.99994	0.8948*
Neg-1-2	5,31	2,48	**0.00539**	0.0000	6,03	1,45	0.72489	0.7452*	5,66	1,70	**0.00039**	0.4909
Neg-1-3	4,08	1,08	0.99994	0.5193	4,63	2,64	0.99994	0.8093*	5,66	1,11	0.99994	0.7208*
Neg-1-4	9,03	1,79	0.98380	-0.4718	9,03	1,80	0.98469	-0.8333*	5,64	0,39	0.99994	0.3105
Pilar 9	6,92	0,18	0.96716	-0.2769	6,19	0,46	0.50338	0.7009	5,82	0,51	0.42181	-0.6347
Lab-1	6,68	0,58	**0.02772**	-0.2036	6,13	0,37	0.57488	0.6272	5,33	1,24	0.16832	-0.6707
Lab-1-1	8,16	0,68	0.08019	-0.4888	5,74	0,46	0.17923	-0.4277	8,14	0,91	0.71316	-0.3234
Lab-1-2	9,05	0,85	**0.02986**	-0.4072	6,34	0,83	0.70039	0.3166	9,05	1,20	**0.03312**	0.1227
Lab-1-3	4,30	0,68	0.37750	-0.7548*	7,76	0,81	**0.03165**	-0.6108	0,54	0,62	0.06999	-0.6386

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Lab-1-4	5,16	0,64	0.12465	-0.0131	5,00	0,71	0.65928	-0.3027	3,17	2,96	0.31956	-0.6587
Lab-2-1	6,76	0,88	0.11604	-0.0734	4,16	0,94	0.98750	-0.7083*	7,25	2,04	0.33684	-0.2036
Pilar 10	3,92	0,67	0.12697	0.8285*	5,29	0,89	0.43162	0.9603*	0,41	0,31	0.06048	0.6386
Fin-1-1	5,70	0,69	0.37250	0.5955	2,84	0,56	0.12158	0.4503	0,62	1,18	**0.00235**	0.5214
Fin-1-2	6,65	1,42	0.35020	0.7898*	7,08	1,14	0.95833	0.5936	0,36	0,48	0.05972	0.3318
Fin-1-3	1,95	0,63	**0.00008**	0.6386	5,98	1,57	**0.00479**	0.4458	0,52	0,24	0.10355	0.5422
Pilar 11	6,88	0,57	0.24674	0.4186	8,58	0,58	0.26708	-0.3916	5,91	1,00	**0.01000**	0.2275
Tam-1	6,82	0,62	0.44780	0.7636*	7,97	0,90	0.21013	0.8650*	2,80	2,16	0.09650	0.1084
Tam-1-1	6,82	0,62	0.44780	0.7636*	7,97	0,90	0.21013	0.8650*	2,80	2,16	0.09650	0.1084
Tam-2	6,94	1,31	0.35198	0.0033	9,19	1,52	0.99351	-0.8078*	9,02	0,82	0.17974	0.7306*
Tam-2-1	7,45	1,42	0.90109	0.4381	10,00	0,00	**0.00025**	0.5808	8,99	0,79	0.12676	0.7306*
Tam-2-2	0,85	0,42	0.31946	0.8129*	3,24	0,77	**0.02319**	0.6467	10,00	0,00	**0.00025**	0.5808
Pilar 12	6,22	0,96	0.33923	0.7289*	8,39	1,04	0.05035	0.8362*	3,15	0,70	0.14416	0.3234
Sof-1-1	8,96	0,64	0.53625	0.1525	8,23	1,61	0.11525	0.7570*	8,97	0,58	0.36137	-0.5629
Sof-1-2	6,76	0,69	0.18925	0.3703	9,08	0,42	**0.01249**	0.4910	1,02	1,04	**0.04910**	-0.6707
Pilar 13	4,20	0,81	0.33976	0.8534*	5,86	1,09	0.46183	0.9566*	0,58	0,47	0.12710	0.9461*
Inn-1	4,30	0,62	0.95479	0.8088*	5,45	0,39	0.71453	0.3400	0,53	0,61	0.73069	0.7212*
Inn-1-1	4,43	0,82	0.41731	0.8224*	6,54	1,18	0.60273	-0.8300*	0,90	0,92	0.46665	0.7212*
Inn-1-2	3,75	0,42	0.58271	-0.2000	4,13	1,16	0.11324	0.8168*	0,00	0,00	**0.00025**	0.5808
Inn-2	3,81	1,19	0.92666	0.1236	6,26	2,35	0.89769	0.8270*	0,25	0,57	**0.00080**	0.4391
Inn-2-1	3,81	1,19	0.92666	0.1236	6,26	2,35	0.89769	0.8270*	0,25	0,57	**0.00080**	0.4391
Inn-3	4,51	0,69	0.13559	0.7200*	5,89	1,06	0.12162	0.8198*	0,83	0,57	0.09637	0.8862*
Inn-3-1	4,01	1,21	0.10450	0.3581	4,60	1,87	**0.00559**	0.4671	0,91	1,01	0.11491	0.2994
Inn-3-2	3,46	0,70	0.14671	0.7333*	4,04	1,02	0.06359	0.8532*	0,41	0,20	0.33413	-0.2275
Inn-3-3	6,05	0,92	0.64230	0.5926	9,02	0,69	0.08981	0.9031*	1,17	1,42	0.33233	0.9059*

Note:
PIB: For the presentation of the table, GDP is given in trillions of pesos.
Dev: Standard deviation.
Prob>z: Shapiro Wilk normality test (normal distribution value >0.05 and non-normal distribution value <0.05) non-normal variables in bold.
Pvalue: Pearson correlation coefficient for normal variables; Spearman for non-normal variables.
*: Significance al 0.05.

Once the variables that have a correlation with GDP growth for the department of Santander have been analyzed, it is important to check whether this occurs in the same way in departments such as Antioquia and La Guajira. In the case of Antioquia, in Table 2, shown above, 36 variables with a significant correlation with GDP growth can be identified. Among the first indicators is Pillar 1 Institutions, which has a coefficient of - 0.7636*, which means that, in the case of the department of Antioquia, the correlation between Pillar 1 and GDP growth is significant, strong and inverse, which allows us to understand that as the department loses points in the rating of its institutions, the GDP increases. To understand the above, the indicators found within this pillar must be reviewed, such as the variables INS-2-1 Fiscal autonomy with a coefficient of 0.7904*, INS-2-2 Local collection capacity with a coefficient of -0.9286*, INS-3

Transparency with a coefficient of -0.9205*, INS-4 Security and justice with a coefficient of 0.8790* and INS-4-1 Homicide rate with a coefficient of -0.7561*. In these indicators it is possible to observe that fiscal autonomy has a significant, positive and strong correlation while local collection capacity has a negative, significant and strong relationship; this may be logical if one considers that fiscal autonomy is simply the autonomy that the tax collection entity has separate from other branches of power, while the collection capacity, quantitatively speaking, refers to money that companies must deliver to the State and therefore, it is logical that the relationship is negative.

Something that is very curious is that the relationship between transparency and GDP is negative, significant and very strong; considering that in this subpillar there are issues such as the percentage of companies in SECOP II and transparency in the use of royalties, it is likely that the increase in control mechanisms to guarantee transparency will somehow slow down the processes regarding investment and contracting of companies by the

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government. On the other hand, security and justice and the homicide rate have positive, significant and strong coefficients, so it is logical to understand that, with greater security and a lower homicide rate, companies have greater freedom to produce, thus increasing GDP. Regarding the indicators within pillar 2, it can be seen that the subpillar INF-2 Road infrastructure with a coefficient of 0.9184* and the variable INF-2-3 Percentage of primary roads in good condition with a coefficient of 0.8971*, are positively, significantly and strongly correlated with GDP growth, which is logical if one considers that good road development facilitates land transport of goods; however, this result is contrary to that of Santander which, as already explained, has a negative correlation in this aspect.

Similarly, within pillar 5, the SAL-1 Health Coverage subpillar was identified with a positive, significant and very strong coefficient with a value of 0.9126*, which implies that as the department of Antioquia improves its health coverage, its GDP also grows. The latter is similar to the behavior of the SAL-2 Health Outcomes subpillar and the SAL-2-1 Infant Mortality variable, which have coefficients of 0.8022* and 0.7877* respectively, which means that these two indicators correlate positively, significantly and strongly with the growth of Antioquia's GDP.

Likewise, within pillar 6, there are the variables EDU-2-1 Saber 11 test scores with a coefficient of 0.8383*, which implies that, similarly to the department of Santander, the department of Antioquia improves its GDP to the extent that high school graduates obtain higher scores in the Saber Pro tests. Interestingly, the variable EDU-2-5 Investment in the quality of basic and secondary education has a coefficient of -0.8644*, which implies a negative, significant and strong correlation with GDP growth, meaning that the greater the investment in the quality of basic and secondary education, the tendency is for GDP to decrease. This may make sense if two scenarios are considered; the first is that the basis of productivity in the department of Antioquia may be the operative workforce with little education; the other scenario may be that the higher the quality of education, the greater the investment in this aspect and, therefore, investments in issues related to the production of companies are reduced.

Within pillar 7, the variables EDS-1-1 Gross coverage in university education, EDS-1-2 Graduates in postgraduate studies and EDS-2-4 Second language proficiency were identified, with coefficients of 0.9341*, 0.7600* and 0.8144*, respectively, which means that these three variables have a positive, significant and strong correlation with the GDP growth of the department of Antioquia. This lays the foundation that part of the success of this department lies mainly in higher education, which, as can be seen, falls on the coverage of higher education, the number of new graduates of postgraduate courses and the increase in professionals with mastery of the second language.

Likewise, Pillar 8 Business Environment has a coefficient of 0.9627*, which means that as a whole, this pillar has a positive, significant and very strong correlation with the GDP growth of the department, which is also accompanied by the variables NEG-1-1 Ease of opening a business 0.7857*, which as can be seen, has a positive, significant and strong correlation, as do the variables NEG-1-2 Ease of registering properties with a coefficient of 0.7452* and NEG-1-3 Ease of obtaining construction permits with a coefficient of 0.8093*, which contribute positively, significantly and strongly to the GDP growth of the department of Antioquia. Similarly to the department of Santander, the variable NEG-1-4 Number of tax payments per year has a coefficient of -0.8333*, which implies that tax collection negatively impacts GDP growth, mainly because, quantitatively speaking, taxes are money that the State takes from business owners as a result of their profits.

Within pillar 9, there is the variable LAB-2-1 Gap in labor participation between men and women with a coefficient of -0.7083*, which means that the higher the score obtained by the department in reducing the gap in labor participation between men and women, the lower the GDP growth. The above may make sense if, in the department of Antioquia, a labor linkage policy based on gender and not on the capabilities of workers were being wrongly developed.

Regarding Pillar 10, Financial System, it is possible to affirm that it has a positive, significant and very strong correlation with GDP growth, given that its coefficient is 0.9603*. This implies that as the system improves within the department of Antioquia, GDP also grows, which is logical, given that the financial system is the one that, for the most part, has the economic resources that entrepreneurs need to invest in the growth of their organizations.
Regarding Pillar 11, it is possible to see that the sub-pillar and variable TAM-1/TAM-1-1 Size of the internal market has a coefficient of 0.8650*, which implies that the greater the consumption of Antioquian citizens, the greater the GDP growth; however, the sub-pillar TAM-2 Size of the external market has a -0.8078*, which means a negative, significant and strong correlation with GDP growth. This may make sense if one considers that,

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probably, the larger the external market, the lower the capacity of local companies to understand how to enter these areas, which, added to the amount of imports mentioned above, reduces net exports, negatively impacting GDP growth. Similarly, Pillar 12 Sophistication and diversification shows a coefficient of 0.8362*, while its variable SOF-1-1 Diversification of export destination markets has a coefficient of 0.7570*, which means that both have a positive, significant and strong correlation with GDP growth. This complements what was stated in the previous pillar, since it shows that it is not the size of the external market but its diversification that moves the economy of a region and increases its GDP.

Finally, for the department of Antioquia, Pillar 13 Innovation and business dynamics has a coefficient of 0.9566*, which implies that innovation has a positive, significant and very strong correlation with the growth of the departmental GDP; In fact, this is one of the pillars with the highest number of variables correlated with GDP, given that the variables INN-1-1 High quality research with a coefficient of -0.8300*, INN-1-2 Journals indexed in Publindex with a coefficient of 0.8168*, INN-2 Industrial property registrations with a coefficient of 0.8270*, INN-2-1 Industrial property registrations with a coefficient of 0.8270*, INN-3 Business dynamics with a value of 0.8198*, INN-3-2 Business density with a figure of 0.8532* and INN-3-3 Participation of medium and large companies with a result of 0.9031*, have a strong, significant and positive correlation with GDP growth, with the exception of the variable INN-1-1 whose correlation is negative. This not only means that GDP is positively affected by issues such as intellectual property registration, but also that aspects such as business density and the participation of the largest companies play a fundamental role in the economic growth of a region.

Regarding the department of La Guajira, in Table 2, 19 variables with a significant correlation with the department's GDP are observed. Within pillar 1, there are the subpillar INS-2 Fiscal management and the variables INS-2-2 Local collection capacity and INS-4-1 Homicide rate, with coefficients of -0.8264*, - 0.7533*, -0.7425*, which indicates that, for this department, a higher tax collection and a lower homicide rate reduce the GDP. This may make sense if one considers that this department has its greatest source of growth in coal exports, for which reason, the payment of taxes by companies such as Cerrejón directly affects its growth potential. Regarding the homicide rate, a logical reason cannot be identified that allows us to understand why this variable is negative; however, this could be due to the conditions of the department itself, where the absence of the State is such that even violence could somehow contribute to the productivity of some companies.

Regarding pillar 2, it is possible to see that the subpillar INF-2 Road infrastructure and the variable INF-2-3 Percentage of primary roads in good condition, have coefficients of 0.9701* and 0.7590* respectively, which means that in the department of La Guajira, these variables have a positive, significant and strong correlation with GDP growth, which implies that, in a region with such poverty rates, the improvement of land roads can mean a great change for the entire local economy. Similarly, Pillar 6 Basic and secondary education has a positive, significant and strong correlation with GDP growth, given its coefficient of 0.7785*, which is aligned with the variables EDU-1-1 Net coverage in preschool with a coefficient of 0.7711*, EDU-1-2 Net coverage of primary education with a value of 0.8222*, EDU-1-3 Net coverage of secondary education with an indicator of 0.7683* and EDU-2 Quality in education with a coefficient of 0.8743*, which, like the pillar, are positive, significant and strong in their relationship with GDP, which means that, in a region like La Guajira, access to basic education can make a big difference between wealth and poverty.

Likewise, within pillar 8, the variables NEG-1-1 Ease of opening a company and NEG-1-3 Ease of obtaining construction permits were identified, which have coefficients of 0.8948* and 0.7208* respectively, which means that, for the department of La Guajira, it is vitally important to have flexibility in the way of doing business, since this positively impacts GDP growth. Regarding pillar 11, it is possible to identify that the subpillar and variable TAM-2/TAM-2-1 Size of the external market, has a coefficient of 0.7306*, which means that the size of the external market has a positive, strong and significant correlation with the growth of the GDP of La Guajira, which is logical when considering that in this region, economic growth, among various factors, is largely leveraged by the mining and energy activity, which is mostly dedicated to the export of resources.

Finally, and as a closing to this chapter, it is observed that Pillar 13 Innovation and business dynamics has a coefficient of 0.9461*, which means that this is an indicator with a positive, significant and strong correlation with GDP growth. This is supported by the subpillars INN-1 Research (0.7212*) and INN-3 Business dynamics (0.8862*) and the variables INN-1-1 High quality research (0.7212*) and INN-3-3 Participation of medium and large companies (0.9059*), whose coefficients are positive, significant and strong, which means that scientific

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research, in conjunction with business dynamics, generate optimal conditions for the economic growth of the region in La Guajira.

MODELS FOR STRENGTHENING PUBLIC POLICIES

As explained in the previous chapters, once the relationship between competitiveness indicators and GDP has been reviewed, it is possible to propose a model that, based on those pillars in which the department of Santander has greater strengths and those variables with a positive correlation with GDP, allows strengthening public policies with three fundamental purposes: improving economic growth (GDP), improving the business environment in the department (Pillar 8) and improving Santander's position in the departmental competitiveness ranking.

In accordance with the above, first of all, the proposals that seek to improve the GDP of the region are presented, given that it is through GDP that the necessary resources are obtained to invest in most of the pillars of competitiveness. As a first step, it is proposed to improve the organization of the public apparatus, which will allow for improved fiscal management, without this meaning an increase in taxes. On the contrary, according to the results, it is more beneficial for the improvement of the department's GDP to create policies that promote business formalization and reduce evasion, which substantially improves public funds to invest in other fundamental aspects related to the quality of life of the inhabitants.

Similarly, it is considered relevant that there are public policies aimed at increasing life expectancy at birth, that is, aimed at early childhood care, given that the first years of a human being's life are crucial for optimal development during adolescence and later adulthood. That is why, in order to have good workers in the future, the department must strengthen its public policy for early childhood care, mainly in those areas with limited health systems, such as small municipalities and rural areas.

As mentioned above, the results of the Saber 11 tests, higher education and training for work and mastery of a second language are related to GDP growth; this shows that education at all levels is essential for the economic growth of a territory, which ultimately translates into greater development. Therefore, another of the proposals within the model that the government should develop in conjunction with the mayors of the metropolitan area and the different municipalities of Santander is to guarantee coverage, quality and access to secondary, higher and bilingual education, through public policies that not only guarantee that the best results of the Saber 11 tests have free access to university, but also that the state can provide training in a second language, since this also allows local companies to have a greater capacity to do business abroad. Similarly, the business environment must be strengthened, specifically in the facilities to open a company, since this is correlated with GDP growth. That is why, according to the results, another aspect to consider within the model is the adjustment of public policies regarding the requirements that a person must meet in order to open a company, including the means used for this purpose; therefore, applying a policy of reducing paperwork is important to motivate entrepreneurs not only to create new companies, but also to formalize existing ones.

Another of the strategies included in the model is about the financial system, specifically about the banking rate, which, as explained in the previous chapter, is related to GDP growth. This allows us to understand that strategies must be strengthened to provide greater access to credit to the different actors that make up a society, both independent and natural. In this order of ideas, initiatives such as the citizen banking of the IMEBU of the mayor's office of Bucaramanga (Imebu 2022), are an example of public policies designed to provide access to credit to citizens and increase the banking rate.

Within the strategies to improve GDP growth in Santander, it is important to design public policies that allow improving the size of the market, given that aspects such as the size of the internal market, and the degree of commercial openness of the region, contribute positively to the GDP. Within this, the governorates and mayors together with the Higher Education Universities can weave alliances in the development of joint events that not only seek to promote the undertakings of students from the respective universities, but also support the visualization of undertakings from all the municipalities in the region, thus achieving greater visibility in markets outside the department and at the same time, promoting local consumption. Likewise, according to the results, sophistication and diversification is another aspect that contributes positively to GDP growth, which means that, to improve the economic growth of the region, public policies must be designed aimed at taking advantage of trade opportunities abroad. To this end, the governorate and the mayors can provide advice, support and technical

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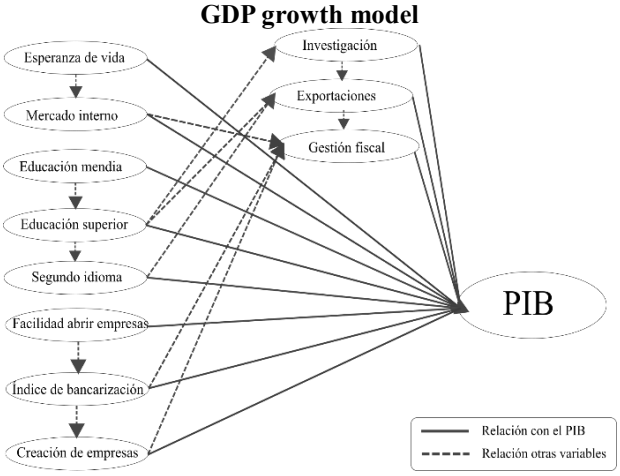
assistance to the different entrepreneurs so that they can export their products and thus increase their sales and, of course, bring resources from the region.

The aim of the project is to promote the development of foreign investment, which, through fiscal management, helps in public investment for the benefit of all. It is important that the public sector supports and strengthens these aspects in which local entrepreneurs do not have great strengths, mainly in the negotiation processes with companies abroad and how to place their products in other territories.

Finally, it was possible to determine a correlation between the aspects of innovation and business dynamics with GDP growth. This implies that, from this pillar, the growth of high-quality research and business density should be encouraged; that is, an increase in investment by the public sector in the development of research that contributes to the development of the business sector and also; together with the ease of opening companies, encourage the increase in the number of companies in the region; However, the latter is only possible if the placement of products abroad is improved, since the demand in the region may not have the capacity to absorb all the products and services available from local companies, which is why a greater number of companies and innovations must seek their growth outside of Santander. The figure shows a diagram of the model developed in this section.

Figure 1.
GDP growth model



Regarding the position of the department within the CPC competitiveness index for the year 2020, it is important to note first that the department of Santander is better than Antioquia in pillars 3, 4, 6 and 9, which means that, currently, Santander has higher scores than Antioquia in 4 of the 13 pillars of competitiveness. This is why the department of Santander must create public policies aimed at improving its competitive position in at least 3 more pillars with respect to the department of Antioquia, since this could position Santander as the most competitive department in the country. To do this, considering the data obtained, Santander has a greater chance of surpassing Antioquia in pillars 1, 2, 5, 7 and 8 in which the differences between the departments of Santander and Antioquia according to the 2020 report are 0.14, 1.00, 0.93, 0.29, and 0.38 respectively.

Therefore, first of all, the department of Santander must improve its public policies with respect to administrative performance, fiscal management, transparency, and security and justice, which are the sub-pillars that group the variables that make up pillar 1. One of the fundamental axes for the competitive development of a region is the development of its public apparatus; in this sense, aspects such as transparency become relevant so that issues such as fiscal management fulfill the objective of its reason for being, which is the collection of taxes and their reinvestment in social issues and the functioning of the public apparatus itself; likewise, public policies must be improved in aspects such as administrative performance and security and justice that revitalize citizens' confidence in the public sector.

Similarly, infrastructure is another key aspect in which Santander has the possibility of surpassing the department of Antioquia given the difference of 100 points within the CPC scale. To improve this pillar, the department of Santander must create public policies aimed at increasing investment in service infrastructure, road infrastructure

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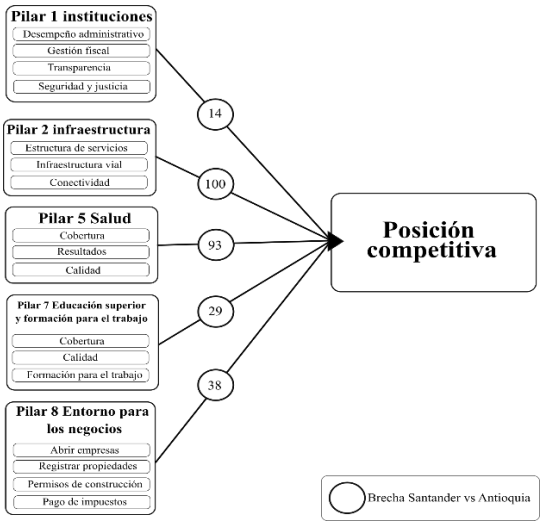
and connectivity, mainly in those municipalities that are far from large cities, primarily guaranteeing access to public services for the entire population and land routes in optimal conditions that contribute to business development.

Table 2.
Pearson correlation Pillar 8 & competitiveness index

	pilar8	neg11	neg13	tic11	sal21	edu21	eds24	tam11	inn11	inn32	inn33
Pilar8	1.0000										
Neg11	0.9671*	1.0000									
Neg13	0.9058*	0.8967*	1.0000								
Tic11	0.7752*	0.6469	0.5629	1.0000							
Sal21	0.9500	0.8921*	0.9251*	0.7154*	1.0000						
Edu21	0.9512*	0.9647*	0.8480*	0.6191	0.9096*	1.0000					
Eds24	0.7935*	0.8155*	0.5985	0.6249	0.7244*	0.8948*	1.0000				
Tam11	0.8854*	0.8540*	0.8571*	0.6571	0.9456*	0.9106*	0.8352*	1.0000			
Inn11	0.7325*	0.7663*	0.6820	0.5018	0.7924*	0.8413*	0.8766*	0.9290*	1.0000		
Inn32	0.7114*	0.7753*	0.6912	0.1859	0.6587	0.8401*	0.6879	0.6941	0.6355	1.0000	
Inn33	0.8922*	0.9313*	0.8872*	0.5665	0.7913*	0.8380*	0.6340	0.6796	0.5447	0.6475	1.0000

Figure 2.
Model for Santander's competitive position



Finally, with regard to improving the business environment, it is worth mentioning that, within the indicators of the departmental competitiveness index, there is pillar 8, which refers to this issue, so it is important to review those variables that, in some way, can contribute to improving this pillar and, in turn, allow Santander to be ranked first in the ranking and increase its GDP.

To solve specific objective 3, a correlation model was developed between pillar 8 and all the variables of the departmental competitiveness index measured between 2013 and 2020. Table 3 shows the results of only those variables with significant and positive coefficients, that is, those that do have a correlation with the increase in the score in pillar 8 and whose direction means that it contributes to the increase in said pillar.

Based on the results presented, if the local government wishes to improve the business environment (pillar 8) in the department of Santander, public policies must be aimed at improving key aspects such as the ease of opening a company (Neg-1-1) and the ease of obtaining construction permits (Neg-1-3), which, as previously stated, are also key to increasing the department's GDP and require investment in systematization and reduction of requirements.

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Secondly, another important variable for improving the business environment is fixed broadband internet penetration (Tic-1-1), probably because improving the internet can facilitate not only the paperwork via the web, but also communication and negotiation with various relevant actors for a company. In this sense, another of the strategies within the Model, aimed at achieving the objective of having a suitable business environment, is the investment in improving the internet infrastructure in the department, mainly in those municipalities and remote areas where this technology is still deficient; The above must be strengthened by technical assistance in the matter, which, from the municipal mayors, can provide advice to entrepreneurs on how to use the Internet for their procedures with the state and for the development of their businesses.

CONCLUSIONS

From the arduous study of the competitiveness indicators and their relationship with the economic growth of the department of Santander, it has been possible to reach several conclusions. Firstly, it is possible to conclude that, in general, for the department of Santander, most of the pillars, sub-pillars and variables of the departmental competitiveness index have values above the average range (5-6) within the CPC measurement scale; in fact, the average of these scores during the observation period 2013-2020 is above the mentioned range in all the pillars. The data also show that the Covid-19 pandemic negatively affected the results of most of the variables, given that almost all of them registered falls between 2019 and 2020, which indicates that global trends on the effects of the pandemic are not foreign to the regions where the Coronavirus was handled acceptably.

Comparatively speaking, it is possible to conclude that, although Antioquia as the first department in the competitiveness ranking is expected to be superior to Santander in all aspects, the reality is different, given that Santander has higher values on average and the data reported in the 2020 report in pillars 3, 4, 6 and 9. Additionally, it is possible to ratify the superiority of Antioquia in fundamental pillars for economic development such as the financial system, market size, exports, and innovation and business dynamics, where the gaps between these two departments are still very wide. Likewise, it was possible to understand that, in peripheral departments such as La Guajira, most of the pillars, sub-pillars and variables have values within the low or very low range of the CPC measurement scale, which is not surprising, but it does make it clear that, the abandonment of these areas can generate gaps that can take decades to close. Regarding economic growth, it is possible to conclude that the department of Santander has had a sustained but gradual growth, with a negative trade balance or net exports, where imports far exceed the department's exports, an aspect in which Santander has great weaknesses and which is a reflection of a problem at the national level. Likewise, the participation in the national GDP has decreased in recent years, which indicates that other departments are growing more rapidly than Santander, in addition to the reduction it has had in its royalties. Although in terms of growth and exports it does not have the best data, the department's GDP per capita is higher than the country's GDP per capita, therefore, it is possible to conclude that, in economic terms, in Santander there are greater probabilities that citizens have a better quality of life than most of the inhabitants of the rest of the country.

Comparatively speaking, it is clear that Antioquia is far superior to Santander in aspects such as size and GDP growth; in terms of exports and royalties, Antioquia and La Guajira far surpass the department of Santander, where even La Guajira is the only one of the 3 departments observed that has a positive trade balance, by far, much higher than that of Santander; however, within the comparative analysis carried out, the department of Santander is the one with the highest GDP per capita, which indicates that, although it does not have the best results in economic growth, its population probably enjoys greater well-being. The study allows us to reach an additional conclusion, which refers to departments such as La Guajira that, although they have very good numbers in terms of exports and economic growth evidenced in their GDP, this does not reflect the social reality of a region in extreme poverty and with very low results in the pillars of competitiveness.

Regarding the correlational analysis proposed in specific objective 2, it is possible to conclude that there is a correlation between some pillars, sub-pillars and variables of the competitiveness index with respect to the GDP of the department of Santander; however, it is important to clarify that most of the variables do not have a statistical relationship, which does not mean that they do not contribute to the GDP, but that their impact may be mediated by another series of conditions and variables that prevent a correlation model from identifying them. Likewise, it is possible to conclude that, in the case of the three departments, different variables related to the behavior of their GDP were identified, therefore, the strategies that can be implemented in

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Santander to improve its economic growth are not comparable to other departments. It is also concluded that education and issues related to fiscal management and transparency are relevant aspects for the improvement of the economy of the 3 regions. The study allows us to conclude that, with respect to GDP growth, public policies should be strengthened that address issues such as life expectancy at birth, the domestic market, education, the use of a second language, ease of opening businesses, access to credit, fiscal management, exports and quality research, which makes it clear that GDP is not an issue that depends solely on productivity, but is a multidimensional aspect that responds to a large number of stimuli generated from various axes of society such as health and education.

REFERENCES

1. Acheampong, Alex O., Eric Evans Osei Opoku, Janet Dzator, and Nana Kwabena Kufuor. 2022. "Enhancing Human Development in Developing Regions: Do ICT and Transport Infrastructure Matter?" Technological Forecasting and Social Change 180(April):121725.doi: 10.1016/j.techfore.2022.121725.
2. Aguirre Unceta, Rafael. 2021. "The Economic and Social Impact of Mining-Resources Exploitation in Zambia." Resources Policy 74(November 2020):102242.oi:
3. 10.1016/j.resourpol.2021.102242.
4. Alburquerque, Francisco. 2004. El Enfoque Del Desarrollo Económico Local. Vol. 1. Primera ed. edited by O. mundial del Trabajo. Buenos Aires.
5. Alex, Dony. 2021. "Anchoring of Inflation Expectations in Large Emerging Economies." Journal of Economic Asymmetries 23(August 2020):e00202. doi: 10.1016/j.jeca.2021.e00202.
6. Alfaro, Martín. 2020. "Market Structures in Small Open Economies: Evidence from Denmark." Research in Economics 74(4):363–78.doi: 10.1016/j.rie.2020.10.007.
7. Alvarez-Melgarejo, Mileidy, and Albeiro Beltrán Díaz. 2021. "Influencia de Las Capacidades de Aprendizaje y de Adaptación Organizacional Sobre La Capacidad Innovadora de Las Empresas Industriales de Colombia." Universidad de Investigación y Desarrollo UDI.
8. Amat Rodrigo, Joaquín. 2016. "Correlación Lineal y Regresión Lineal Simple." Junio. Retrieved (https://www.cienciadedatos.net/documentos/24_c orrelacion_y_regresion_lineal).
9. Amissah, Emmanuel, Spiros Bougheas, Fabrice Defever, and Rod Falvey. 2021. "Financial System Architecture and the Patterns of International Trade." European Economic Review 136:103751. doi: 10.1016/j.euroecorev.2021.103751.
10. Ando, Sakai, and Misaki Matsumura. 2020. "Constrained Inefficiency of Competitive Entrepreneurship." Journal of Mathematical Economics 88:98–103. doi: 10.1016/j.jmateco.2020.03.005.
11. Arakpogun, Emmanuel Ogiemwonyi, Ziad Elsahn, Richard B. Nyuur, and Femi Olan. 2020. "Threading the Needle of the Digital Divide in Africa: The Barriers and Mitigations of Infrastructure Sharing." Technological Forecasting and Social Change 161 (August): 120263. doi: 10.1016/j.techfore.2020.120263.
12. Araoz, Mercedes., Carlos. Carillo, and Sandra van. Ginhoven. 2002. Indicadores de Competitividad Para Los Países Andinos : El Caso Del Perú. Primera ed. edited by Universidad del Pacífico.
13. Ashraf, Badar Nadeem, Ningyu Qian, and Yinjie (Victor) Shen. 2021. "The Impact of Trade and Financial Openness on Bank Loan Pricing: Evidence from Emerging Economies." Emerging Markets Review 47(January):100793. doi:10.1016/j.ememar.2021.100793.

DOI: 10.46121/pspc.53.4.3

14. Awasthi, Rajul, Mohan Nagarajan, and Klaus W. Deininger. 2021. “Property Taxation in India: Issues Impacting Revenue Performance and Suggestions for Reform.” Land Use Policy 110(April 2019):104539. doi:10.1016/j.landusepol.2020.104539.
15. Bastos, Paulo. 2020. “Exposure of Belt and Road Economies to China Trade Shocks.” Journal of Development Economics 145(February):102474. doi: 10.1016/j.jdeveco.2020.102474.
16. Benkraiem, Ramzi, Ali Uyar, Merve Kilic, and Friedrich Schneider. 2021. “Ethical Behavior, Auditing Strength, and Tax Evasion: A Worldwide Perspective.” Journal of International Accounting, Auditing and Taxation 43:100380. doi: 10.1016/j.intaccaudtax.2021.100380.
17. Beumer, Koen, Harro Maat, and Dominic Glover. 2022. “It’s Not the Market, Stupid: On the Importance of Non-Market Economies in Sustainability Transitions.” Environmental Innovation and Societal Transitions 42(May 2021):429–41. doi: 10.1016/j.eist.2022.02.001.
18. Bossone, Biagio. 2021. “Commercial Bank Seigniorage and the Macroeconomy.” International Review of Financial Analysis 76(June 2020):101775. doi: 10.1016/j.irfa.2021.101775.
19. Botta, Alberto, Eugenio Caverzasi, and Alberto Russo. 2020. “When Complexity Meets Finance: A Contribution to the Study of the Macroeconomic Effects of Complex Financial Systems.” Research Policy (April):103990. doi: 10.1016/j.respol.2020.103990.
20. Bottega, Ana, and João P. Romero. 2021. “Innovation, Export Performance and Trade Elasticities across Different Sectors.” Structural Change and Economic Dynamics 58:174–84. doi: 10.1016/j.strueco.2021.05.008.
21. Branger, Nicole, René Marian Flacke, and Nikolai Gräber. 2020. “Monopoly Power in the Oil Market and the Macroeconomy.” Energy Economics 85:104597. doi: 10.1016/j.eneco.2019.104597.
22. Bruton, Garry D., and Juanyi Chen. 2022. “Bringing Entrepreneurship and Family Business Fully into a Home in Management Departments.” Journal of Family Business Strategy 13(1):100483. doi: 10.1016/j.jfbs.2022.100483.
23. Çakır Melek, Nida, Michael Plante, and Mine K. Yücel. 2021. “Resource Booms and the Macroeconomy: The Case of U.S. Shale Oil.” Review of Economic Dynamics42:307–32. doi: 10.1016/j.red.2020.11.006.
24. Camacho-Sandoval, J. 2008. “Asociación Entre Variables: Correlación No Paramétrica.” Acta Médica Costarricense 50(3):144–46.
25. Carlino, Bernarndo. 2015. Macroeconomía Al Alcance de Todos. Primera ed. edited by Macchi grupo editor S.A. Córdoba: Ediciones Macchi.
26. Castro-Castro, Martha Lenis, Albeiro Beltrán-Díaz, and Adolfo Vargas Espitia. 2021. “Análisis Sistémico de La Sostenibilidad Económica de Unidades de Producción Agropecuaria Familiar En Una Comunidad Campesina de Lebrija, Colombia.” La Granja 34(2):141–53. doi: 10.17163/lgr.n34.2021.10.
27. Chen, Qiuhui, and Xianxiang Xu. 2022. “China Economic Quarterly International Stabilizing Economic Growth : Growth Target and Government Expenditure since World War II ☆.” China Economic Quarterly International 2(2):98–110. doi: 10.1016/j.ceqi.2022.05.003.
28. Chen, Zhenxi, Donald Lien, and Yaheng Lin. 2021. “Sentiment: The Bridge between Financial Markets and Macroeconomy.” Journal of Economic Behavior and Organization 188(19):1177–90. doi:10.1016/j.jebo.2021.06.025.

29. Cheng, Zhonghua, and Wei Jin. 2021. “Agglomeration Economy and the Growth of Green Total-Factor Productivity in Chinese Industry.” Socio-Economic Planning Sciences (December):101003. doi: 10.1016/j.seps.2020.101003.
30. Chester, Karen. 2020. “Public Policy: The First Line of Defence.” Economic Analysis and Policy 65(September 2019):256–61. doi: 10.1016/j.eap.2020.02.003.
31. Chletsos, Michael, and Andreas Sintos. 2021. “Hide and Seek: IMF Intervention and the Shadow Economy.” Structural Change and Economic Dynamics 59:292–319. doi: 10.1016/j.strueco.2021.09.008.
32. Churm, Rohan, Michael Joyce, George Kapetanios, and Konstantinos Theodoridis. 2021. “Unconventional Monetary Policies and the Macroeconomy: The Impact of the UK’s QE2 and Funding for Lending Scheme.” Quarterly Review of Economics and Finance80:721–36. doi: 10.1016/j.qref.2018.10.004.
33. Consejo Privado de Competitividad. 2021. Índice Departamental De Competitividad 2020-2021.
34. Cuevas-Vargas, Héctor, and Neftalí Parga-Montoya. 2021. “How ICT Usage Affect Frugal Innovation
35. Dahlum, Sirianne, Carl Henrik Knutsen, and Valeriya Mechkova. 2022. “Women’s Political Empowerment and Economic Growth.” World Development 156. doi: 10.1016/j.worlddev.2022.105822.
36. Dalalah, Doraid, Sharfuddin Ahmed Khan, Yazan Al- Ashram, Saeed Albeetar, Yahya Abou Ali, and Elias Alkhouli. 2022. “An Integrated Framework for the Assessment of Environmental Sustainability in Wood Supply Chains.” Environmental Technology and Innovation 27:102429. doi: 10.1016/j.eti.2022.102429.
37. Das, Sabyasachi, Souvik Dutta, and Abhirup Sarkar. 2021. “Political Economy of Third Party Interventions.” Journal of Public Economics 195:104331. doi: 10.1016/j.jpubeco.2020.104331.
38. Diduch, Amy Mc Cormick. 2021. “Normative Shortages and the Limits of Rationing by Price.” International Review of Economics Education 36(May 2020):100200. doi: 10.1016/j.iree.2020.100200.
39. Dosi, Giovanni, Maria Enrica Virgillito, and Xiaodan Yu. 2020. “The Wage-Productivity Nexus in the World Factory Economy.” World Development 129:104875. doi: 10.1016/j.worlddev.2020.104875.
40. Dumitrescu, Bogdan Andrei, Meral Kagitci, and Cosmin Octavian Cepoi. 2022. “Nonlinear Effects of Public Debt on Inflation. Does the Size of the Shadow Economy Matter?” Finance Research Letters 46(August 2020):102255. doi: 10.1016/j.frl.2021.102255.
41. Dunlap, Alexander, and Louis Laratte. 2022. “European Green Deal Necropolitics: Exploring ‘Green’ Energy Transition, Degrowth & Infrastructural Colonization.” PoliticalGeography 97(February):102640. doi: 10.1016/j.polgeo.2022.102640.
42. Galindo-Martín, Miguel Ángel, María Soledad Castaño- Martínez, and María Teresa Méndez-Picazo. 2021. “Effects of the Pandemic Crisis on Entrepreneurship and Sustainable Development.” Journal of Business Research 137(May):345–53. doi: 10.1016/j.jbusres.2021.08.053.

43. Giménez, Eduardo L. 2022. “Offer Curves and Uniqueness of Competitive Equilibrium.” Journal of Mathematical Economics 98:102575. doi: 10.1016/j.jmateco.2021.102575.
44. Guerrero, Diego. 1995. COMPETITIVIDAD: TEORÍA Y
45. POLÍTICA. Primera ed. edited by Ariel. Barcelona. ESPAÑA.
46. Gueye, Ghislain Nono. 2021. “Pitfalls in the Cointegration Analysis of Housing Prices with the Macroeconomy: Evidence from OECD Countries.” Journal of Housing Economics 51(January):101748. doi: 10.1016/j.jhe.2021.101748.
47. Hajilee, Massomeh, and Farhang Niroomand. 2021. “Is There an Asymmetric Link between the Shadow Economy and the Financial Depth of Emerging Market Economies?” Journal of Economic Asymmetries 23(December 2020):e00193. doi: 10.1016/j.jeca.2020.e00193.
48. Hao, Zezhong, Xiuwu Zhang, and Jiangying Wei. 2022. “Research on the Effect of Enterprise Financial Flexibility on Sustainable Innovation.” Journal of Innovation and Knowledge 7(2):100184. doi: 10.1016/j.jik.2022.100184.
49. Housni, Farah, Abderrazak Boumane, Brian Dalby Rasmussen, Mohamed Reda Britel, Philip Barnes, Sedqui Abdelfettah, Kamal lakhmas, and Amal Maurady. 2022. “Environmental Sustainability Maturity System: An Integrated System Scale to Assist Maritime Port Managers in Addressing Environmental Sustainability Goals.” Environmental Challenges 7(January):100481. doi: 10.1016/j.envc.2022.100481.
50. Hryckiewicz, Aneta. 2021. “There Is No Smoke without a Fire: The Effect of Government Interventions in Less Advanced Economies.” Economic Systems 45(1):100776. doi: 10.1016/j.ecosys.2020.100776.
51. Imebu. 2022. “Banca Ciudadana.” Retrieved (https://imebu.gov.co/web4ini/home/).
52. Isham, Amy, Simon Mair, and Tim Jackson. 2021. “Worker Wellbeing and Productivity in Advanced Economies: Re-Examining the Link.” Ecological Economics 184(December 2020):106989. doi: 10.1016/j.ecolecon.2021.106989.
53. Kaliszewski, Adam, Arkadiusz Kozłowski, Janusz Dąbrowski, and Hanna Klimek. 2021. “LinkedIn Survey Reveals Competitiveness Factors of Container Terminals: Forwarders’ View.” Transport Policy 106(December 2020):131–40. doi: 10.1016/j.tranpol.2021.03.024.
54. Kapinos, Pavel, N. Kundan Kishor, and Jun Ma. 2022. “Dynamic Comovement among Banks, Systemic Risk, and the Macroeconomy.” Journal of Banking and Finance 138:105894. doi: 10.1016/j.jbankfin.2020.105894.
55. Karanfil, Fatih, and Axel Pierru. 2021. “The Opportunity Cost of Domestic Oil Consumption for an Oil Exporter: Illustration for Saudi Arabia.” Energy Economics 96. doi: 10.1016/j.eneco.2021.105161. Khan, Ashraf, M. Kabir Hassan, Andrea Paltrinieri, and Salman Bahoo. 2021. “Trade, Financial Openness
56. and Dual Banking Economies: Evidence from GCC Region.” Journal of Multinational Financial Management 62(xxxx):100693. doi: 10.1016/j.mulfin.2021.100693.
57. Kim, Daisoon. 2021. “Economies of Scale and International Business Cycles.” Journal of International Economics 131:103459. doi: 10.1016/j.jinteco.2021.103459.
58. Kitao, Sagiri, and Minamo Mikoshiba. 2020. “Females, the Elderly, and Also Males: Demographic Aging and Macroeconomy in Japan.” Journal of the Japanese and International Economies 56(January):101064. doi: 10.1016/j.jjie.2020.101064.

DOI: 10.46121/pspc.53.4.3

59. Kokkaew, Nakhon, Noppadon Jokkaw, Vachara Peansupap, and Warit Wipulanusat. 2022. “Impacts of Human Resource Management and Knowledge Management on Non-Financial Organizational Performance: Evidence of Thai Infrastructure Construction Firms.” Ain Shams Engineering Journal 13(6):101750. doi: 10.1016/j.asej.2022.101750.
60. Laborda, Juan, Vicente Salas, and Cristina Suárez. 2020. “Manufacturing Firms’ Export Activity: Business and Financial Cycles Overlaps!” International Economics 162(July 2019):1–14. doi: 10.1016/j.inteco.2020.03.001.
61. Laplane, Andrea, and Mariana Mazzucato. 2020. “Socializing the Risks and Rewards of Public Investments: Economic, Policy, and Legal Issues.” Research Policy: X 2(March). doi: 10.1016/j.repolx.2020.100008.
62. Lazaro-Mojica, Jonas, and Rebeca Fernandez. 2021. “Review Paper on the Future of the Food Sector through Education, Capacity Building, Knowledge Translation and Open Innovation.” Current Opinion in Food Science 38:162–67. doi: 10.1016/j.cofs.2020.11.009.
63. Li, Boyao, and Yougui Wang. 2020. “Money Creation within the Macroeconomy: An Integrated Model of Banking.” International Review of Financial Analysis 71:101547. doi: 10.1016/j.irfa.2020.101547.
64. Luìs, Galindo, Guarini Giulio, and Porcile Gabriel. 2020. “Environmental Innovations, Income Distribution, International Competitiveness and Environmental Policies: A Kaleckian Growth Model with a Balance of Payments Constraint.” Structural Change and Economic Dynamics 53:16–25. doi: 10.1016/j.strueco.2020.01.002.
65. Madureira, Luís, Aleš Popovič, and Mauro Castelli. 2021. “Competitive Intelligence: A Unified View and Modular Definition.” Technological Forecasting and Social Change 173(December 2020). doi: 10.1016/j.techfore.2021.121086.
66. Malikov, Emir, Valentina Hartarska, and Roy Mersland. 2020. “Economies of Diversification in Microfinance: Evidence from Quantile Estimation on Panel Data.” Finance Research Letters 34. doi: 10.1016/j.frl.2019.07.019.
67. Mankiw, Gregory N. 2012. Principios de La Economia. Sexta edic. edited by Cengage Learning Editores S.A. México D.F.
68. van Megen, Bram, Meinrad Bürer, and Martin K. Patel. 2019. “Comparing Electricity Consumption Trends: A Multilevel Index Decomposition Analysis of the Genevan and Swiss Economy.” Energy Economics 83(2019):1–25. doi: 10.1016/j.eneco.2019.06.004.
69. Merino, Fernando, and Maria A. Prats. 2020. “Why Do Some Areas Depopulate? The Role of Economic Factors and Local Governments.” Cities 97(October 2019):102506. doi: 10.1016/j.cities.2019.102506.
70. Miotto, Giorgia, Cristina Del-Castillo-Feito, and Alicia Blanco-González. 2020. “Reputation and Legitimacy: Key Factors for Higher Education Institutions’ Sustained Competitive Advantage.” Journal of Business Research 112(November):342–53. doi: 10.1016/j.jbusres.2019.11.076.
71. Mydland, Ørjan, Subal C. Kumbhakar, Gudbrand Lien, Roar Amundsveen, and Hilde Marit Kvile. 2020. “Economies of Scope and Scale in the Norwegian Electricity Industry.” Economic Modelling 88(January 2019):39–46. doi: 10.1016/j.econmod.2019.09.008.

72. Nasir, Muhammad Ali, Toan Luu Duc Huynh, and Xuan Vinh Vo. 2020. “Exchange Rate Pass-through & Management of Inflation Expectations in a Small Open Inflation Targeting Economy.” International Review of Economics and Finance 69:178–88. doi: 10.1016/j.iref.2020.04.010.
73. Nayak, Bishwajit, Som Sekhar Bhattacharyya, and Bala Krishnamoorthy. 2021. “Explicating the Role of Emerging Technologies and Firm Capabilities towards Attainment of Competitive Advantage in Health Insurance Service Firms.” Technological Forecasting and Social Change 170(May):120892. doi: 10.1016/j.techfore.2021.120892.
74. Nechifor, Victor, Alvaro Calzadilla, Raimund Bleischwitz, Matthew Winning, Xu Tian, and Arkaitz Usubiaga. 2020. “Steel in a Circular Economy: Global Implications of a Green Shift in China.” World Development 127:104775. doi: 10.1016/j.worlddev.2019.104775.
75. Neumark, David, and Luis Felipe Munguía Corella. 2021. “Do Minimum Wages Reduce Employment in Developing Countries? A Survey and Exploration of Conflicting Evidence.” World Development 137:105165. doi: 10.1016/j.worlddev.2020.105165.
76. Nieto-Barthaburu, Augusto. 2021. “Competitive General Equilibrium with Network Externalities.” Journal of Mathematical Economics 94:102466. doi: 10.1016/j.jmateco.2020.102466.
77. Olasehinde-Williams, Godwin, and Mehmet Balcilar. 2020. “Examining the Effect of Globalization on Insurance Activities in Large Emerging Market
78. Economies.” Research in International Business and Finance 53(April 2019):101228. doi: 10.1016/j.ribaf.2020.101228.
79. Ortigueira-Sánchez, Luis Camilo, Dianne H. .. Welsh, and William C. Stein. 2022. “Innovation Drivers for Export Performance.” Sustainable Technology and Entrepreneurship 1(2):100013. doi: 10.1016/j.stae.2022.100013.
80. Otten, Kasper, Vincent Buskens, Wojtek Przepiorka, and Naomi Ellemers. 2021. “Cooperation between Newcomers and Incumbents: The Role of Normative Disagreements.” Journal of Economic Psychology 87(January):102448.mdoi: 10.1016/j.joep.2021.102448.
81. Pantea, Smaranda. 2020. “The Effect of Minimum Wage Hikes on Employment: Evidence from Regional Panel Data from Romania.” Economic Systems 44(3). doi: 10.1016/j.ecosys.2020.100805.
82. Peretto, Pietro F. 2021. “The Employment and Output of Nations: Theory and Policy Implications.” Economic Modelling 103(June):105580. doi: 10.1016/j.econmod.2021.105580.
83. Porter, Michael E. 2017. Ser Competitivo. Vol. 9 EDICIÒN. Novena edi. edited by Ediciones Deusto. Barcelona.
84. Raikov, A. 2021. “Decreasing Tax Evasion by Artificial Intelligence.” IFAC-PapersOnLine 54(13):172–77. doi: 10.1016/j.ifacol.2021.10.440.
85. Robertson, Jeandri, Albert Caruana, and Caitlin Ferreira. 2021. “Innovation Performance: The Effect of Knowledge-Based Dynamic Capabilities in Cross- Country Innovation Ecosystems.” International Business Review (May):101866. doi: 10.1016/j.ibusrev.2021.101866.
86. Rodríguez Rincón, Isabel Cristina, and Jorge E. Chaparro Medina. 2018. “Creación de Valor En Empresas Privadas Del Sector Salud En El Departamento de Córdoba (Colombia).” Opción, Año 34, Especial No. 18 Vol. 34(1256–1278).

DOI: 10.46121/pspc.53.4.3

87. Romero-Martínez, A. M., Á. Montoro-Sánchez, and Y. Garavito-Hernández. 2017. “El Efecto de La Diversidad de Género y El Nivel Educativo En La Innovación.” Revista de Administração de Empresas 57(2):123–34.
88. Rueda Galvis, Javier Francisco. 2008. “Los Procesos de Internacionalización de La Empresa: Causas y Estrategias Que Lo Promueven.” Cuadernos Latinoamericanos de Administración 4(7):51–57.
89. Saad, Ayhab F. 2021. “Institutional Change in the Global Economy: How Trade Reform Can Be Detrimental to Welfare.” Economic Modelling 95:97–110. doi: 10.1016/j.econmod.2020.12.006.
90. Salau, O. P., A. Osibanjo, A. Adeniji, H. Falola, E. Igbinoba, T. Atolagbe, and O. Ogueyungbo. 2020. “Crystalising Employment Quality and Behavioural Outcomes of Employees in the Public
91. Service.” Heliyon 6(12):e05619. doi: 10.1016/j.heliyon.2020.e05619.
92. Sarabia, María, Fernando Crecente, and Maria Teresa del Val. 2021. “Health, Longevity, Infrastructure and Competitiveness: The Four Horsemen of COVID-” Journal of Business Research 129(December 2020):244–49. doi: 10.1016/j.jbusres.2021.02.053.
93. Sato, Kiyotaka, Junko Shimizu, Nagendra Shrestha, and Shajuan Zhang. 2020. “New Empirical Assessment of Export Price Competitiveness: Industry-Specific Real Effective Exchange Rates in Asia.” North American Journal of Economics and Finance 54(February):101262. doi: 10.1016/j.najef.2020.101262.
94. Saunavaara, Juha, Antti Laine, and Matti Salo. 2022. “The Nordic Societies and the Development of the Data Centre Industry: Digital Transformation Meets Infrastructural and Industrial Inheritance.” Technology in Society 69(June 2021):101931. doi: 10.1016/j.techsoc.2022.101931.
95. Schmitt-Grohé, Stephanie, and Martín Uribe. 2021. “Deterministic Debt Cycles in Open Economies with Flow Collateral Constraints.” Journal of Economic Theory 192:105195. doi: 10.1016/j.jet.2021.105195.
96. Schydlowsky, Daniel M. 2020. “Prudential Regulations for Greening the Financial System: Coping with Climate Disasters.” Latin American Journal of Central Banking 1(1–4):100010. doi: 10.1016/j.latcb.2020.100010.
97. Soares, Glauciana Gomes, Vitor Lélio da Silva Braga, Carla Susana da Encarnação Marques, and Vanessa Ratten. 2021. “Corporate Entrepreneurship Education’s Impact on Family Business Sustainability: A Case Study in Brazil.” International Journal of Management Education doi: 10.1016/j.ijme.2020.100424.
98. Veiga, Pedro Mota, Sérgio Jesus Teixeira, Ronnie Figueiredo, and Cristina I. Fernandes. 2020. “Entrepreneurship, Innovation and Competitiveness: A Public Institution Love Triangle.” Socio-Economic Planning Sciences 72(January). doi: 10.1016/j.seps.2020.100863.
99. Weber, Max. 2002. Economía y Sociedad. Segunda ed. edited by F. de cultura E. de España. Madrid, España.
100. Wickström, Bengt Arne. 2020. “On the Political Economy of Minority Rights. Three Ways to World Economic Forum. 2018. The Global ompetitiveness Report. edited by K. Schwab; and Woeld Economic Forum. Geneva.

DOI: 10.46121/pspc.53.4.3