



prosantander

GROWTH DIAGNOSTIC

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EXECUTIVE SUMMARY

Santander is a landlocked department located in the northeastern part of Colombia. With a population of 2.2 million inhabitants, Santander is the 6th most populous department in Colombia and has the fourth-largest economy. Compared to the other large and wealthy economies in Colombia, Santander has a large oil sector. However, from preliminary calculations, less than 10% of the oil GDP generated by Santander stays in the department. Even after discounting oil GDP, Santander's income per capita is still very high, second only to Bogotá's. During the rest of this analysis, we will compare Santander to a set of five peer departments that share similarities with Santander and include: Antioquia, Atlántico, Cundinamarca, Valle del Cauca, and Bogotá.

Santander's economic growth has been volatile and visually correlated to changes in the price of oil. When growth was strong, Santander was the second-fastest grower among its peers, when growth slowed, Santander suffered the most. Decomposing growth, we see some sectors have remained stable, such as services, while others, like construction, have followed the ups and downs of the price of oil. Considering i) the decrease in Santander's economic growth over the last 5 years and ii) its volatility, mainly associated with changes in the price of oil, we ask: How can Santander resume its economic growth and make it more stable?

We performed a joint economic complexity analysis at the product and industry levels and found that Santander has a peripheral position in the product space but has been improving in recent years in the industry space due to the dynamic behavior of the services sector.

At the product level, Santander is trapped in a state of low economic complexity as it has no nearby products to increase its complexity. Additionally, Santander is living beyond its means, as its non-oil per capita income is not supported by its complexity level. In contrast, when we analyzed employment data at the industry level, we realized that Santander nodes in the industry space are better connected and positioned than in the product space which can be used as a lever to improve its complexity in the medium term.

To identify the most binding constraints we tested the usual suspects: finance, human capital, geography and infrastructure, public services, labor market, coordination and information failures, and macroeconomic conditions. We concluded that neither the macroeconomic conditions nor access to finance are a constraint for Santander as there are other departments in Colombia facing the same conditions with better results in economic growth. The results in the national test Saber Pro, a decreasing schooling gap, and low returns to education signal that Santander faces no constraint regarding human capital. Santander has made significant progress in the supply of public goods and services, such as reliable electricity, natural gas, and internet connection. We also found a healthy and inclusive labor market. Finally, after further examination, we found no evidence to support the hypothesis of information failures in Santander.

We identified road infrastructure and coordination failures as the most binding constraints for Santander's economic growth. On one hand, bad quality roads, longer distances, slower speeds, low infrastructure-intensive exports, as well as

the dynamic behavior of service exports that do not use infrastructure, signal the presence of a binding constraint in infrastructure. On the other hand, despite Santander having improved recently in coordination efforts among its multiple stakeholders, there are still important sources of concern for its ability to overcome the coordination challenges required to achieve higher economic growth.

Based on our analysis we believe that Santander suffers from a Cristo Petrolero (Oil Christ) Syndrome. In the 1920s, oil was discovered and saved the department from a sharp economic slump. Oil lifted Santander out of obscurity, fed it, and gave it hope. Local leaders showed their gratitude by offering the Cristo everything it needed but ignored the needs of the rest of the economy. Now that oil price is down, the Cristo has stopped responding to their prayers and the rest of the economy is too weak to give them what they so much desire, economic growth, and prosperity.

To secure higher growth rates, Santander needs to relax its binding constraints and support the sectors with higher potential to increase its economic complexity given its current capabilities. We recommend Santander, both the government and private sector, to improve the quality of roads, explore other types of transport, as well as to increase the coordination of the truck fleet. Santander should also strengthen the coordination mechanisms among the multiple stakeholders interested in its development. Finally, we identified five sectors that can be the levers for higher growth: chemicals, metal-mechanic industry, financial services, health manufacture and services, and the electric industry.



INTRODUCTION

| Methodology

As a response to the widely discussed failures of the standardized policy reforms prescribed by the Washington Consensus, and to acknowledge the need for a more contingent framework to figure out policy priorities, Hausmann, Rodrik, and Velasco developed the Growth Diagnostics methodology in 2005. The proposed framework rests on three premises. First the authors argue that economic growth is central to the development of nations, for achieving higher life quality, and for increasing human capabilities. Second, there is no standardized policy recommendation that will boost economic growth in every country, as each economy is characterized by its context and constraints. Third, the framework acknowledges that governments in developing countries face administrative and political limitations and struggle to implement a long list of reforms (wholesale reform) and proposes focusing instead on targeting binding constraints.

The methodology assumes that an underperforming economy is one in which multiple market imperfections and distortions are at play, which prevents it from attaining its productivity frontier.

The authors argue that targeting the most binding constraints (the ones with the biggest direct effect) is a superior method to the following strategies:

- *Wholesale reform*, which is technically correct, but nearly impossible to implement.
- *Doing as much as one can, as best as one can*, which ignores policy interactions that can

cause harm rather than good.

- *Second best strategy*, which is hindered by the challenges of anticipating interactions ex ante.
- *Targeting the biggest distortions*, which requires complete information of distortions magnitude and does not guarantee that reforms that have the biggest direct effect on growth are prioritized.

For a full layout of arguments see Hausmann, Rodrik, and Velasco (2005).

Identifying the most binding constraints is a method that assumes that different inputs to growth are complements rather than substitutes.

If inputs were substitutes, then increasing one of the inputs could solve the problems caused by the lack or insufficiency of the other one (poor performance in one area could be substituted with over performance in another). This is an unrealistic picture of how economic growth works, and growth diagnostics assume that determinants of growth are complements rather than substitutes. In every specific context, different determinants are binding, and no matter how much a country increases or improves other determinants, growth will not be accelerated. The question becomes then, what are the most binding constraints? The ones that, if relaxed, will deliver the biggest direct effect on growth?

The methodology seeks to identify the preponderance that potential growth restrictions may have, which can be done in four major steps. These restrictions include problems in the credit market and low levels of complementary factors of production (such as human capital or infrastructure) or appropriability of returns, due to failure of government (excessive

taxation, fiscal instability, insecurity, etc.) or market (problems of coordination between private parties or negative externalities to innovation). The process can be broken down into the following steps:

1. Analyze the recent growth trajectory of an economy, to identify the growth question to be answered.
2. Develop a decision tree that identifies the different determinants or complementary inputs, that could contribute to answering the growth question. For example, if the growth question is related to low or insufficient growth rates, then the decision tree needs to consider the determinants of growth¹ (Figure 1).
3. Identify active growth restrictions through a diagnosis to test for the following signs²:
 - a. A high (shadow) price.
 - b. Movements in the constraint should produce significant movements in the objective function.
 - c. Agents in the economy should be attempting to overcome or bypass the constraint.
 - d. Agents less intensive in that constraint should be more likely to survive and thrive, and vice versa.
4. Find a syndrome common to all identified bottlenecks. This allows for the design of public policies that target the most binding restrictions of economic growth in a specific context.

A Growth Diagnostics decision tree

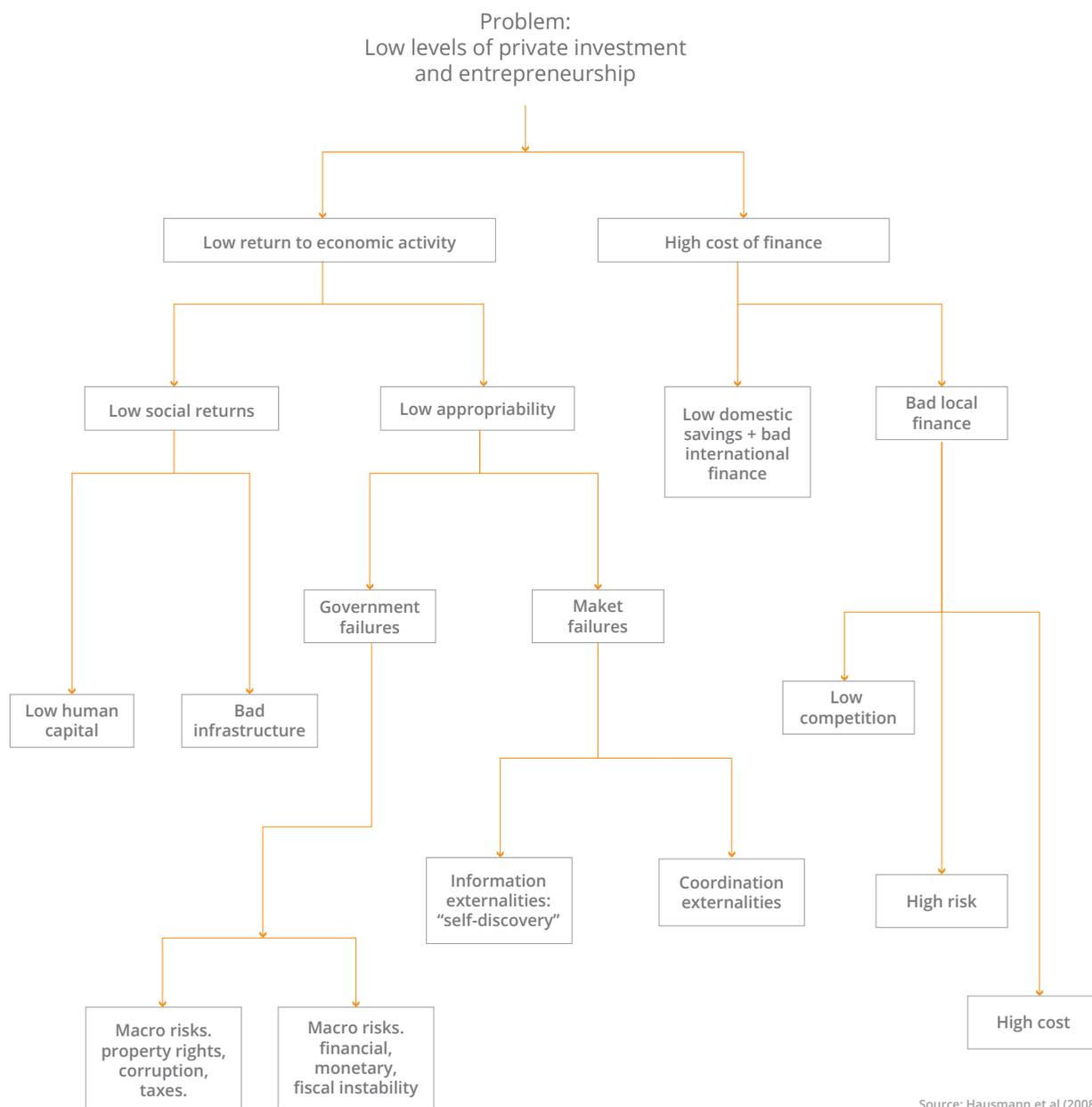


Figure 1

¹It is interesting to note that the methodology could be adapted to other economic issues different from growth, such as inequality, low levels of education or informality.

²Hausmann, Klinger and Wagner (2008) present the general properties that a constraint should exhibit to be potentially binding. They acknowledge that no single test is definitive, but it is the application of several tests that signal a potential constraint.

SAN
TAN
DER
COLOMBIA



*Economic
Context*

Economic Context

Santander is a landlocked department located in the northeastern part of Colombia. Bucaramanga, the capital of the department and central business hub, is a 9-hour drive from the nearest port, 9 hours from Bogotá, and 6 hours from the Venezuelan border. Additionally, like most of the country's populous departments, Santander is very mountainous.

With a population of 2.2 million inhabitants, Santander is the 6th most populous department in Colombia. More than half of its population is concentrated in the Bucaramanga Metropolitan Region, which is formed by four of the five municipalities with more than 100,000 inhabitants in Santander. Its population growth rate has been slowing down in the last 10 years. A similar trend can be found in the rest of Colombia.



Santander is a relatively wealthy department with the fourth largest economy in Colombia. Santander's \$ 7,970 USD GDP per capita in current prices is the 4th highest in Colombia, surpassed only by Bogotá and the two largest oil-producing departments (Figure 2). Both inequality and poverty in Santander have stayed in line with those of similar departments, and, in the last 15 years, have on average decreased (Figure 3).

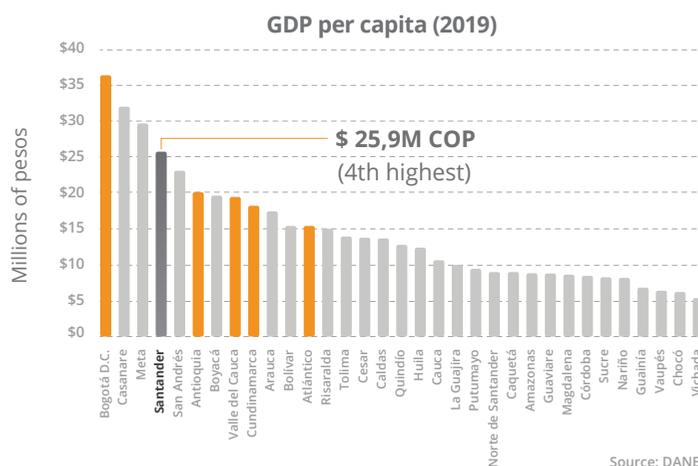


Figure 2

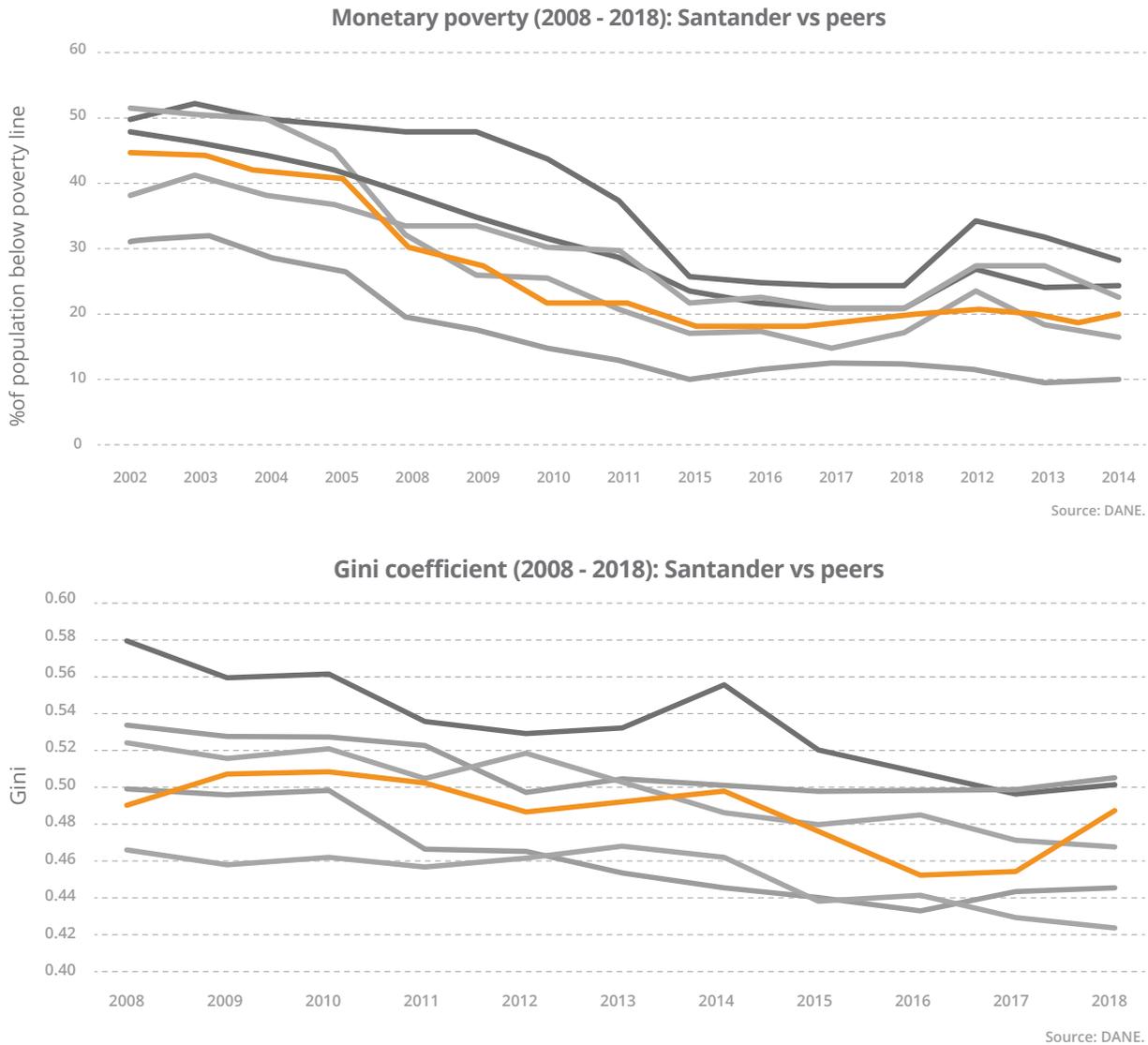


Figure 3

Compared to the other large and wealthy economies in Colombia, Santander has a large oil sector (Figure 4). Refining close to 80% and extracting 7% of the crude oil produced in Colombia, Santander is the largest oil refiner and third-largest oil producer in the country. More than 50% of the department's manufacturing GDP comes from oil refining, thus making the non-oil manufacturing sector very

small in comparison to its peers' (Figure 5). Santander's economy is slightly more industrialized than Colombia's and has maintained a stable composition throughout the last 40 years.

However, from preliminary calculations, less than 10% of the oil GDP generated by Santander stays in the department (Figure 6).

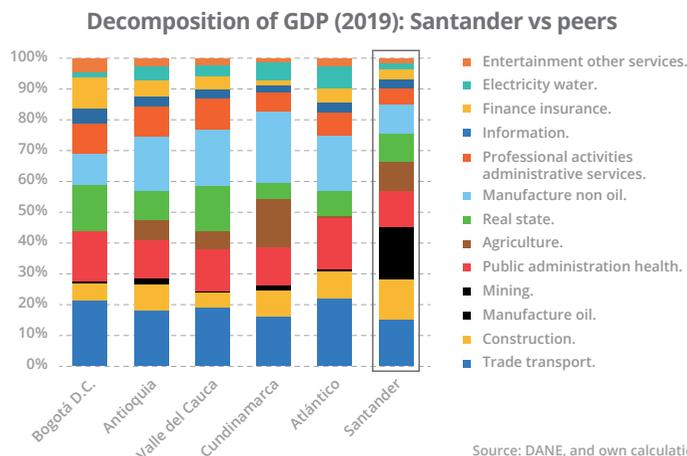


Figure 4

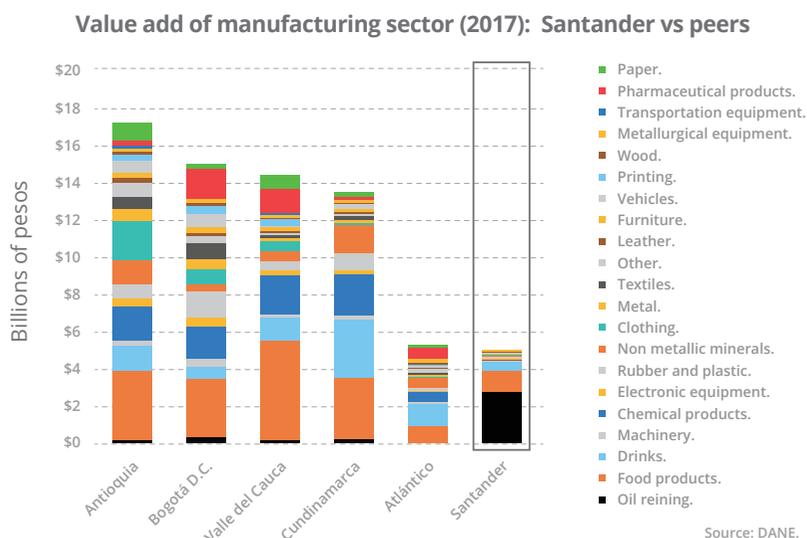


Figure 5

Of the \$ 8.5 billion dollars that Santander registers from oil production (\$1.4 B) and processing/refining (\$7.1 B), most of it (\$7.3 B) is spent on buying oil from other departments for the refining processes. And the \$1.5 B left is divided among oil royalties, local labor, and profits of the state-owned oil company, among other things. We estimate that through royalties and local labor,

Santander is left with approximately \$ 700 million USD per year from its oil activities. This is a rough estimate, but even if the numbers are off significantly, the point is still the same: Santander gets to keep only a fraction of the oil revenue generated by Ecopetrol, the Colombian state-owned oil company, in the department.

Allocation of Oil GDP (2019): Santander

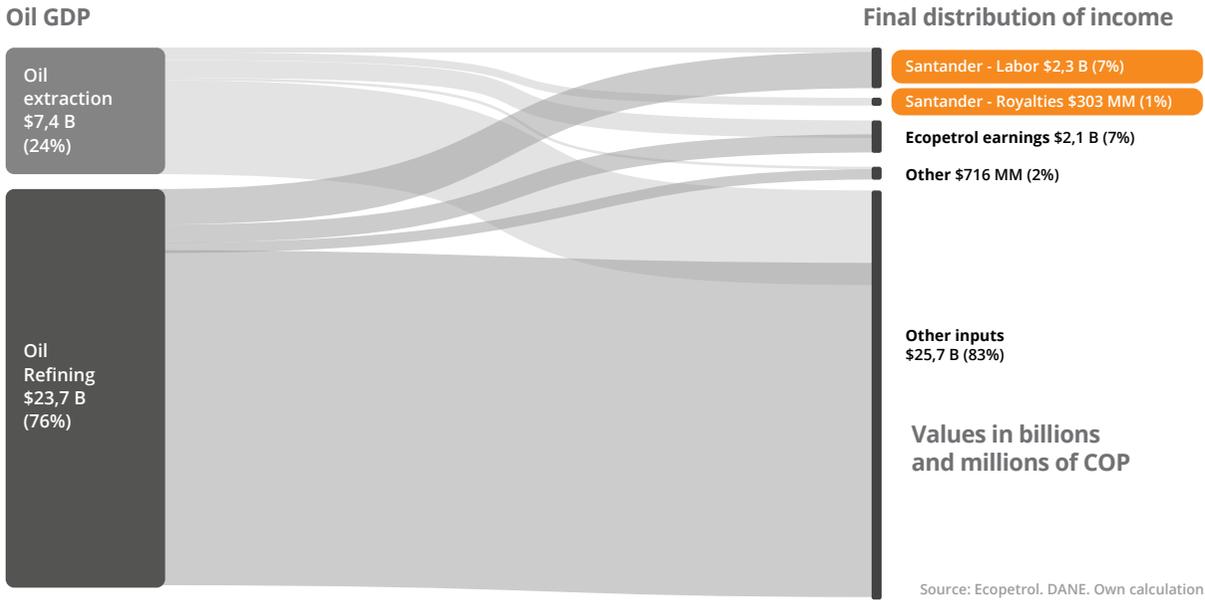


Figure 6

Even after discounting oil GDP, Santander’s income per capita is still very high, second only to Bogotá’s (Figure 7). This is because the second and third highest income departments are large extractors and experience a dramatic drop in the ranking when oil GDP is removed. This also indicates that even though oil is an important source of income for Santander, the department still has a strong non-oil sector.

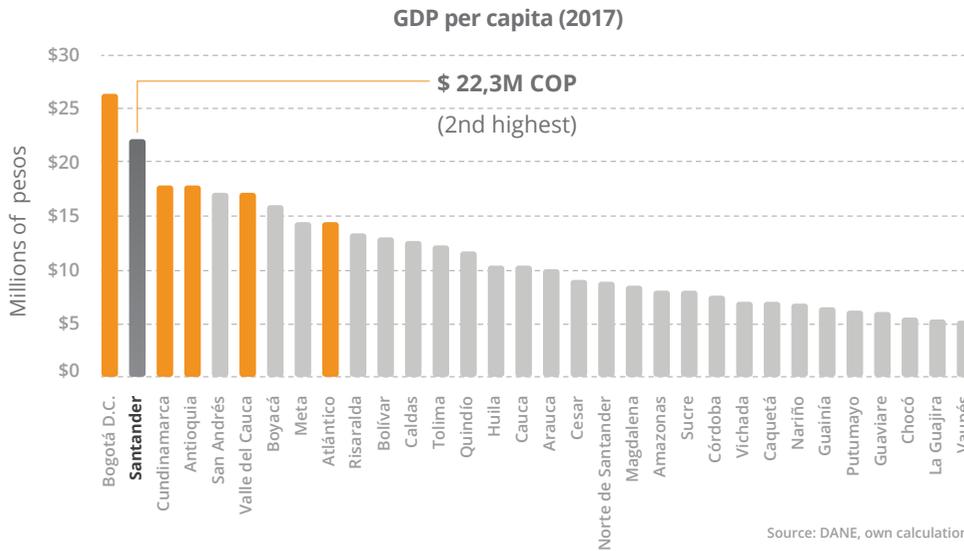


Figure 7

Santander’s poor export performance contrasts its high GDP ranking when compared to other departments.

In 2020, Santander was the 15th department with the highest non-oil exports, which totaled \$ 269 million USD (Figure 8). It was surpassed by economies a sixth its size and a tenth its population. As it is detailed in the diagnosis section of this report, most of Santander’s exports, close to 80%, are composed of oil

and oil derivatives, 10% are composed of coffee, and the remaining 10% everything else.

As done in this section, and throughout the rest of this analysis, we will compare Santander to a set of five peer departments that include: Antioquia, Atlántico, Cundinamarca, Valle del Cauca, and Bogotá.

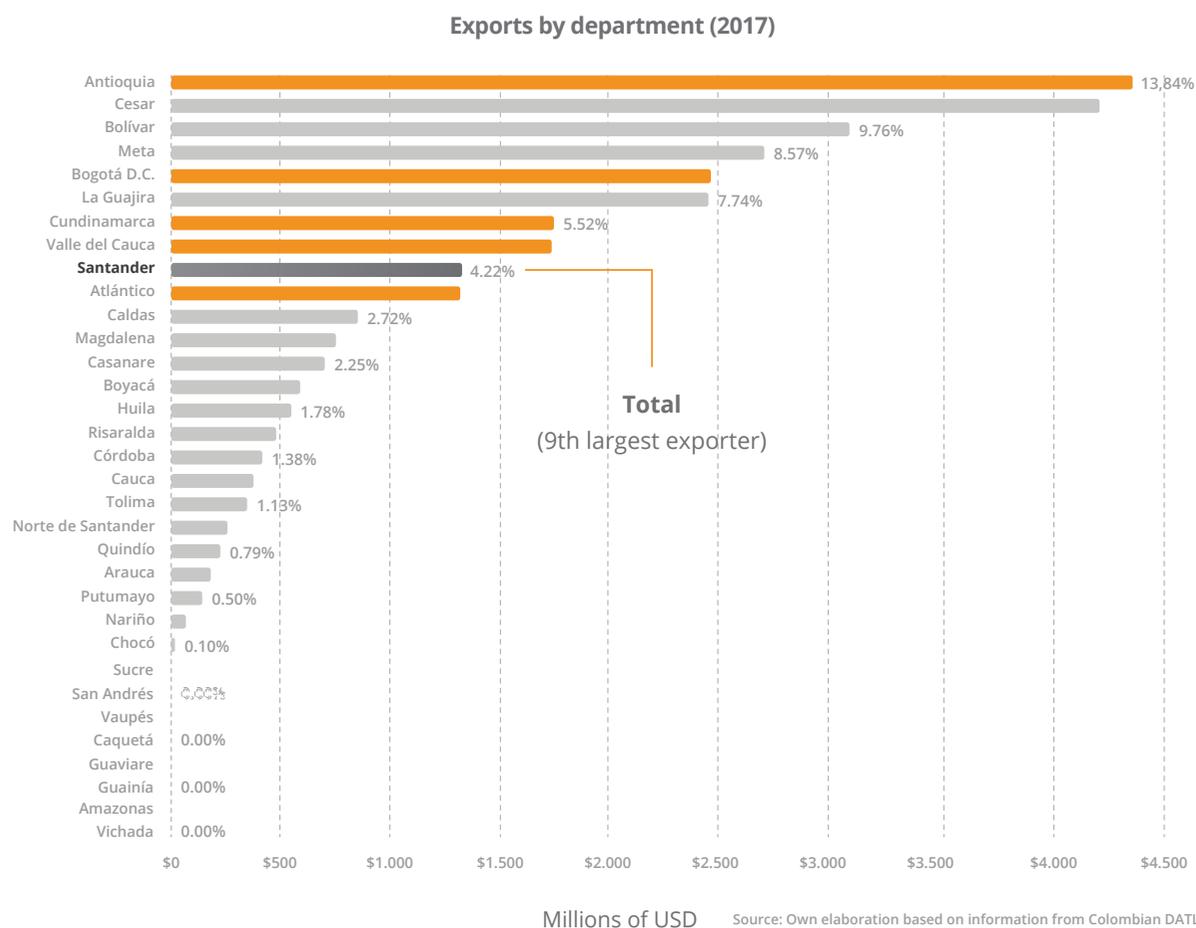


Figure 8

Non-oil exports by department (2017)

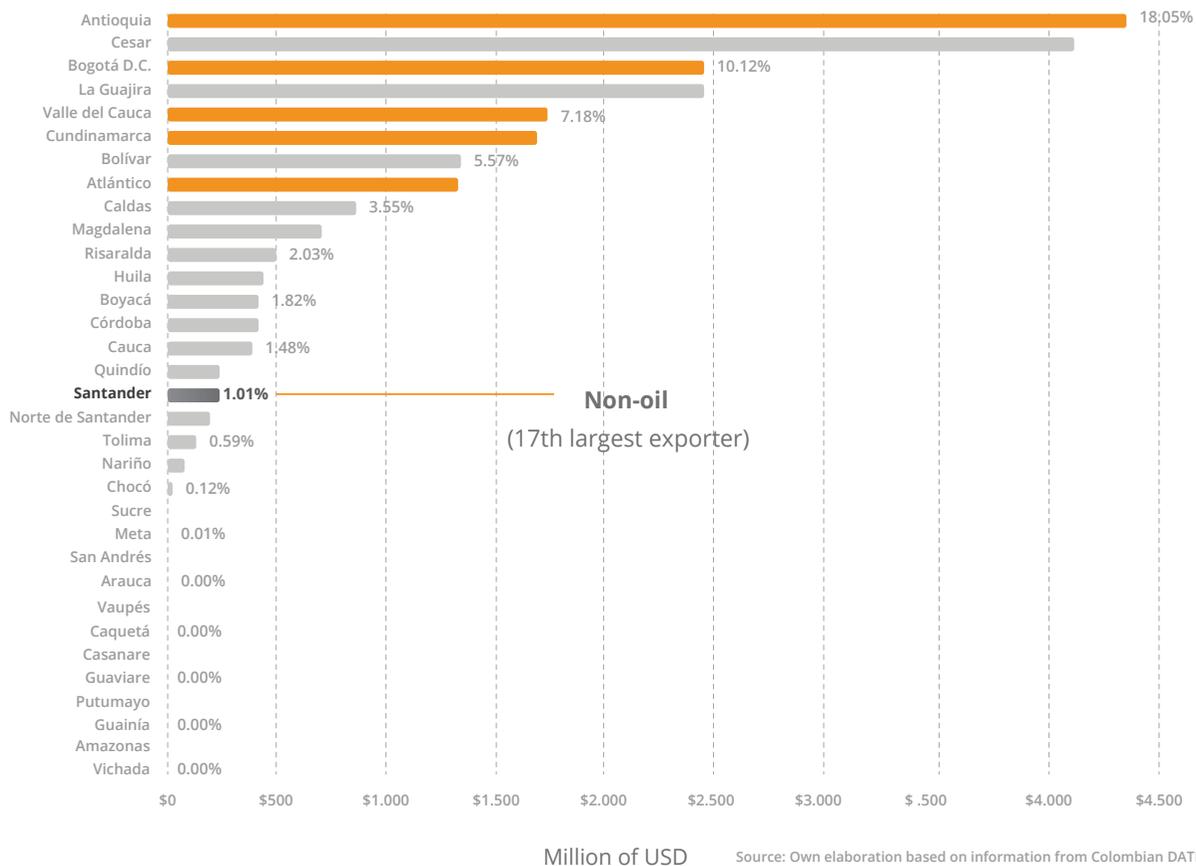


Figure 8

These peers have been selected for having similar GDP per capita, population, and economic growth to Santander. It's important to mention that Bogotá is included as an aspirational peer since it has experienced exceptional growth during the last 15 years, yet its GDP per capita only surpassed Santander's five years ago.

Despite the similarities, there are important differences among the peer group. Santander's economy is larger than Atlántico's and Cundinamarca's economy,

but only one two thirds the size of Valle del Cauca's, and less than half of Antioquia's. Among its peers, Santander has the second-highest income per capita, outperformed only by Bogotá. Santander's GDP per capita growth has only outperformed two peers, Cundinamarca and Atlántico. Despite being the 4th largest economy, Santander contributed on average only 1.92% to Colombia's exports from 2005 to 2019 and was the 9th largest exporter in 2017. Additionally, its exports are significantly less complex than those of its peers.



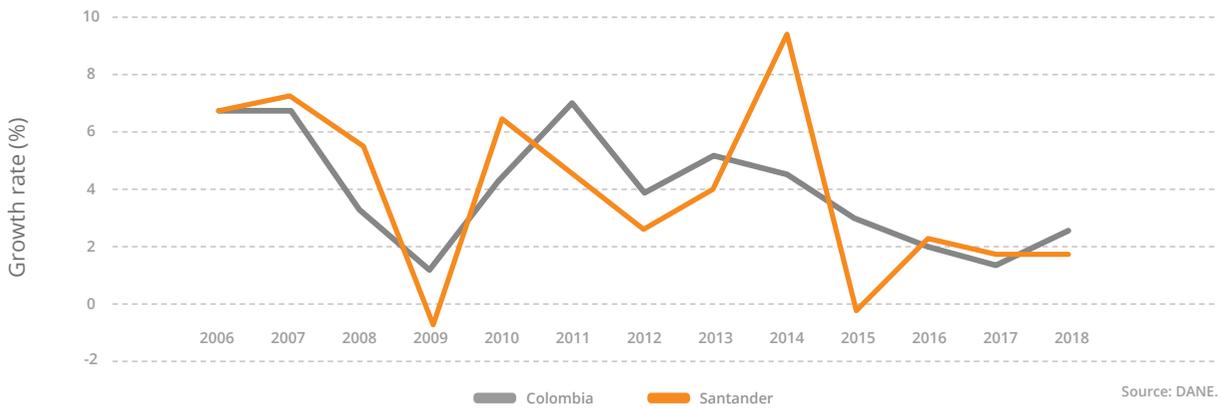
*Growth
Trajectory*

Growth Trajectory |

Santander's economic growth has been volatile and visually correlated to changes in the price of oil (Figure 9).

During the last 15 years, Santander's growth rate, ranging from -0.64% to 9.34%, and with a standard deviation (SD) of 2.8, has been 1.5 times more volatile than that of the national economy, with an SD of 1.9. The growth rate of Santander's GDP per capita has been high when oil prices were increasing, and low when they crashed. This can be seen more clearly from 2006 to 2011 and after 2014, but the tendency is harder to observe between 2011 and 2014.

GDP growth rate (2006 -2018): Santander vs Colombia



GDP growth rate of Santander vs oil price (2006 -2018)

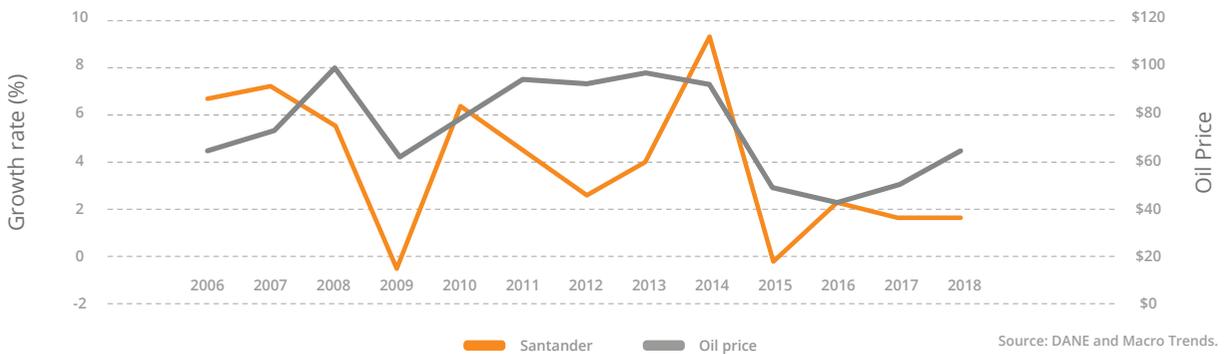


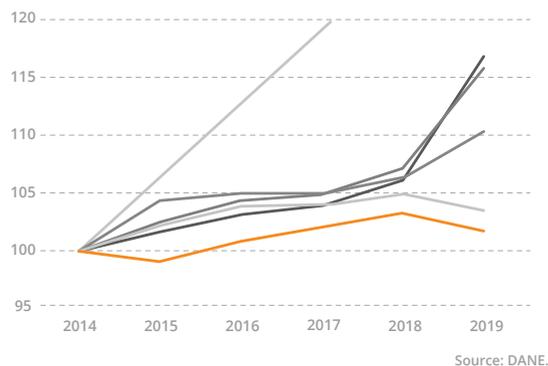
Figure 9

When growth was strong, Santander was the second-fastest grower among its peers, when growth slowed, Santander suffered the most. Santander enjoyed strong growth until 2014, averaging 4.5% and surpassing all of its peers except the overachieving Bogotá (Figure 10). But in the commodity crash of 2014, Santander's GDP per capita suffered a structural break, and from there onward, it has grown at 0.86%, much slower than all of its peers (Figure 11).

Decomposing growth, we see some sectors have remained stable, such as services, while others, like construction,

have followed the ups and downs of the price of oil (Figure 12). The strong grower during the last fifteen years has been services, adding on average 2.2% per year to the department's GDP per capita. The activity with the largest booms and bust has been construction. It was a principal driver before 2014, increasing the department's GDP per capita an average of 1.7% per year, and from there onward, contracting it by 0.77% per year. Examining the boom and bust cycle of the construction sector, we discover that 90% of the construction done in Santander during the last 15 years has been of housing, mostly financed by private actors.

Normalized Real GDP per Capita Growth (2014 - 2019): Santander vs Peers



Normalized Real GDP per Capita Growth (2005 - 2019): Santander vs Peers

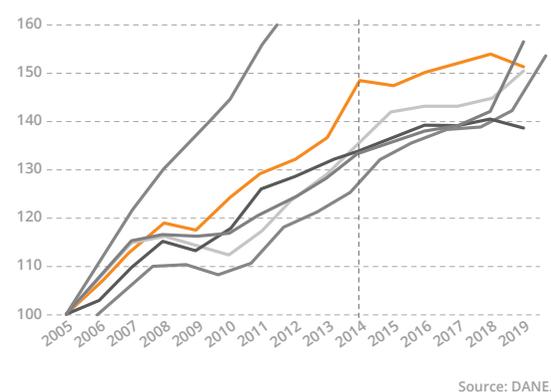


Figure 10

GDP per capita growth rate: Santander (2019)

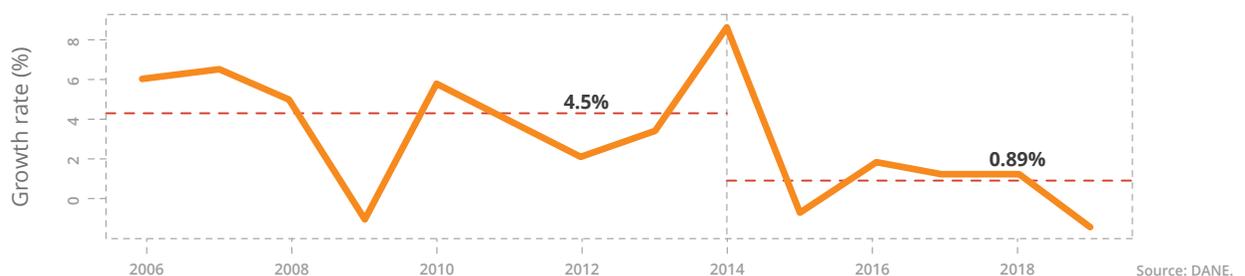


Figure 11

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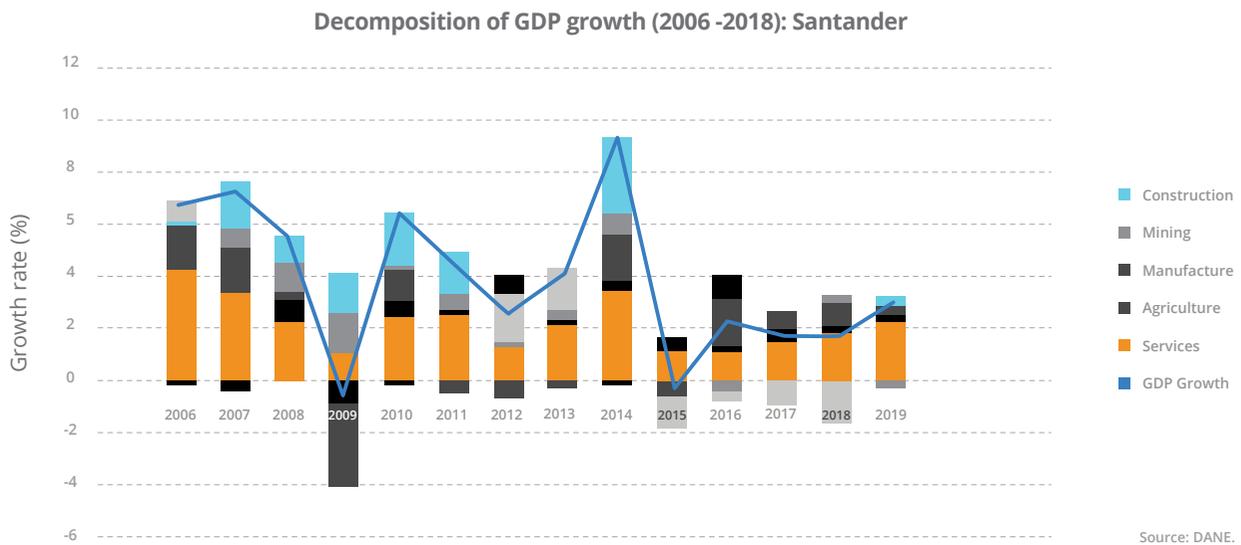


Figure 12

I Growth Question

Considering i) the decrease in Santander’s economic growth over the last 5 years and ii) its volatility, mainly associated with changes in the price of oil, we ask:

How can Santander resume its economic growth and make it more stable?



DIAGNOSIS:

ECONOMIC COMPLEXITY

The theory of economic complexity (Hausmann, Hidalgo, et al., 2011) is based on the idea that the production of goods and services requires not only raw materials, labor, and machinery, but also the tacit knowledge necessary to combine these elements within the context of a productive unit. This type of knowledge or know-how tends to be one of the main factors limiting the structural transformation and productive diversification of the world's economies. It is also the most difficult to transmit and teach since it is only acquired by experience (it is in people's brains more than books and recipes).

To make this idea more concrete, the theory of economic complexity can be understood as a Scrabble game where the longest and more sophisticated words need many letters (knowledge), while the shortest and simplest words require few and more common letters. Players with the most letters can put together longer and more sophisticated words, while the ones with few and common letters can only bring together a limited variety of short words. An analogous situation happens with places that have varying levels and stocks of knowledge. How is this relevant?

Economic complexity measures the amount of know-how embedded in an economy, and there is a strong correlation between complexity and income. Evidence also shows that places with a higher-than-expected economic complexity given their income level, tend to grow faster than the ones that are too rich given their complexity levels. Thus, economic complexity is relevant not only because it explains differences in income levels, but also because it is a predictor of future growth. Given all this, we have included an analysis of economic complexity in this growth diagnostic exercise, which will allow us to understand and identify the knowledge base of Santander and how it has evolved in time and provide inputs for its potential development path.

Places produce goods and services in line with the know-how of their inhabitants and institutions/organizations, which we can quantify using a mix of methods. Even if productive capabilities are not directly observable, we can infer the amounts and diversity of know-how embedded in an economy by looking at the goods and services it produces. From production patterns in different places and across time, we can build two indexes that can measure the latter: the

Product Complexity Index (PCI), a measure of the number of capabilities and know-how embedded in the making of a product or service, and the Economic Complexity Index (ECI), a measure of the capabilities and know-how embedded in an economy.

The ECI es calculated from the number of products an economy can competitively produce or export (diversity), and the number of economies that can also competitively produce or export them (ubiquity). It is obtained by applying the “method of reflections”. More complex economies tend to be more diversified and produce/export products and services that are produced/exported in fewer places (lower ubiquity), such as Japan, Switzerland, South Korea, and Germany. Less complex economies tend to be less diversified and produce/export products and services that many other economies produce/export (higher ubiquity), such as Angola, Burkina Faso, and Nigeria. The PCI follows the same logic and is calculated from the average diversity of the economies that competitively produce or export a certain product, and the average ubiquity of the other products those economies competitively produce or export. More complex products are produced/exported by fewer economies, and generally those that produce/export them are involved in the production/export of other complex products.

We will use two data sources for our analysis. We will first analyze the capabilities and know-how embedded in Santander’s economy from the perspective of exports, based on information available in the Colombian Datlas, sourced from export

and import data from the Department of National Tax and Customs Authority (DIAN). Nevertheless, export data does not include services, and that is why we will also analyze the capabilities and know-how embedded in Santander’s economy using the information on formal employment obtained from the Integrated Report of Social Security Contributions, also found in the Colombian Datlas. We will denominate this analysis as the industry perspective analysis, since the data is not grouped by products, like the export data, but instead, it is grouped by industry (i.e. economic activity).

Economic Complexity - Exports Perspective

Santander’s exports per capita reached \$ 641 USD in 2017, an intermediate position among Colombian departments (Figure 13). Crude and refined oil exports represented 82% of Santander’s exports in 2017 (Figure 14), followed by considerable distance by coffee exports (10% of total exports in 2017). When excluding oil from the picture, exports per capita are reduced to \$ 118 USD (Figure 15), and Santander is outperformed by all peers and is positioned in the lower bound of Colombian departments. In other words, when excluding oil, Santander exports vanish.

Exports per capita by department (2017)

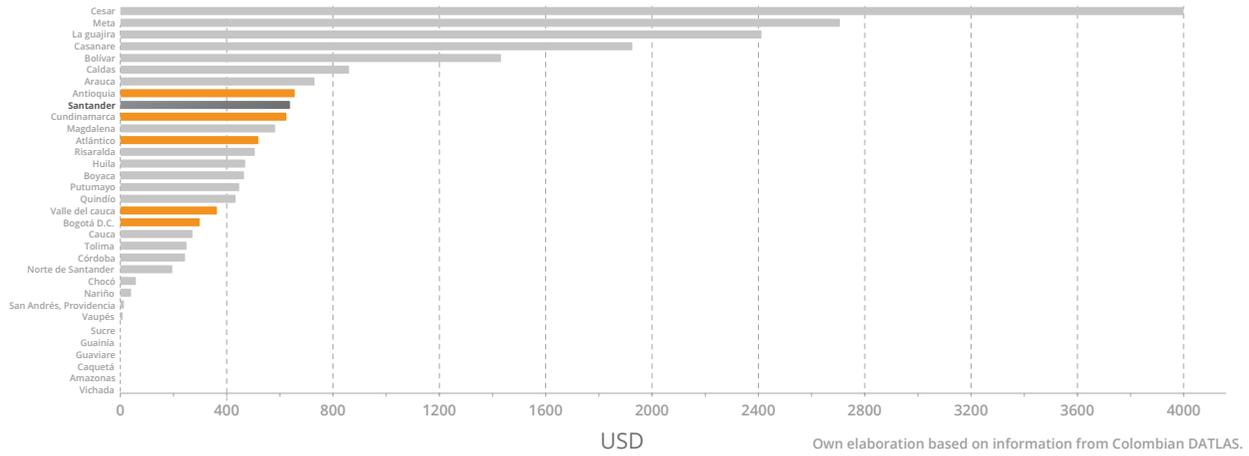
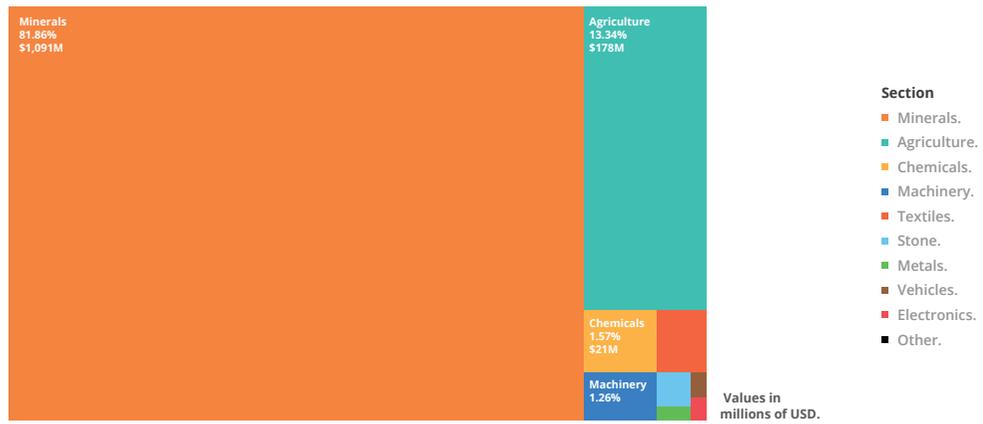


Figure 13

Total exports by section (2017): Santander



Source: Own elaboration based on information from Colombian DATLAS.

Figure 14

Non-oil exports per capita by department (2017)

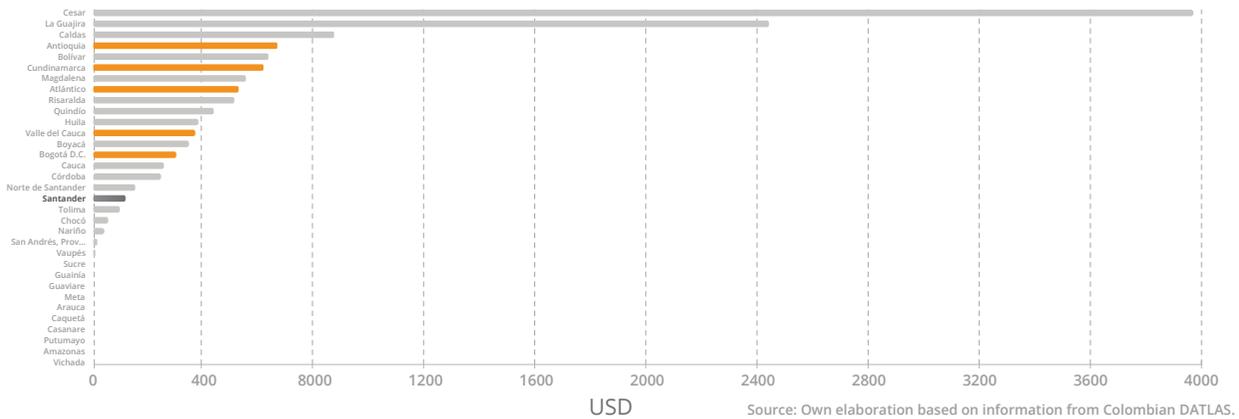
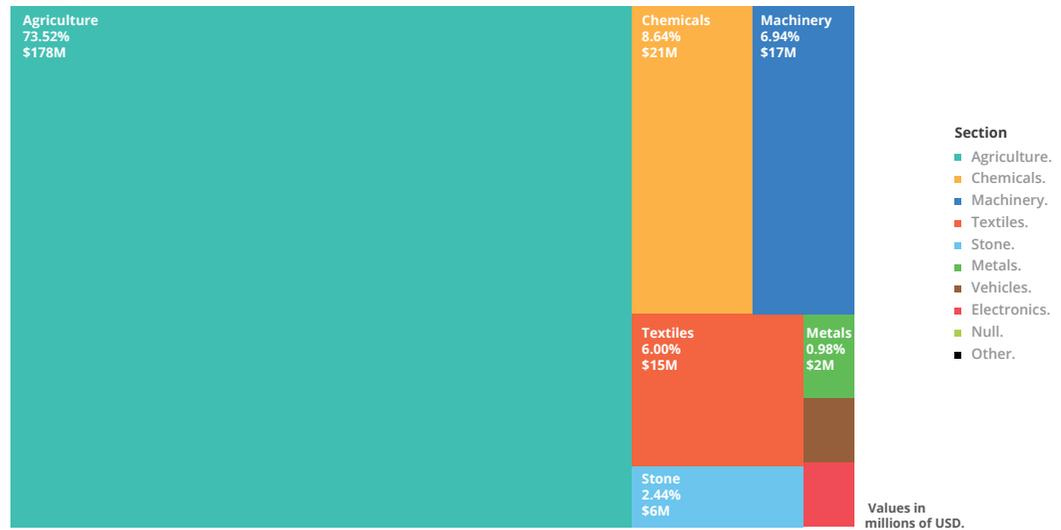


Figure 15

Most of Santander's non-oil export basket is mostly composed of agricultural products, and some chemicals and machinery (Figure 16). Agricultural exports concentrate 74% of non-oil exports, rising to \$ 178 million USD in 2017, followed by chemicals (\$ 21 million USD, 9% of non-oil exports), and machinery (\$ 17 million USD, 7% of non-oil exports). Within agriculture, coffee represents 56% of non-oil exports in 2017, outperforming every other product (Figure 18).

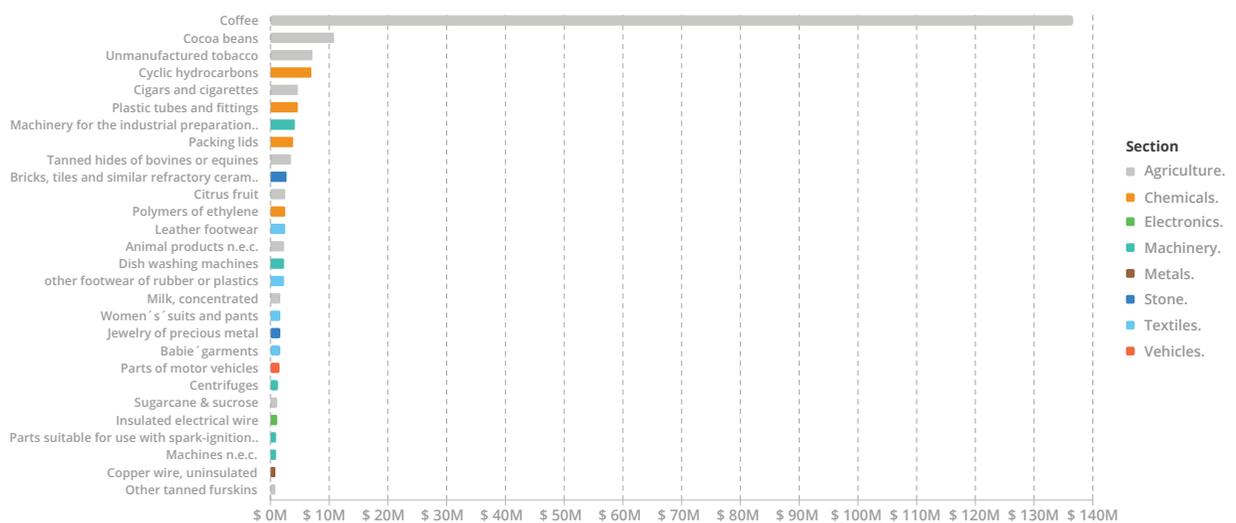
Total exports excluding oil by section (2017): Santander



Source: Own elaboration based on information from Colombian DATLAS.

Figure 16

Main products exported, excluding oil (2017): Santander



Exports in USD Source: Own elaboration based on information from Colombian DATLAS.

Figure 17

Within chemicals, cyclic hydrocarbons and plastic tubes are the most relevant, but still very limited in terms of size (Figure 19). Cyclic hydrocarbon exports show a very volatile path, with ups and downs, while plastic tubes and plastic articles for packing show a sustained but modest growth in time. Within machinery, machinery for the industrial preparation of food and drinks is the most relevant and the one that has increased the most in the period 2008-2017 (Figure 20). Other relevant machinery exports (although limited in size, are dishwashing machines and centrifuges.

Evolution of agricultural exports (2017): Santander

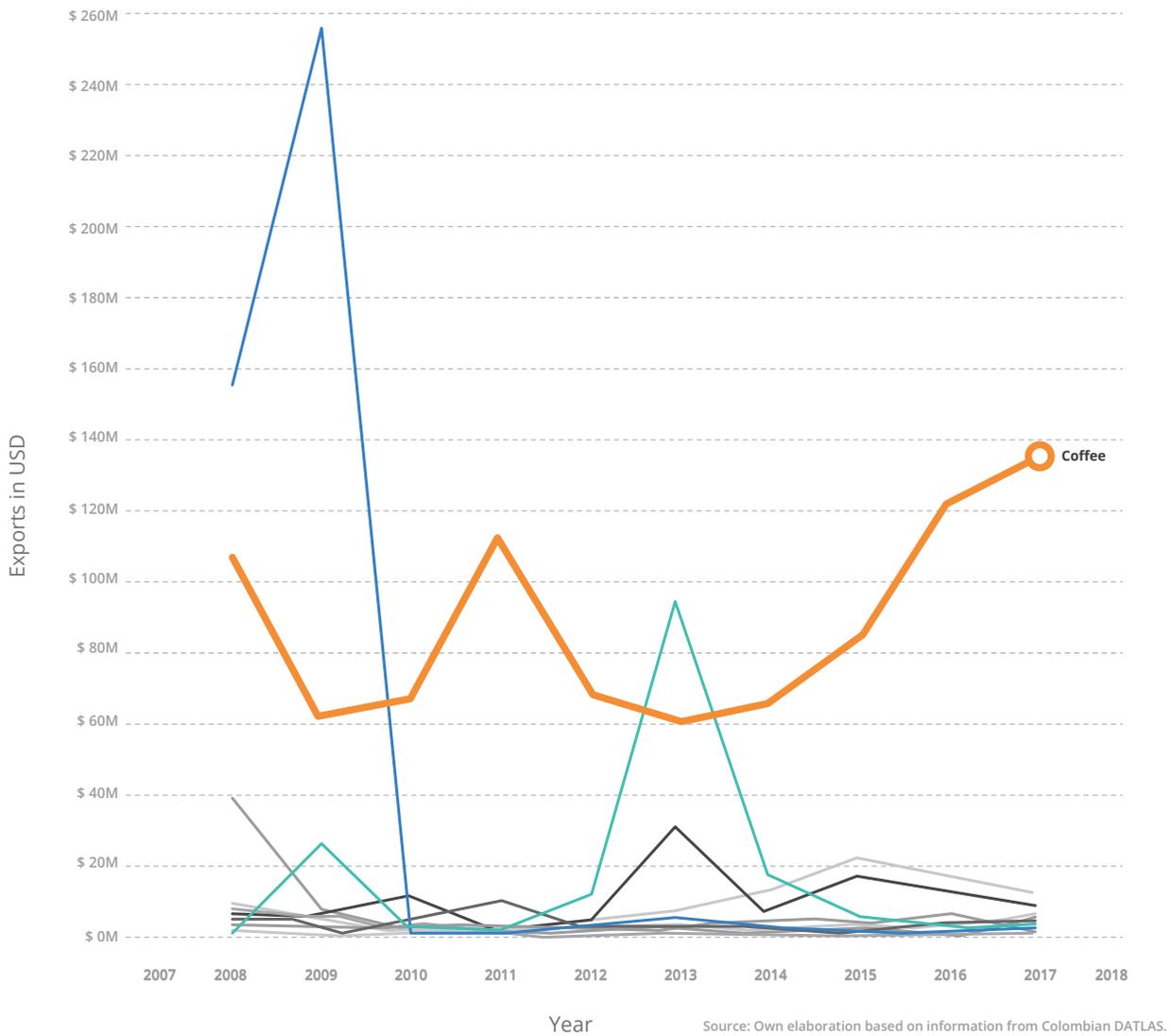


Figure 18

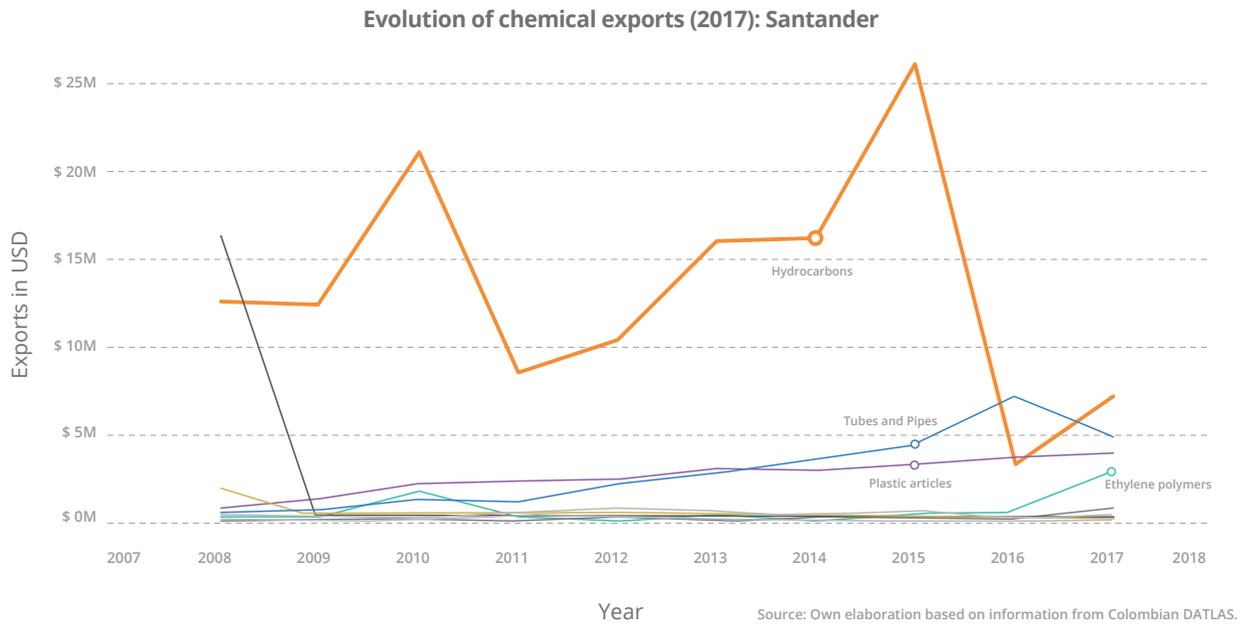


Figure 19

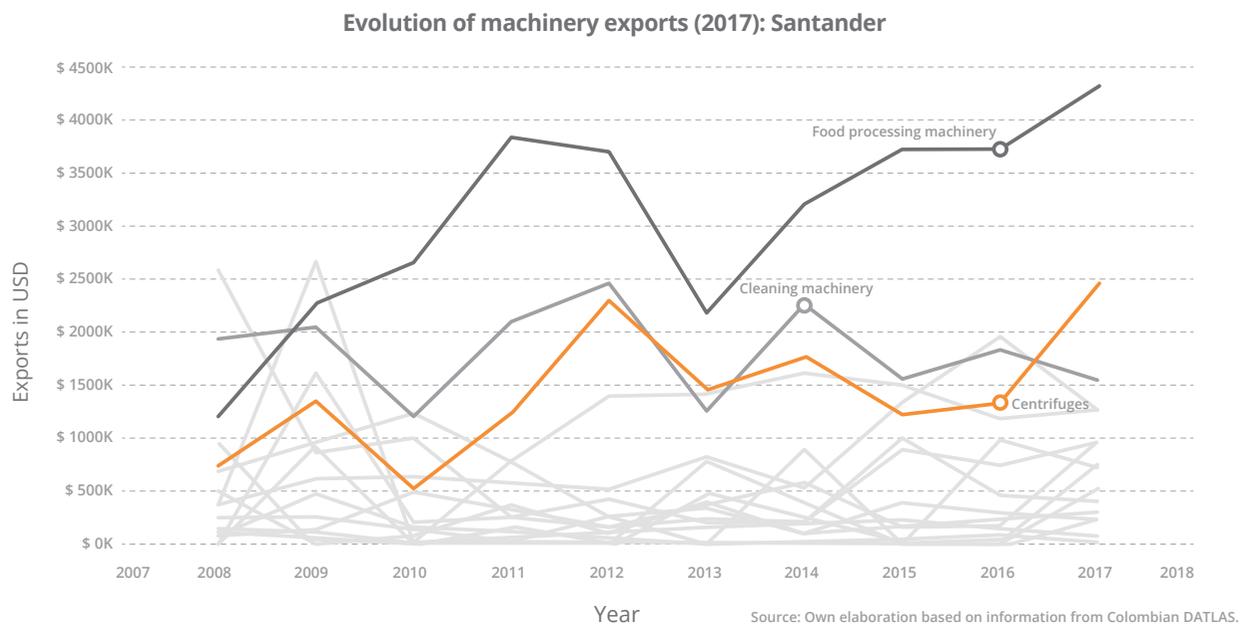


Figure 20

When looking at export's evolution, we can see an increase in value between 2008-2012, led by oil, and then a steep decrease after 2012, related to the crash in oil prices (Figure 21). When excluding oil, we see a sharp decrease in exports after 2009 (related to the world crisis), and then a stagnation period until 2017 (Figure 22).

Exports value evolution (2008 - 2017): Santander

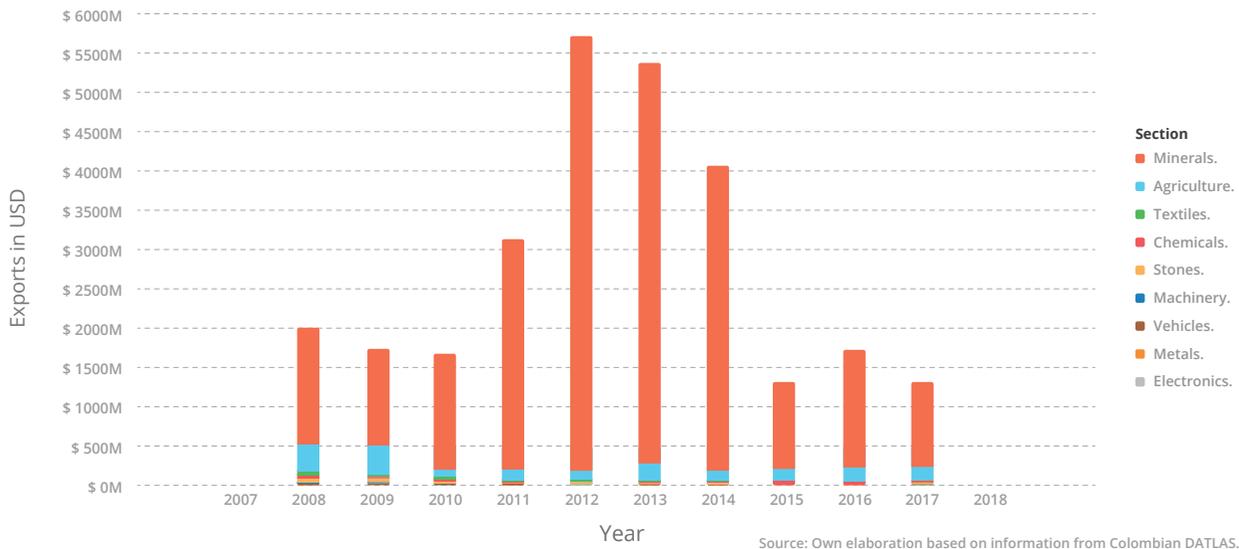


Figure 21

Exports value evolution, excluding oil (2008 - 2017): Santander

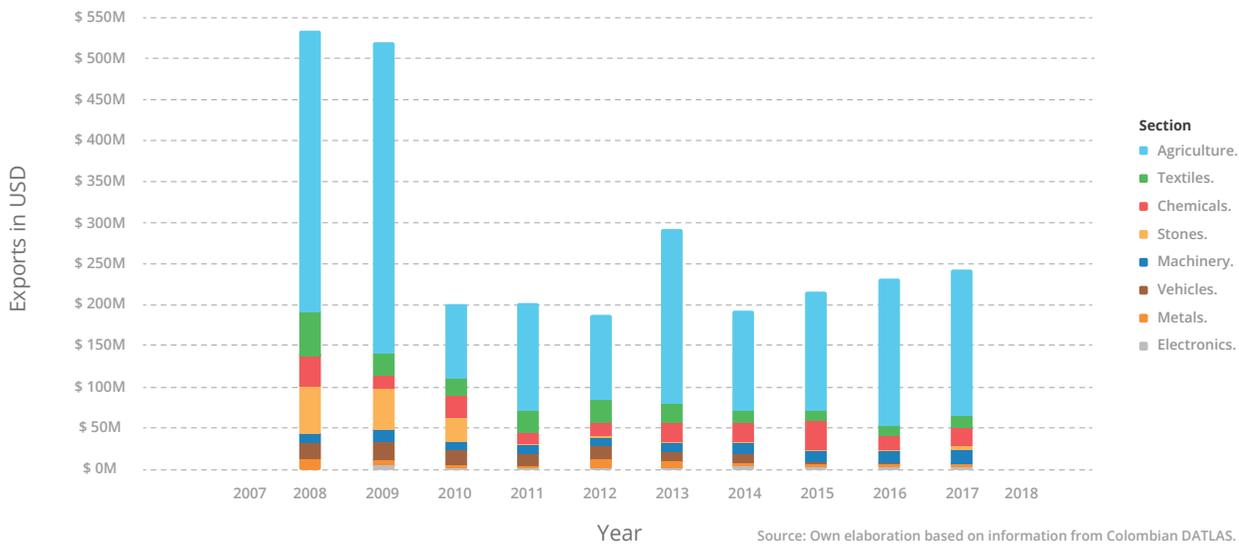


Figure 22

In 2017, Santander competitively exported 33 products, outperformed significantly by its peers, with Antioquia, a mid-positioned peer, exporting competitively 143 products (Figure 23). An economy is competitively exporting a product if it exports a bigger share of it (out of the economy’s total exports) than the share the product represents in total world trade (relative comparative advantage). Thus, Santander performs much worse than its peer in terms of diversity of exports. When we exclude oil from the analysis, we see that Santander presents a relative comparative advantage in 70 products, a significant improvement, but still lags its peers (Figure 24).

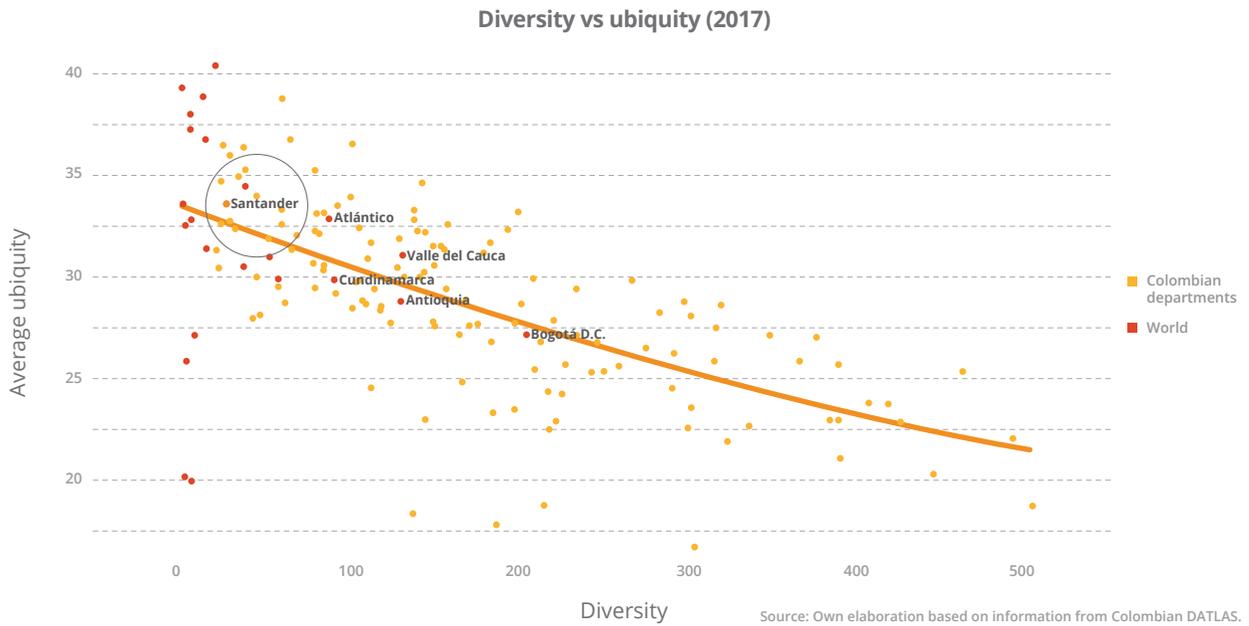


Figure 23

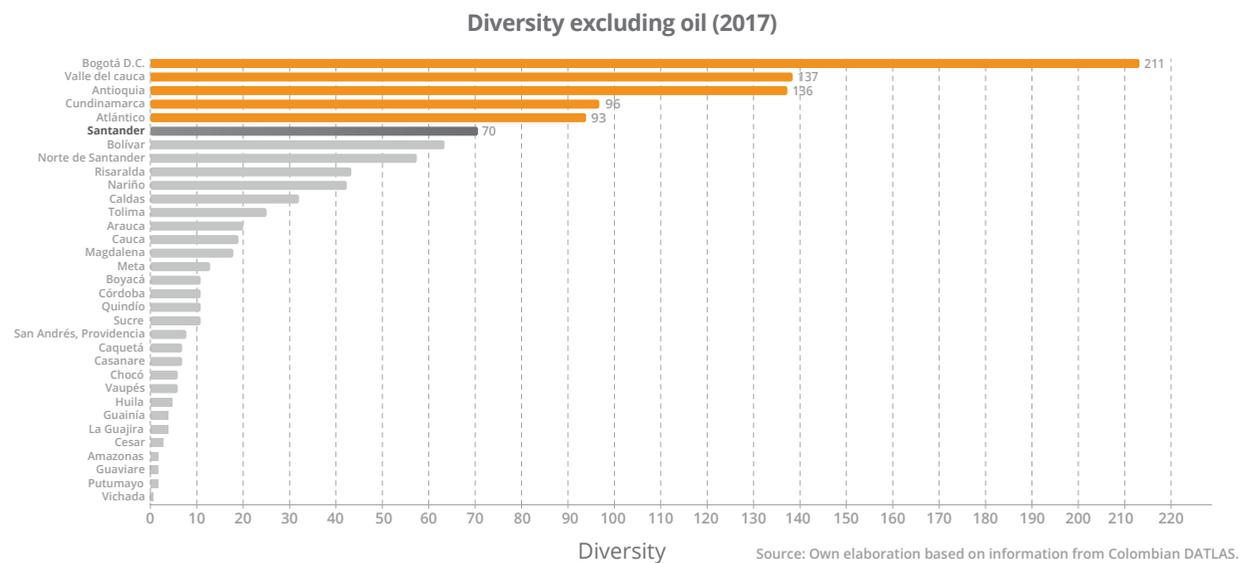
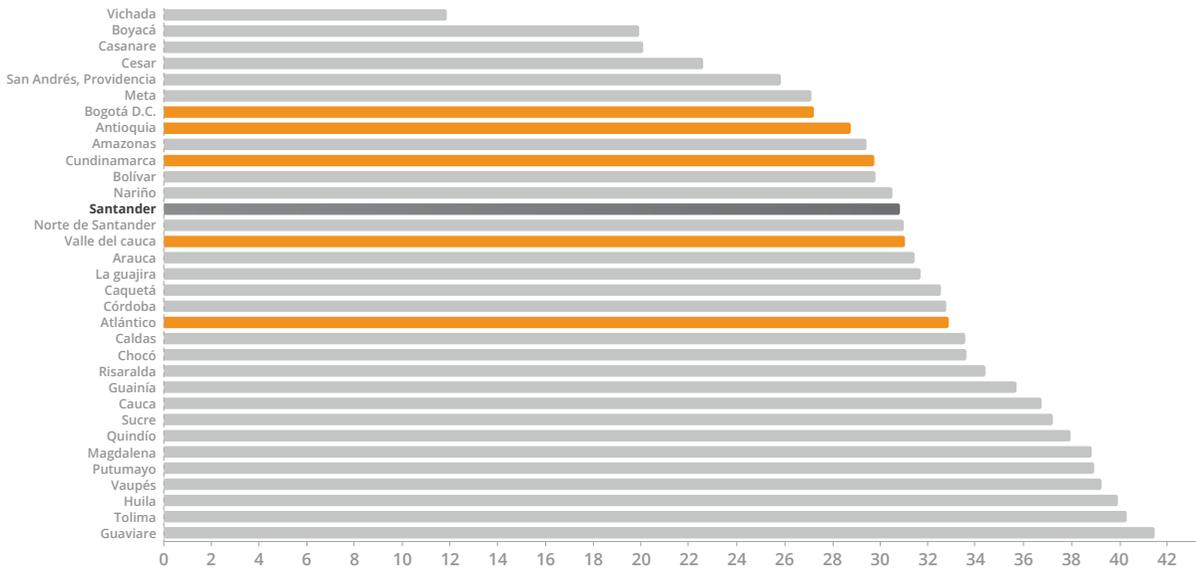


Figure 24

In terms of ubiquity, a measure of how many economies competitively export a specific product, Santander competitively exports products that are more ubiquitous than its peers (Figure 23). When excluding oil, Santander is in an intermediate position compared to its peers, which represents a relative improvement compared to its position when considering oil (Figure 25).

Average ubiquity excluding oil (2017)



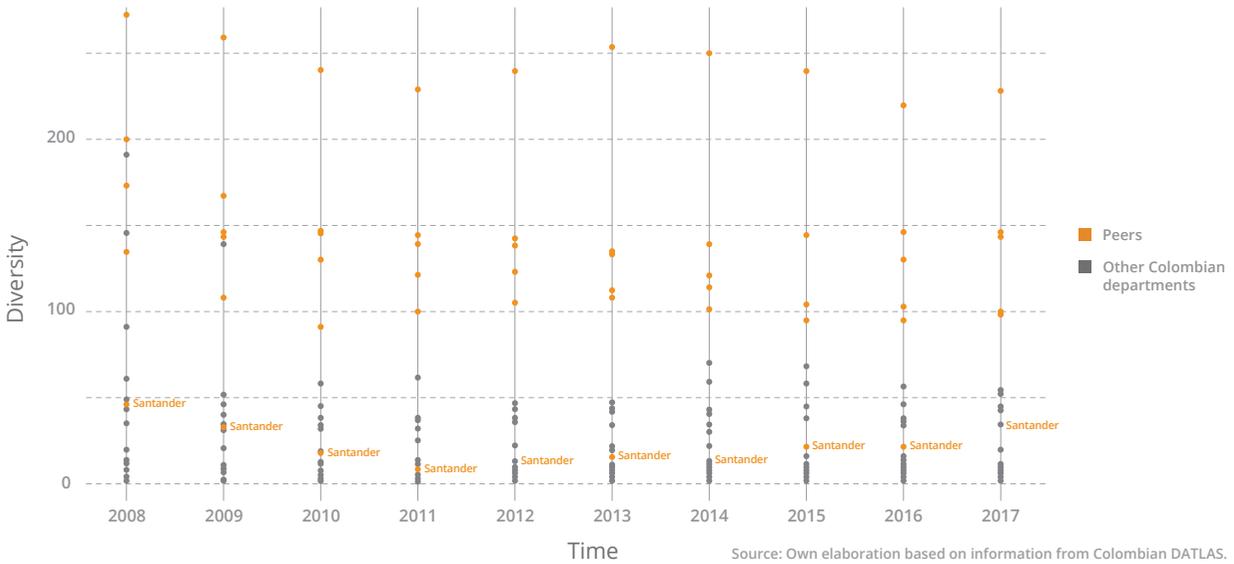
Average Ubiquity

Source: Own elaboration based on information from Colombian DATLAS.

Figure 25

Santander has struggled to increase its export basket diversity over time and it ranks average in terms of ubiquity. Figure 26 shows that in the period 2008-2017 Santander maintained a stagnant diversity level (with a minimum value in 2012).

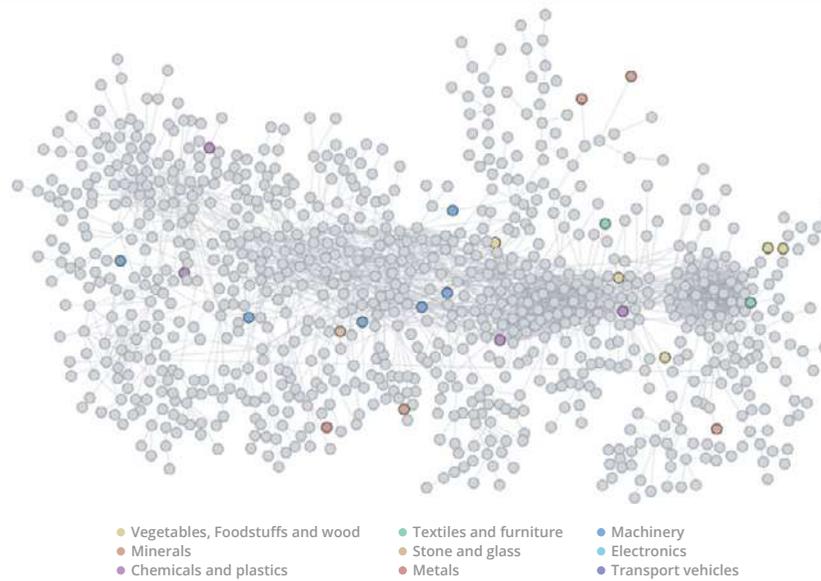
Evolution in time of diversity (2008 - 2017)



Source: Own elaboration based on information from Colombian DATLAS.

Figure 26

Export product space (2017): Santander

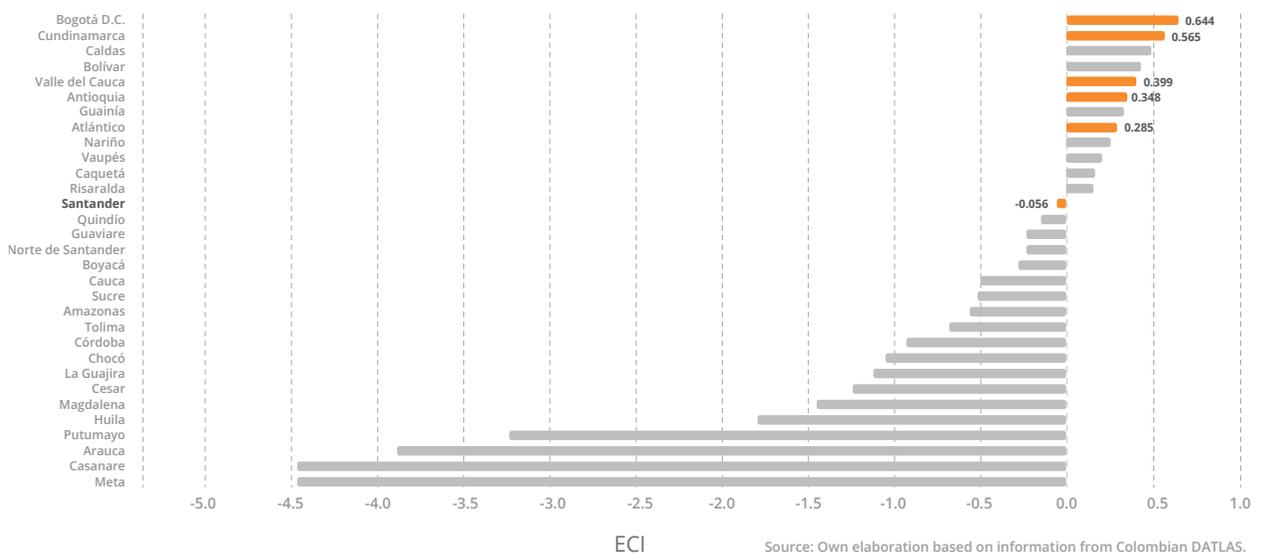


Source: Colombian DATLAS.

Figure 27

Santander’s position in terms of diversity and ubiquity is coherent with its position in the product space (Figure 27). Santander positioning in the product space is peripheral, with presence in few, and poorly connected nodes. The latter is coherent with a low level of economic complexity (Figure 28), whether considering oil or not (Figure 29). Low levels of economic complexity are explained by exporting competitively products that are of low complexity.

ECI - Total exports (2017)



Source: Own elaboration based on information from Colombian DATLAS.

Figure 28

ECI excluding oil (2017)

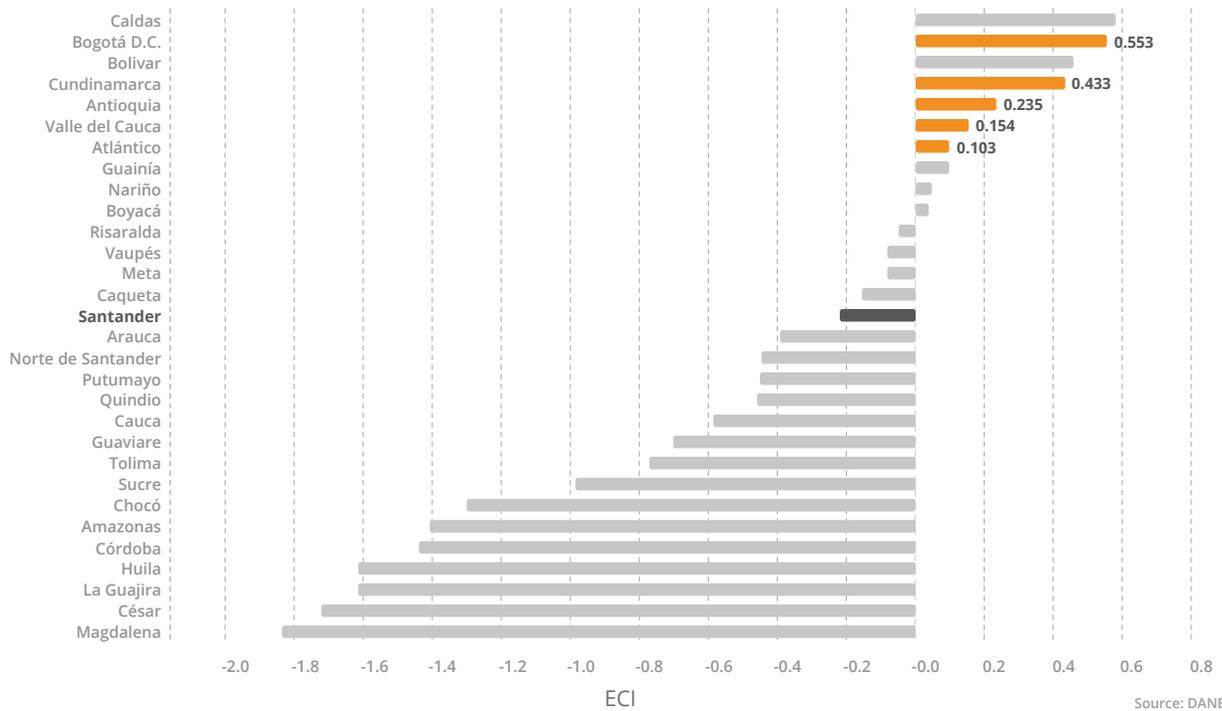


Figure 29

Among the higher complexity products that Santander exports, mostly are machinery products.

These include dishwashing machines, milking machines, agricultural machinery, boilers, and machines for the preparation of food or drinks. When excluding oil, some of the more complex products that are exported competitively are orthopedic appliances (machinery), parts for aircraft engines (machinery), printed postcards (agriculture), preparations and charges for fire extinguishers (chemicals) and centrifuges (machinery).

It is interesting to note that when excluding oil, new products appear as being competitively exported in oil intensive economies. This happens because the share of other products (non-oil) over the total exports for a certain economy increases (numerator). However, it is important to mention that the boost other oil-exporting departments and countries get when excluding oil from the analysis is bigger than the boost Santander gets. This might be explained by the fact that the average complexity (PCI) of the products Santander adds when excluding oil is lower than for other oil-exporting departments and countries (Figure 30).

Average Product Complexity Index (PCI) and Economic Complexity Index (ECI) including and excluding oil (2017): Santander vs peers

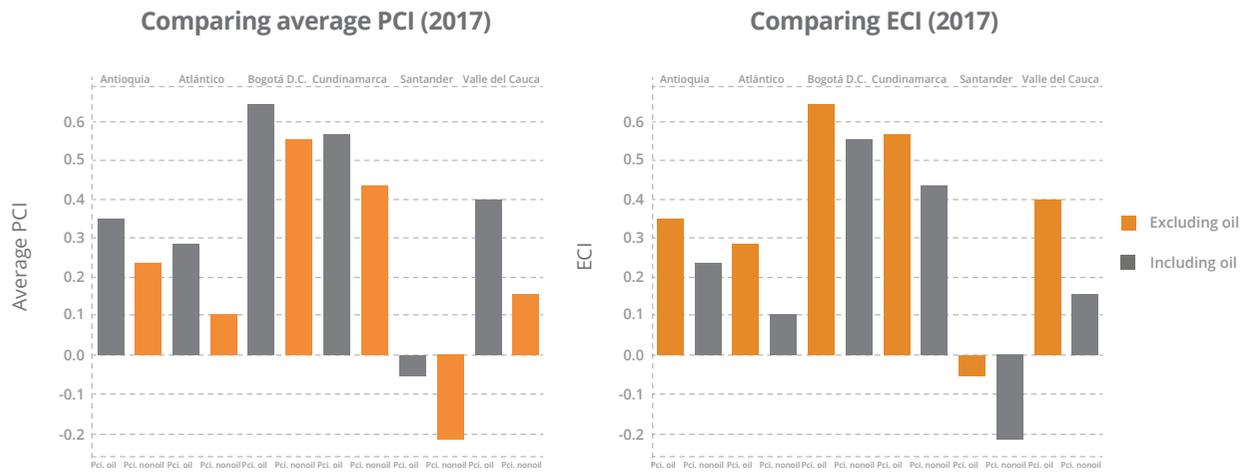


Figure 30

When looking at the trajectory of complexity as measured by the Economic Complexity Index (ECI) for Santander compared to peers, we can see that its relative position has not changed in the last years and that it shows higher volatility compared to peers (Figures 31 and 32).

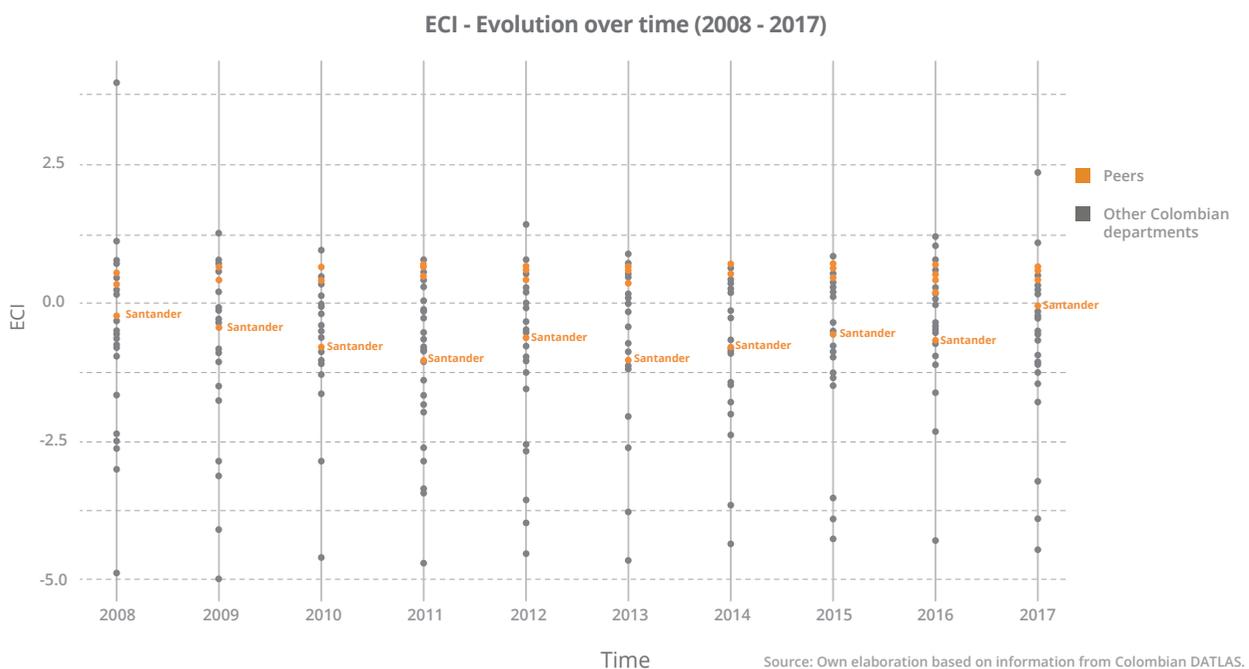


Figure 31

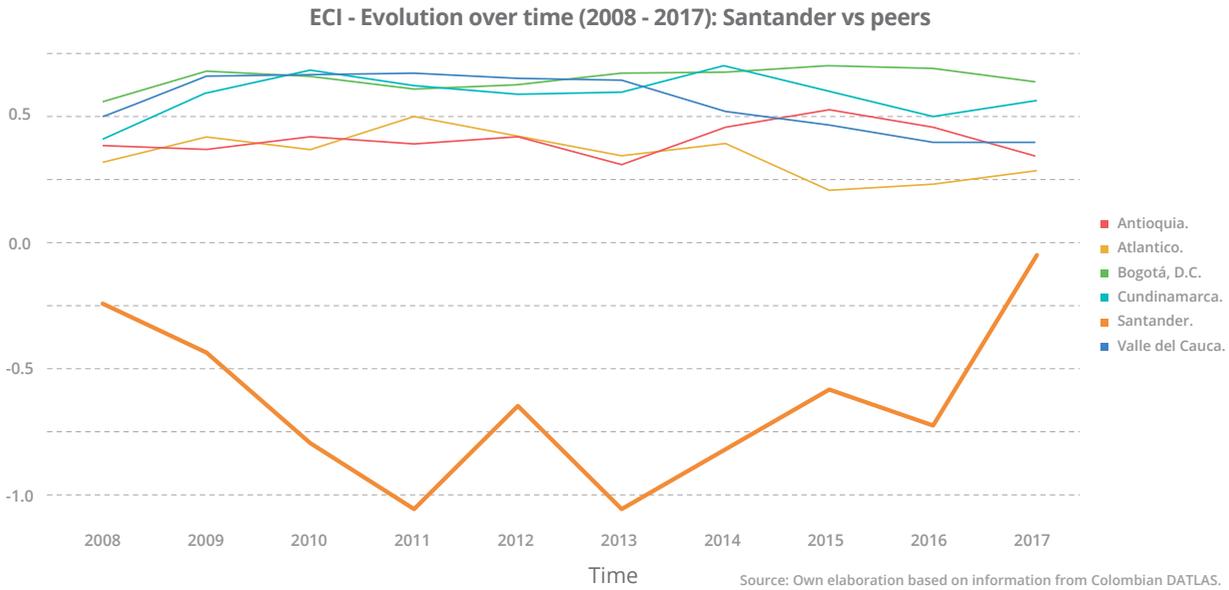


Figure 32

In conclusion, Santander is trapped in a state of low ECI as it has no nearby products to increase its complexity. Figure 33 shows that the department performs poorly in terms of ECI and Complexity Opportunity Index (COI). The COI captures how easy it will be for a country to add more letters to its collection, or, in a more technical manner, to diversify to more complex products, as it measures the availability of high Product Complexity Index (PCI) products close to the country's current position in the product space.

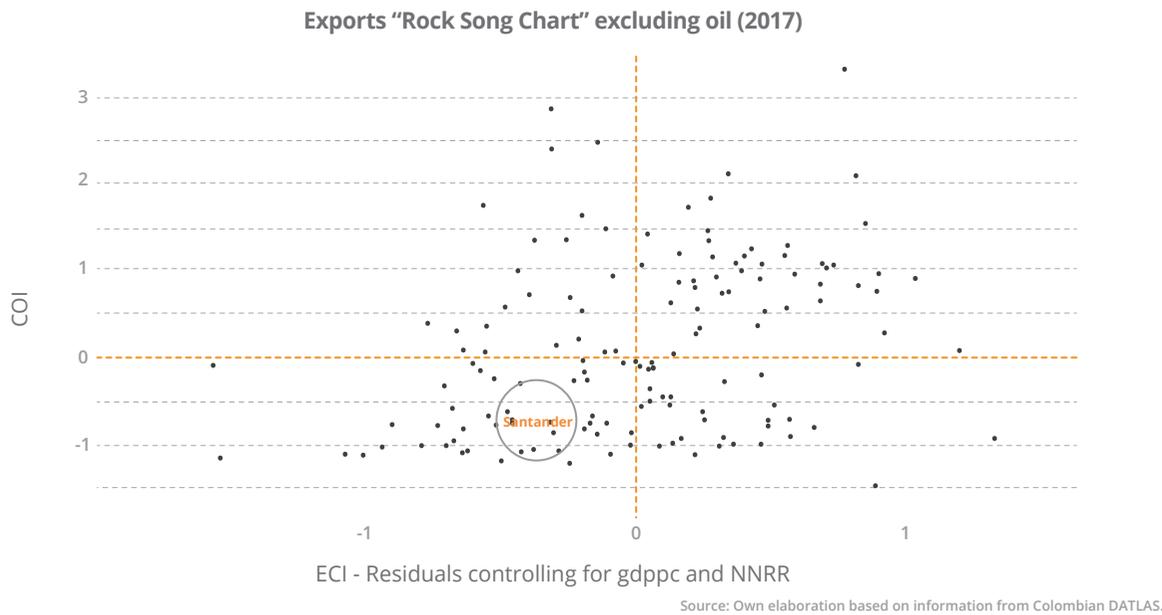


Figure 33

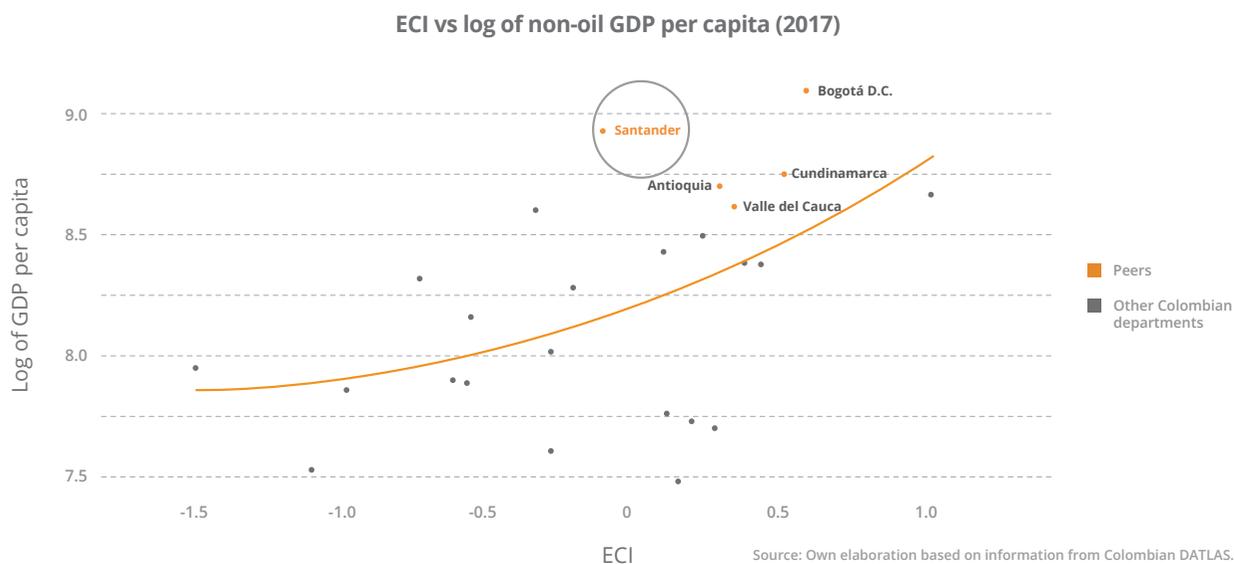


Figure 34

Additionally, Santander is living beyond its means, as its non-oil per capita income is not supported by its complexity level (Figure 34). As we mentioned in the beginning of this section, complexity metrics are relevant not because they are a proxy of the know-how embedded in the economy, but also because of its predictive power. Therefore, one would expect growth to be even lower in the next years in the absence of policy intervention.

Economic Complexity - Industry Perspective

As mentioned in the introduction of this section, the export product space analysis does not consider services (due to data limitations) and thus does not deliver a complete approach to the productive capabilities of an economy. In this case, we have access to subnational formal employment data that allows us to replicate the export complexity analysis for the industry (all productive sectors) in each one of Colombia's departments.

Because we are using employment data, and not exports, we will redefine the concept of revealed comparative advantage. A department has a revealed comparative advantage in a certain industry if the share of employment of the sector, out of the department's total employment, is bigger than the share of that industry in total employment for Colombia. Thus, the analysis will be based on how complex are industries in which the department is intensive.

In this context, diversity is a measure of the number of sectors in which a department has a revealed comparative advantage, and ubiquity is a measure of how many departments have a revealed comparative advantage in that industry.

Santander ranks better, compared to peers, in industry diversity and average ubiquity metrics than in product complexity metrics (Figure 35). Santander has a revealed comparative advantage in 156 industries and is mid-positioned among peers, outperformed by Bogotá, Antioquia, and Valle del Cauca, and slightly better positioned than Cundinamarca and Atlántico. In terms of average ubiquity, Santander lags its peers.

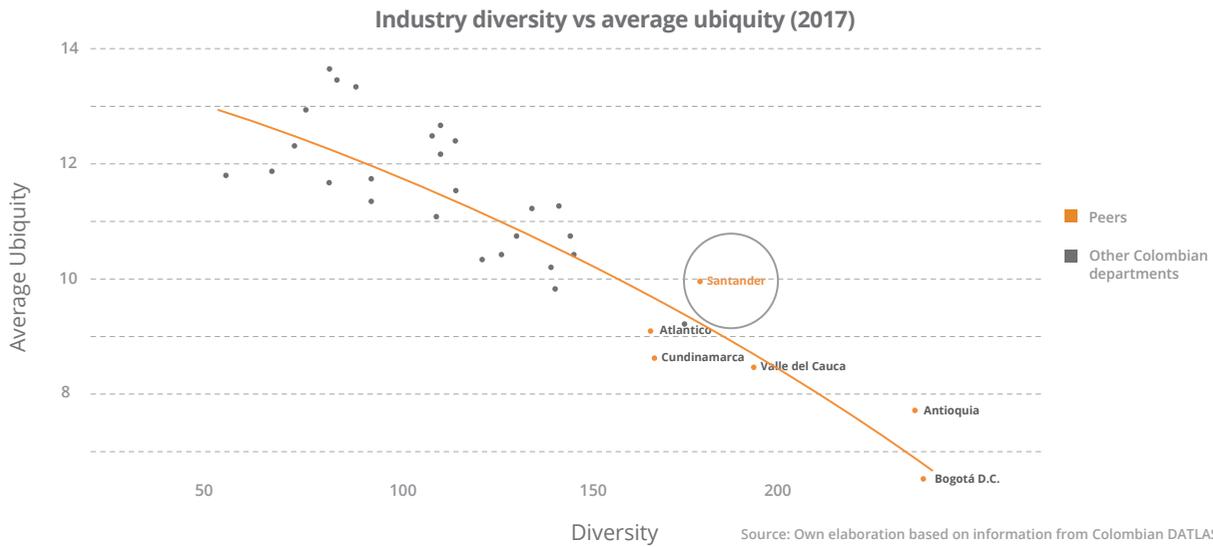


Figure 35

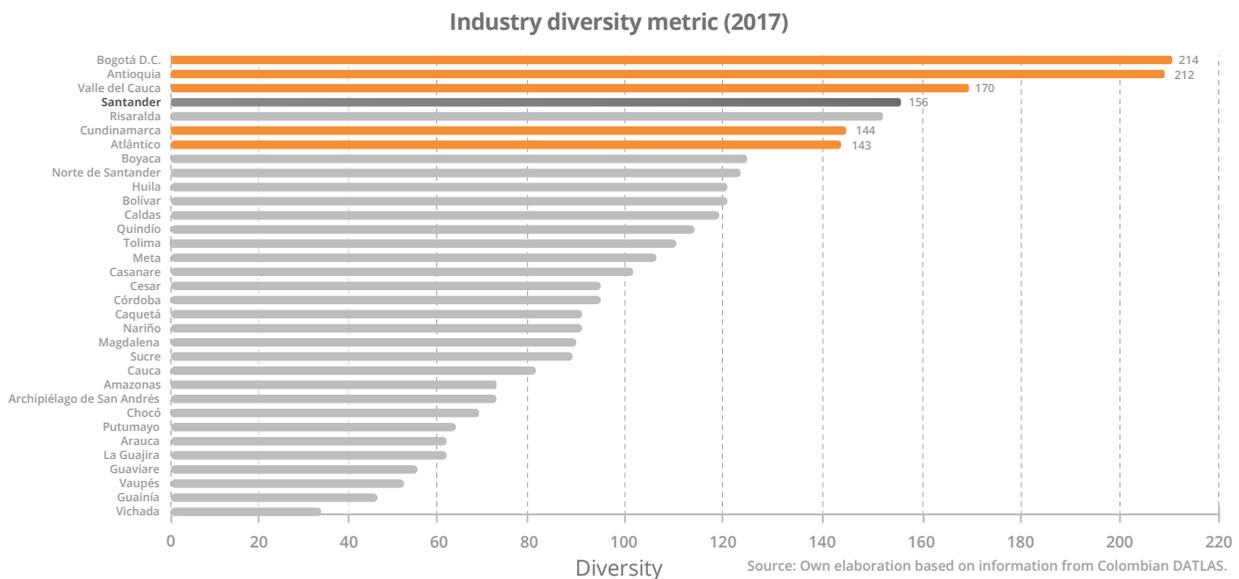


Figure 36

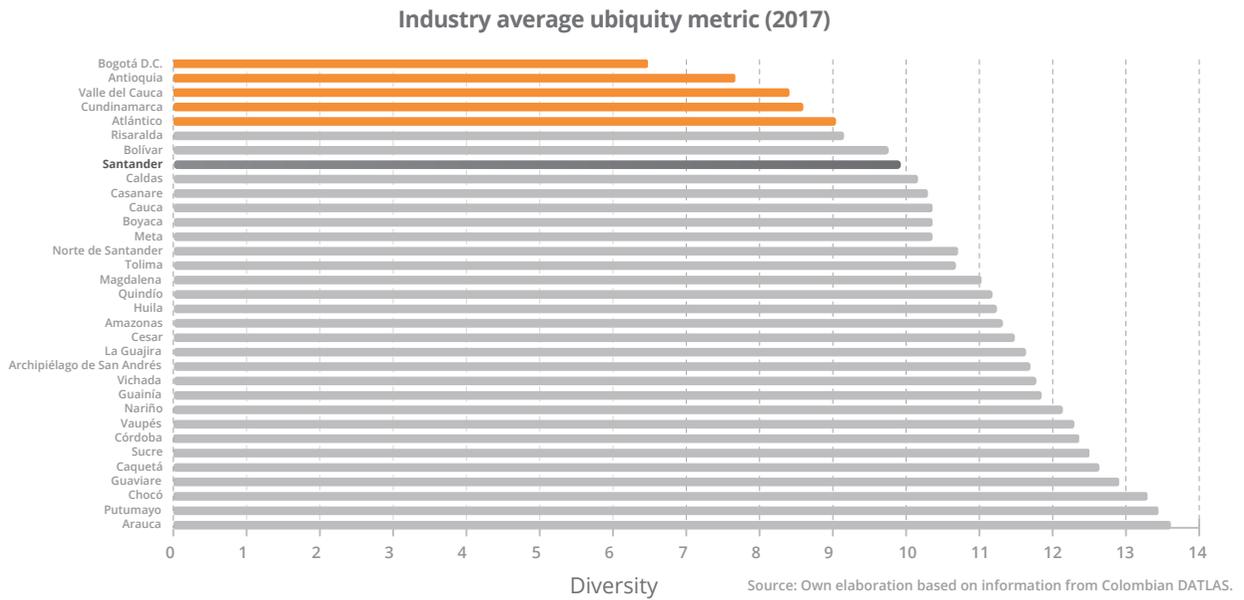


Figure 37

Santander’s industry space is much more diverse than the product space (more nodes are colored) and the colored nodes are better connected to other nodes (less peripheral) (Figure 38). Also, it is relevant to note that Santander is relatively intensive in services related industries; retail (violet), transportation and communications (purple), social services (light blue) and financial and professional services (blue).

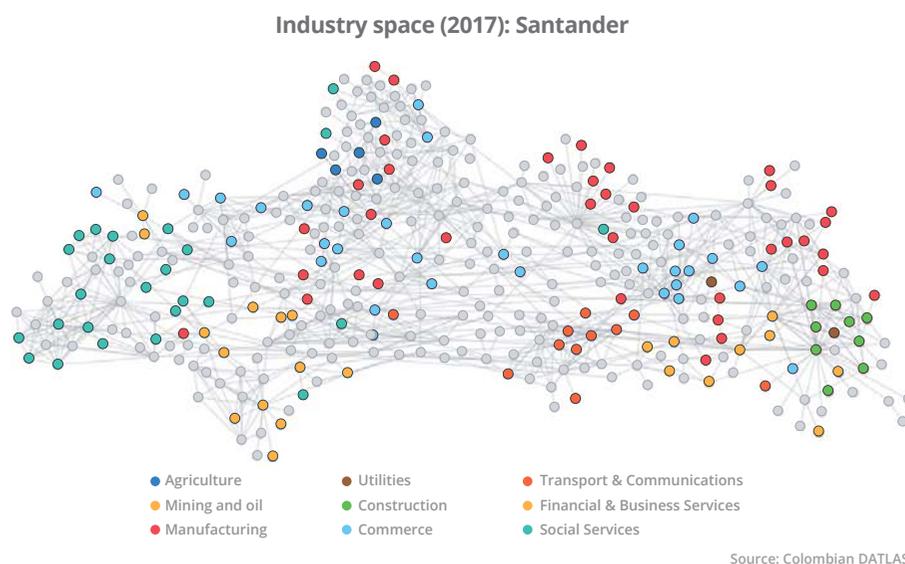


Figure 38

Despite its improvement in the positioning in the industry space compared to the product space, Santander is performing worse than its peers in terms of economic complexity (Figure 39). Although it is the 10th best positioned among Colombian departments, Santander has a relatively high Complexity Opportunity Index (Figure 40), ranked 3rd among Colombian departments, which is equivalent to say that there is a high potential for diversification and complexity improvements. When looking at the evolution of COI for Santander and its peers (Figure 41), we see that from 2008 to 2017 there have been relevant improvements, and Santander transitioned from being 5 out of 6 in 2008 to ranking 3 out of 6 in 2017.

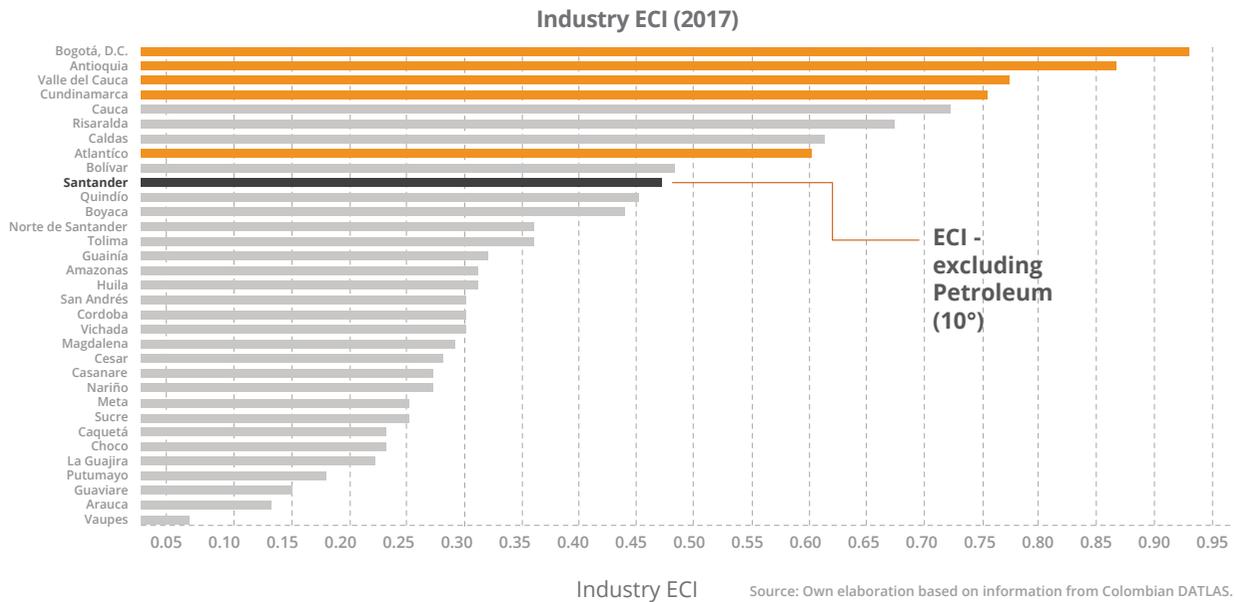


Figure 39

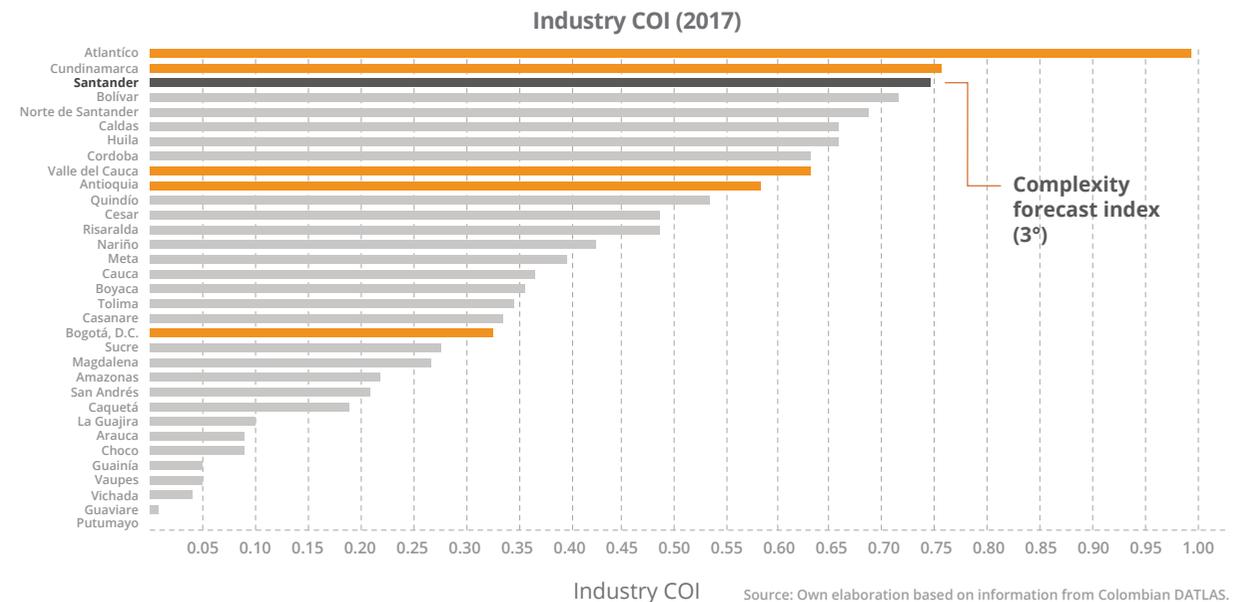
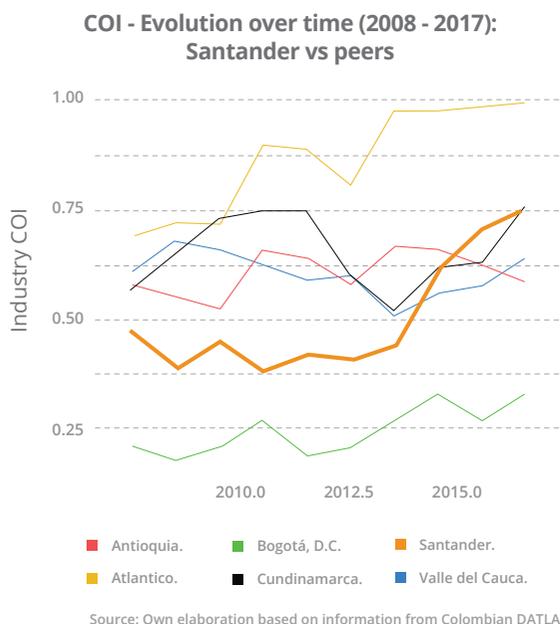


Figure 40



Movements in the industry space towards services have increased Santander's COI during the 2013 - 2017 period. Table 1 shows industries for which Santander transitioned from not having a Revealed Comparative Advantage (RCA) in 2013 to having an RCA in 2017. Of the new industries with an RCA greater than one in Santander's industry space, 63% are services related.

Figure 41

Services vs other activities that transited from RCA<1 in 2013 to RCA>1 in 2017: Santander

New services with RCA>1 in 2017 (and RCA<1 in 2013)	Others with RCA>1 in 2017 (and RCA<1 in 2013)
Renting of construction or demolition equipment with operator	Mining of other precious and semi-precious stones
Inland water transport	Manufacture of wooden containers
Rental of freight trucks with driver	Manufacture of instruments and appliances for measuring, checking,
International freight transport by road	Manufacture of builders' carpentry and joinery
Wholesale of food, except coffee threshings	Manufacture of railway and tramway locomotives and rolling stock
Activities auxiliary to insurance	Manufacture of other general purpose machinery n.e.c.
Motion picture projection	Manufacture of bicycles and invalid carriages
Medical practice activities	Manufacture of carpets and rugs
Primary education	Manufacture of other products of wood
Veterinary activities	Cutting, shaping and finishing of stone
Retail sale of all types of footwear, articles of leather and eather subst	Wholesale of machinery and equipment n.e.c.
Other supporting transport activities	Non-specialized farming of animals
Demolition and site preparation for the construction of buildings	Buiding and repairing of pleasure and sporting boats
Sewage and refuse disposal, sanitation and similar activities	Manufacture of other special purpose machinery n.e.c.
Publishing of newspapers, journals and periodicals	Manufacture of pumps, compressors, taps and valves
Scheduled intermunicipal collective passenger transport	Production, collection and distribution of electricity
Sale of motor vehicle parts and accessories	Other animal farming and production of animal products n.e.c.
Private households with employed persons	Farming of cattle
Cable transmission services	Manufacture of medical and surgical equipment and orthopedic appli
Wholesale of pharmaceutical, medical, cosmetic and toiletry products	Manufacture of brown sugar
Accounting, book-keeping and auditing activities	
Recycling of metal waste and scrap	
Adult and other education	
Retail sale of apparel and accessories (including articles of fur)	
Activities of financial cooperatives and employee funds	
Repair of household goods	
Other financial intermediation n.e.c.	
Wholesale of food, beverages and tobacco	
Wholesale of solid, liquid and gaseous fuels and related products	
Preschool education	
Activities of religious organizations	
Other business activities n.e.c	
Public order and safety activities	
Retail sale of household appliances, articles and equipment	

Source: Own elaboration based on information from Colombian DATLAS.

Table 1

With all of this, we conclude that a high industry COI relative to other Colombian departments, combined with a relatively low ECI, place Santander in a strategic position for improving its complexity (Figure 42). Santander has a set of productive capabilities that can be used to move (to diversify) to higher complexity industries that can thus boost productivity and incomes.

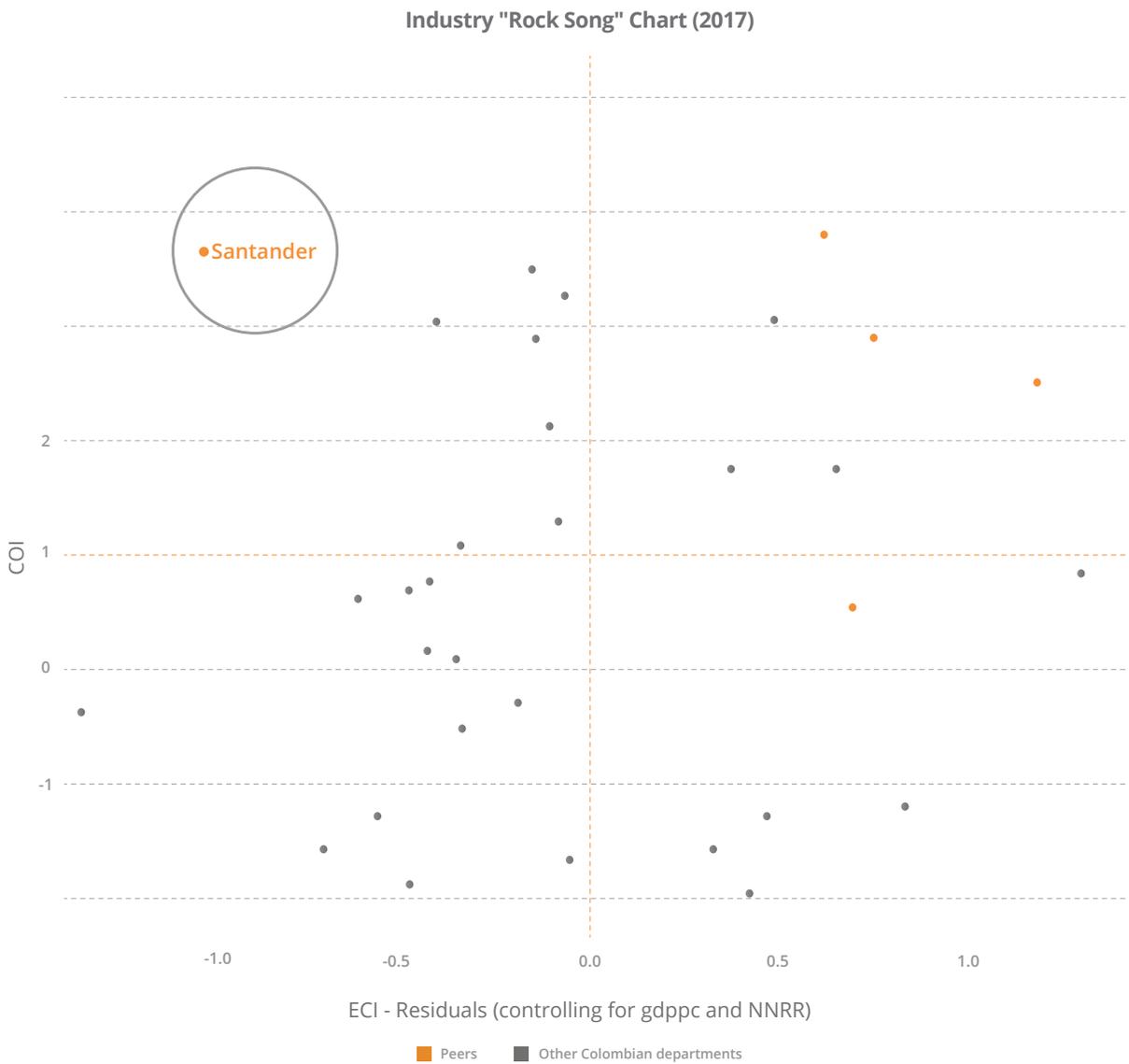


Figure 42

DIAGNOSIS:

POTENTIAL CONSTRAINTS

As we concluded from the previous section, Santander has limited opportunities to diversify to more complex products in the export product space, which constrains its development of productive capabilities and know-how, and thus its growth potential. On the other side, Santander seems to be better positioned in the industry space, although still lagging peers in ECI, but close to high complexity activities to improve it. Understanding Santander's current position and challenges allow us to better motivate this growth diagnostic analysis.

Why has Santander not been able to accumulate more productive capabilities in the product space, despite its relatively better position in the industry space? Even though it might be logical to see a delay in improvements in ECI, motivated by a high COI, what could be constraining movements in the industry space towards more complex industries?

I Finance

The first suspect we analyzed is finance in Santander. Low and expensive credit can decrease the return to investment, which can in turn represent a challenge for firm creation and growth.

Santander has a smaller financial sector relative to its economy when compared to peers (Figure 43). Financial depth in Santander is 27% of its GDP, outperformed by Valle del Cauca (43%), Atlántico (59%), Antioquia (60%), and Bogotá (72%). This might be the reason why Santander is outperformed by every peer, except for Cundinamarca, in the number of companies with access to one financial product when compared to peers.

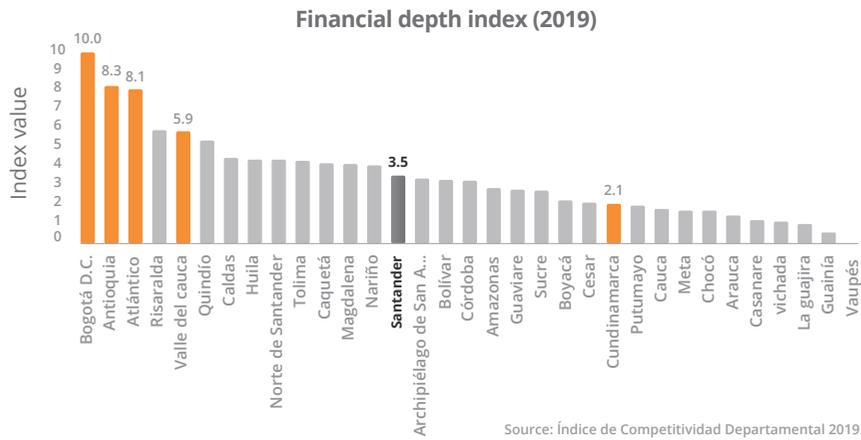
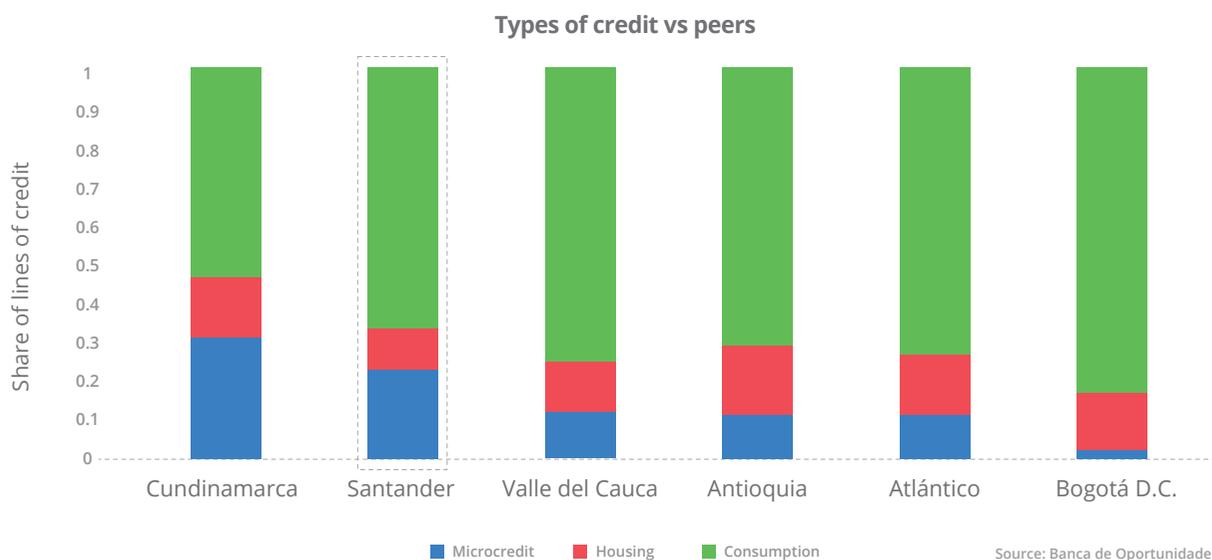


Figure 43

Santander’s credit might be relatively costly because microcredits are the most important component. Most credit in Colombia is geared towards consumption. However, 23% of Santander’s credit is in the form of microcredits (Figure 44), well above Valle del Cauca (12%), Antioquia (10%), Atlántico (10%), and Bogotá (2%). The higher credit of microloans increased the average interest rate in Santander, as the average interest rate in September 2020 in Colombia for commercial credit was 8%, while this

figure almost doubled for consumption (14.5%) and more than three folded for microcredits (36%). There are two important aspects to consider: first, the presence of a high share of microcredits might be positive because it means that lower-income households and microbusinesses have access to credit, and on the other hand, it also signals that the cost of credit has been relatively high in Santander compared to other regions.



Source: Banca de Oportunidades.

Figure 44

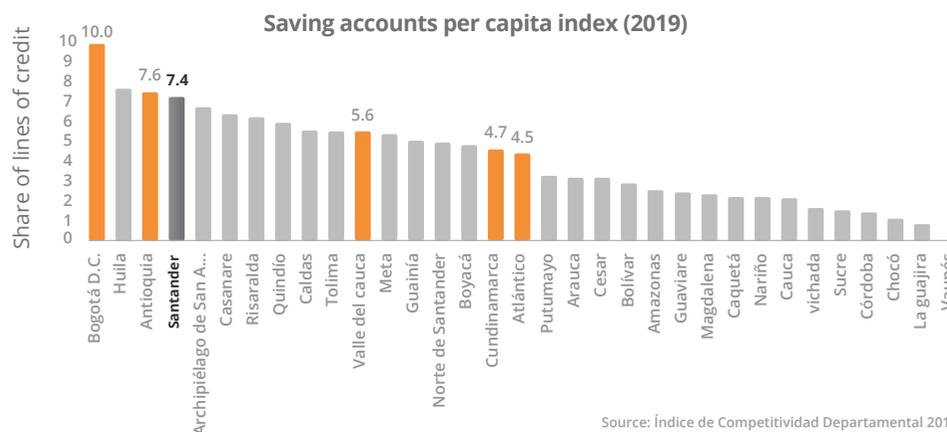


Figure 45

Santander’s bad performance in financial depth contrasts with a positive performance in access (Figure 45) and financial inclusion (Figure 46). Regarding the contact points per 10,000 inhabitants, Santander (48.48) outperforms Valle del Cauca (39.01), Antioquia (34.94), and Atlántico (31.31), although it lags behind Bogotá (72.67) and Cundinamarca (59.86).

Regarding access to saving accounts, Santander has 90 active saving accounts per 100 adults, outperforming Cundinamarca (64), Valle (72), and Atlántico (62), although it lags behind Bogotá (115) and Antioquia (92). 85% of Santander’s population holds at least one financial product, which is average compared to its peers.

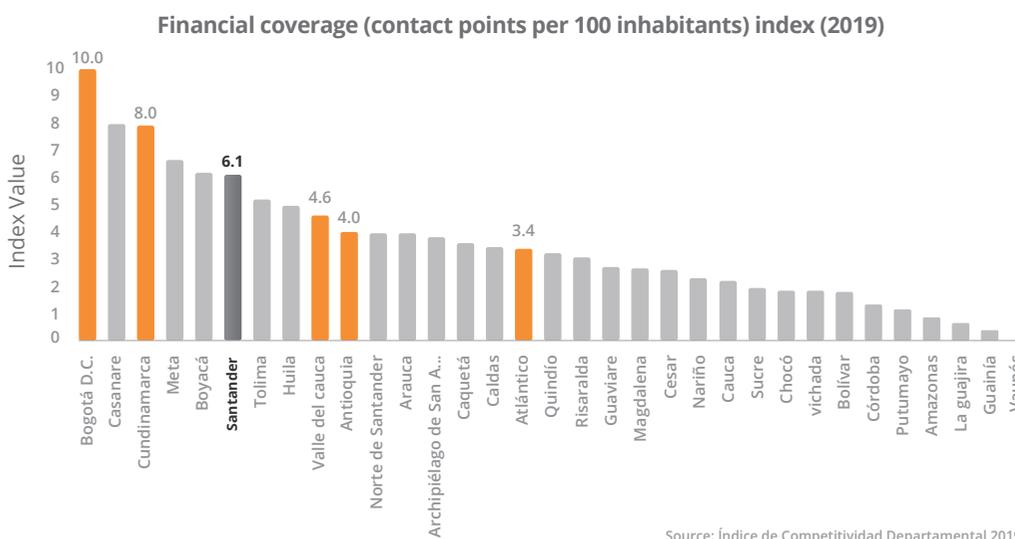


Figure 46

Even though Santander has low financial depth and a hypothesized relatively high cost of credit, we don't find enough evidence to conclude that finance is more of a constraint in Santander than elsewhere because the amount and composition of credit are endogenous to regional productivity and structure. We did not find any evidence to point that credit supply is particularly constrained in Santander. Therefore, low financial depth is a consequence of low productivity rather than a cause. Additionally, there is no evidence to conclude that firms cannot relax this constraint by accessing cheaper credit in other departments. Finally, 80% of the surveyed firms in the 2017 World Bank Enterprise Survey believe that credit is not a major challenge in Colombia. Thus, in this paper, we will focus on other factors that appear to be a larger constraint for growth in Santander.

Human Capital

Next, we examined human capital as a possible binding constraint for growth in Santander. Lack of qualified human capital can lead to firms that require many capabilities to settle elsewhere. To test whether human capital is a relevant binding constraint for Santander, we looked at quantity and quality indicators, we performed an analysis of regional returns to education, and an internal migrant's analysis.

Santander has higher schooling attainment than Colombia's average but underperforms its peers.

When measured in average years of schooling of its adult population, Santander ranks higher than the national average of Colombia (Table 2), but on the lower end of the distribution of its peers. Additionally, Santander fares better than the Colombian average but worse than its peers in the proportion of its labor force that did not finish primary school and proportion of labor force that finished secondary school. However, in the last years, Santander has been growing more than the Colombian average and catching up with its peers (Figure 47).

Education quality and quantity (2018 - 2019): Santander vs Colombia

By 2018	Colombia	Santander
Years of schooling	8.9	9.3
By 2019, as % of labor force		
Zero schooling	4%	3.2%
Literacy	96.05%	96.99%
Unfinished primary school	13.8%	14.1%
Finished secondary	53.1%	53.8%

Source: Global Data Lab and Gran Encuesta Integrada de Hogares. DANE - Colombia.

Table 2

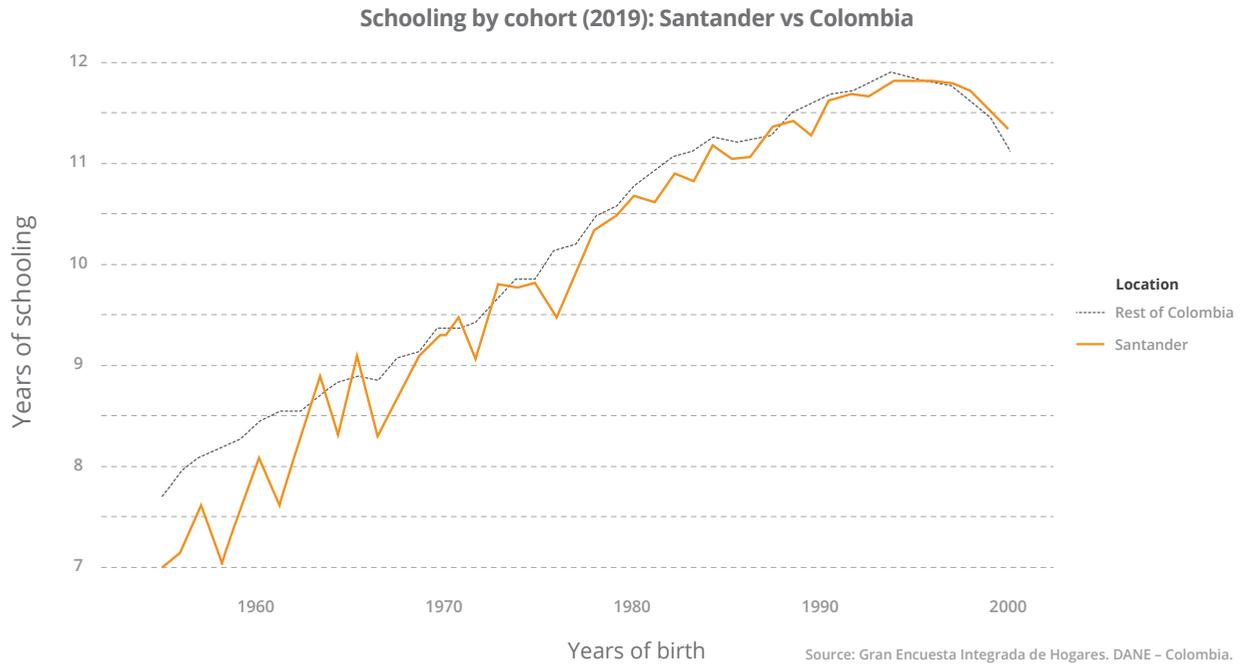


Figure 47

Santander’s quality of education is superior compared to the Colombian average and to peers. In 2019, Santander was the third-best performer in the national standardized test for graduating college students “Pruebas Saber Pro” (Figure 48), and the second-best performer in the math section of the test (Figure 49).

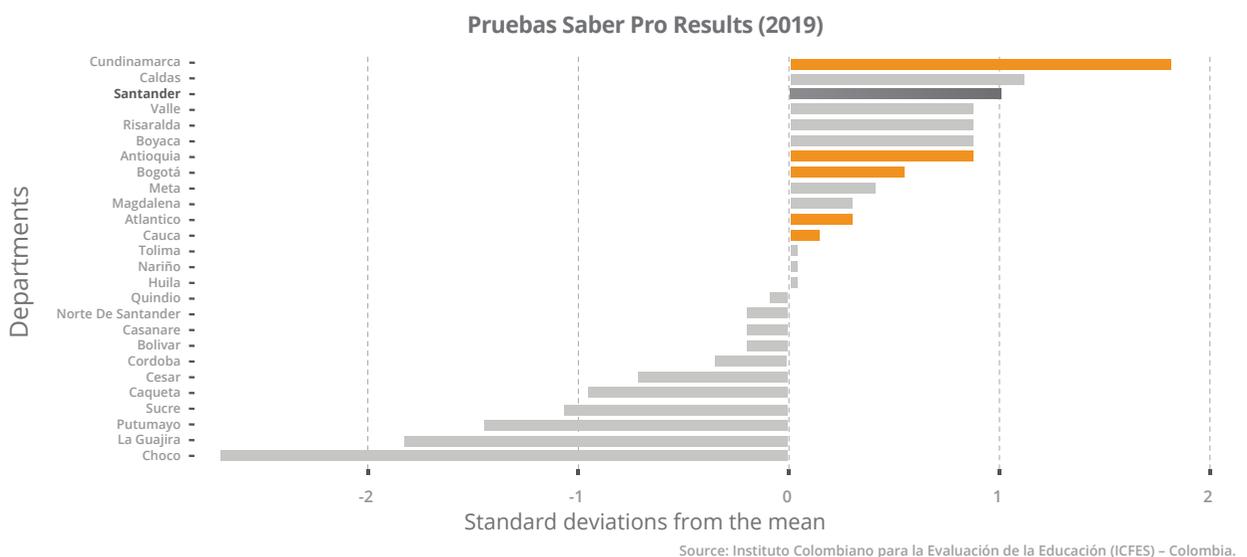
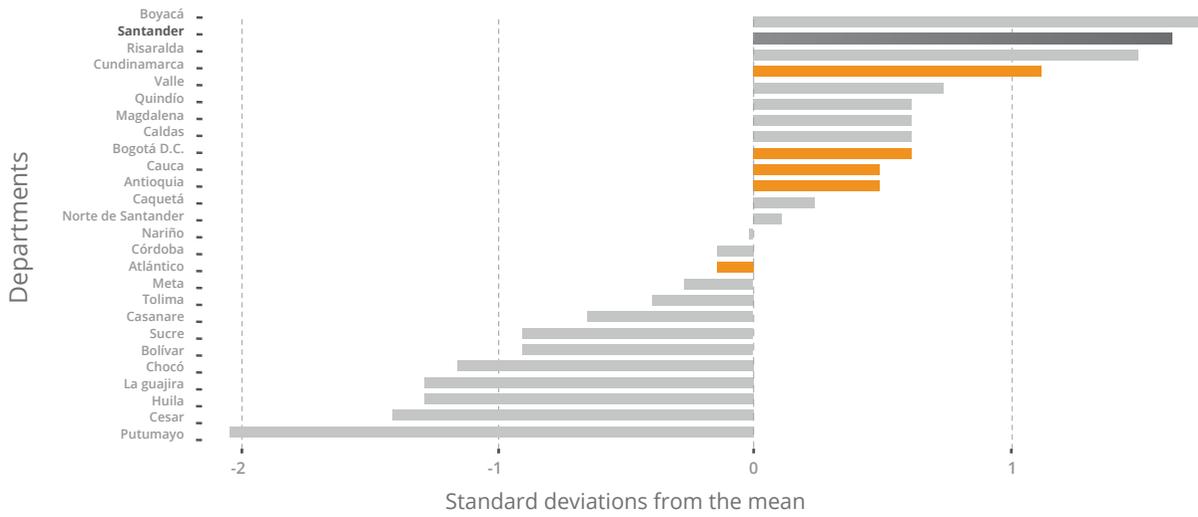


Figure 48

Pruebas Saber Pro Math Results (2019)



Source: Instituto Colombiano para la Evaluación de la Educación (ICFES) - Colombia.

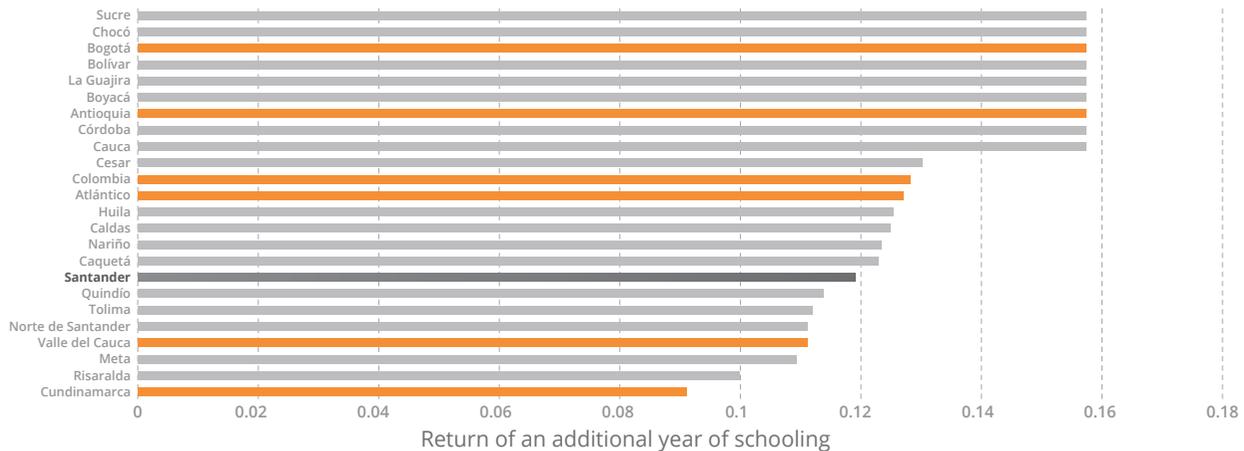
Figure 49

We performed a Mincer regression analysis using data from Colombia's 2019 Household Survey and we found that Santander's returns to education are below those of its peers and the national average, suggesting that there is no shortage of appropriately educated people in the department (Figure 50).

If returns to education were higher in

Santander, it would signal scarcity of skilled human capital. A possible hypothesis that emerged after the Mincer regression analysis is that people from Santander migrate out of the department to look for higher salaries, which would be consistent with the general consensus that many Santandereanos migrate into Bogotá for better job opportunities.

Mincer returns to years of schooling (2020)

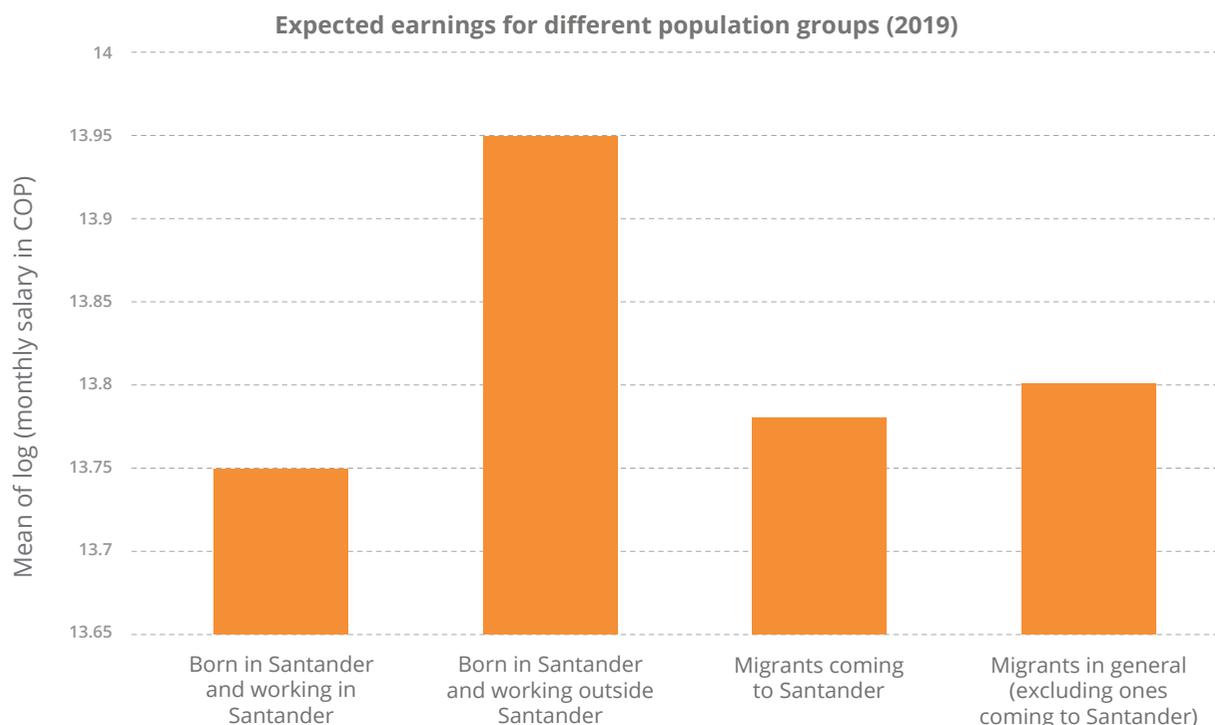


Source: Own elaboration based on information from the Gran Encuesta Integrada de Hogares. DANE - Colombia.

Figure 50

Finally, we performed an analysis that compares the average earnings of people born and working in Santander vis-a-vis people who migrated and are working in other departments, as well as migrants that currently work in Santander and the general migrant population in Colombia. People born and working in Santander earn less on average than people that are born in Santander and are working in other parts of Colombia (Figure 51). The underlying hypothesis is that if people born in Santander and working outside were earning less than people from that place or other

migrants, then we would worry about the skills of Santander’s labor force. However, we can see that the migrants that Santander sends to other departments in Colombia earn more than other migrants from other departments, which signals that the skills of the Santanderean workforce are highly valued within Colombia. Finally, another hypothesis that builds on these conclusions is that Santander’s economy is not generating enough attractive jobs to employ workers, who then decide to migrate searching for higher incomes.



Source: Own elaboration based on information from the Gran Encuesta Integrada de Hogares. DANE - Colombia.

Figure 51

Since Santander has a decreasing schooling gap, high-quality education, and no shortage of qualified people, we do not consider human capital to be a binding constraint for growth. However, further analysis regarding managerial capacities would deliver important insights for policymakers, which remains a venue for further research.

I Labor Force

From our analysis, we observe that Santander's labor market seems relatively healthy and inclusive. Out of the 2.2 million people that call Santander home, around 1.7 million are of working age, and out of that, 69% were actively working as of December 2018 (Figure 52). None of the important indicators show

large discrepancies between genders, and compared to its peers, workers in Santander seem to be satisfied with the wages they are earning. Additionally, Santander's informal labor rate is middle of the pack among its peers and doesn't appear to have more impact in Santander than in the rest of Colombia.

Labor participation rate (2006 - 2018): Santander vs peers

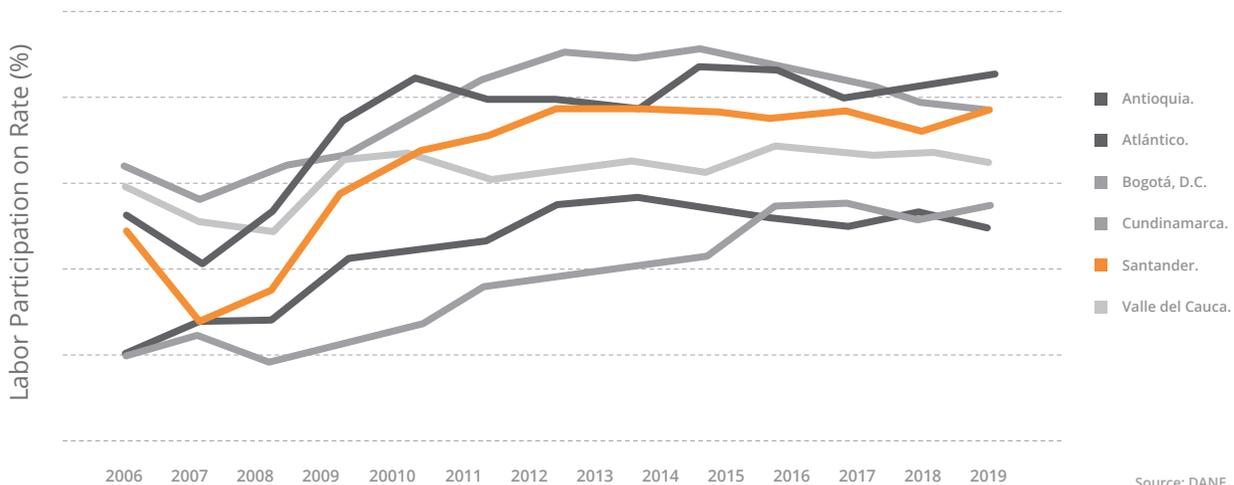
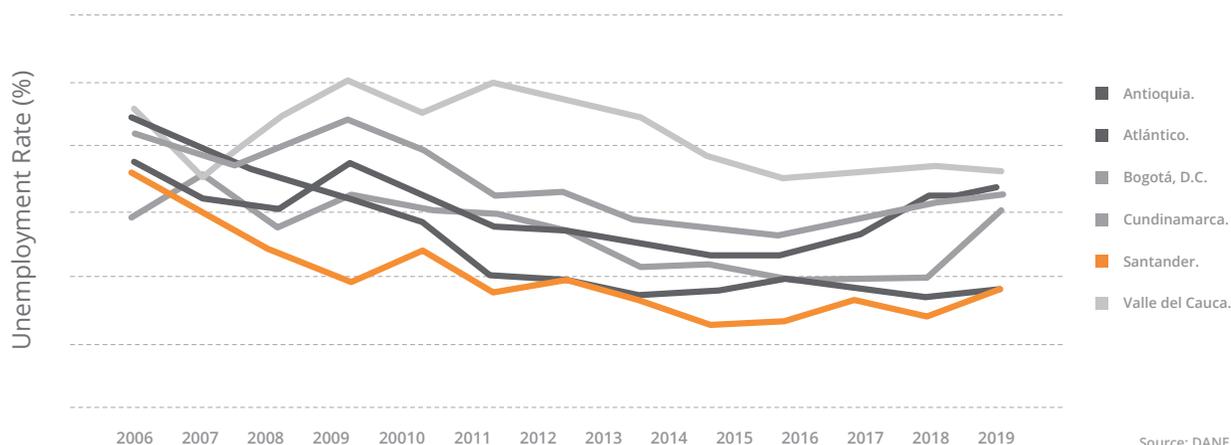


Figure 52

Unemployment in Santander (7.7%) is the lowest among its peer group and has remained consistently low throughout the last years (Figure 53). Additionally, the rate of sub-employment (17.8%) is among the lowest in the group and it is currently in a strong downward trajectory, indicating that

most workers are satisfied with the amount of work available to them. It is also important to mention that the discrepancy between the male and the female unemployment rate is 5.7pp, and it is the second-lowest among the peer group.

Unemployment rate (2006 - 2018): Santander vs peers



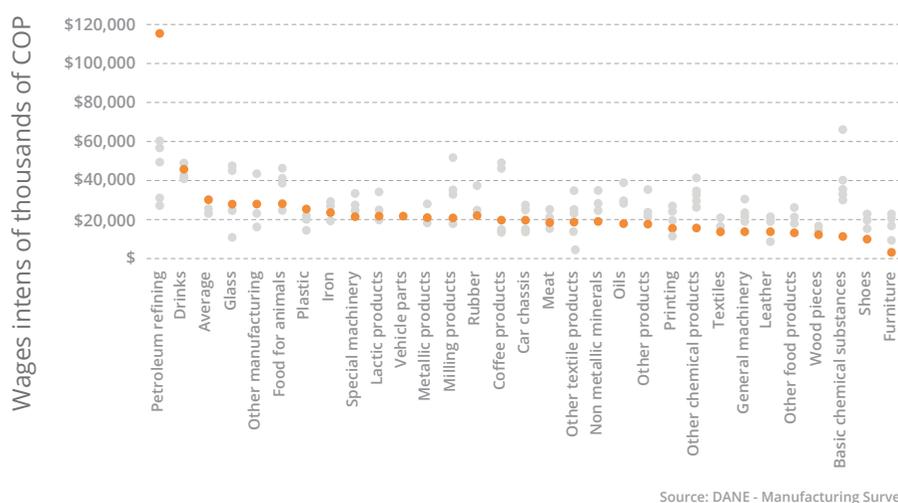
Source: DANE.

Figure 53

The majority of Santander’s workforce is concentrated in commerce, but the highest salaries are in mining and oil (Figure 54). The largest employment sectors across the economy are commerce, which employs 31% of all workers, followed by services which employs 23%, and then manufacturing with 17%. The formal sector, which encompasses 67% of all active workers, has a different distribution where the majority of workers are employed in financial

services (28%), then social services (27%), and finally commerce (15%). The wages of formal workers in mining and oil have fluctuated significantly over time, but are on average 1.7 times higher than in all other sectors. It is also interesting to point out the large gender wage gap in Santander, and the astronomical salaries paid to employees in oil refineries, which are not only high for Santander standards but high across the peer group (Figure 54).

Wages by Industry (2017): Santander vs Peers



Source: DANE - Manufacturing Survey

Figure 54

When looking at all of Colombia, the biggest two obstacles reported by firms in the 2017 Enterprise Survey are high tax rates, identified by 19.5% of firms, and the behavior of competing firms in the informal sector, identified by 21% of firms. The share of Colombian firms that report these problems is about twice as high as the share among all Latinamerican firms. These obstacles are even more pungent for small firms (5 to 19 employees), which is bad news for Santander, where 68% of all formal workers are employed by firms with less than 20 employees.

We are unsure of what drives the complaints of firms, but we have several hypotheses including high contracting costs of formal employees and an elevated effective corporate tax rate (Table 3). The first challenge is that for every dollar a firm in Colombia pays to a formal worker, they also pay 50 cents in non-wage costs. And this is exasperated by the fact that Colombia has the highest minimum wage relative to average wage among all OECD members. The second challenge formal firms face is a high effective tax rate, which at 70% of profits, is one of the ten highest rates in the world. Both of these issues increase the total operating costs of formal small businesses and hinder competition with informal ones that don't pay taxes or hire workers formally.

Obstacles faced by firms (2017)

	Colombia	Latam	All countries
Percent of firms choosing tax rates as their biggest obstacle	19.5	11.4	12.5
Small (5-19)	20	12.1	12.9
Medium (20-99)	20.9	10.2	11.5
Large (100+)	11.9	7.7	11.1
Percent of firms choosing practices of the informal sector as their biggest obstacle	21.2	12.6	11.6
Small (5-19)	24.3	13.5	12.3
Medium (20-99)	17.3	10.8	10.8
Large (100+)	13.7	12.2	9.8

Source: World Bank Enterprise Survey.

Table 3

In conclusion, we do not believe the labor force is a binding constraint for Santander.

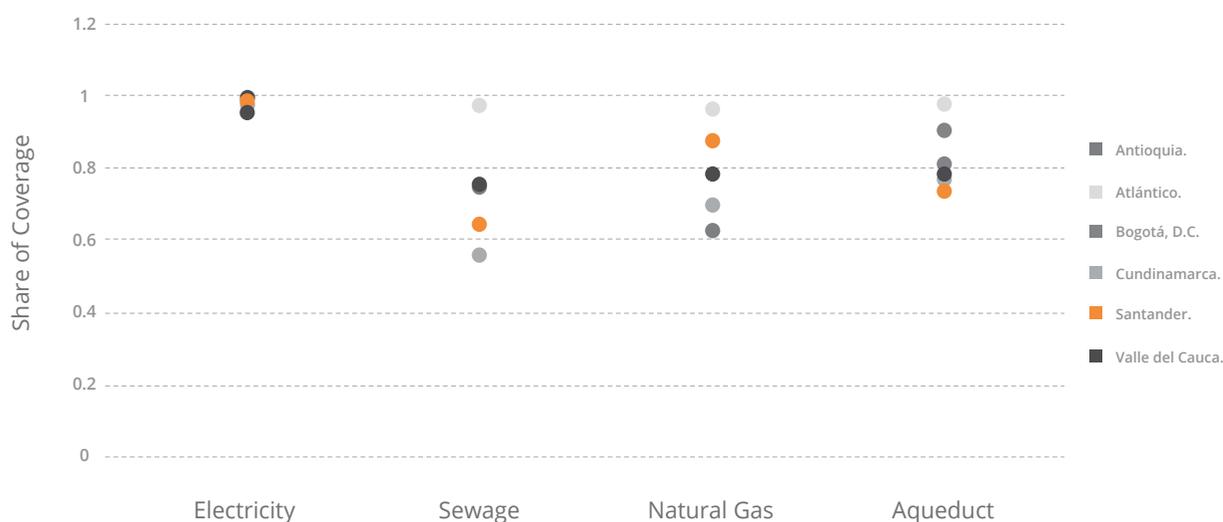
Despite identifying a source of concern in the labor market, possibly accrued to either high contracting costs of formal employees and an elevated effective corporate tax rate, we found no evidence that these variables affect Santander more than other departments in Colombia with better growth performance.

Public Services

Santander has achieved almost universal coverage in electricity and natural gas and needs additional investment in sewers and aqueducts (Figure 55).

Santander has 98.5% coverage of electricity and is relatively well-off in natural gas coverage (89%) when compared to its peers (average of 79%), only outperformed by Bogotá (96%). However, sewers, at 65% coverage, and aqueducts, at 74% coverage, require additional investment for Santander to catch up with its peers.

Coverage of public services (2019): Santander vs peers



Source: Índice de Competitividad Departamental 2019.

Figure 55

Santander has an average internet coverage rate and speed (Figure 56), and electricity cost among its peer group (Figure 57). At 497.86 COL, the kilowatt per hour for companies in Santander is cheaper than in Antioquia (511.86 COL/kwh) and Valle del Cauca (506.52 COL/kwh) and but more expensive than in Cundinamarca (486.54 COL/kwh), Atlántico (472.48 COL/kwh) and Bogotá (487.57 COL/kwh). Regarding internet coverage and speed, Santander shows an average performance when compared to its peers.

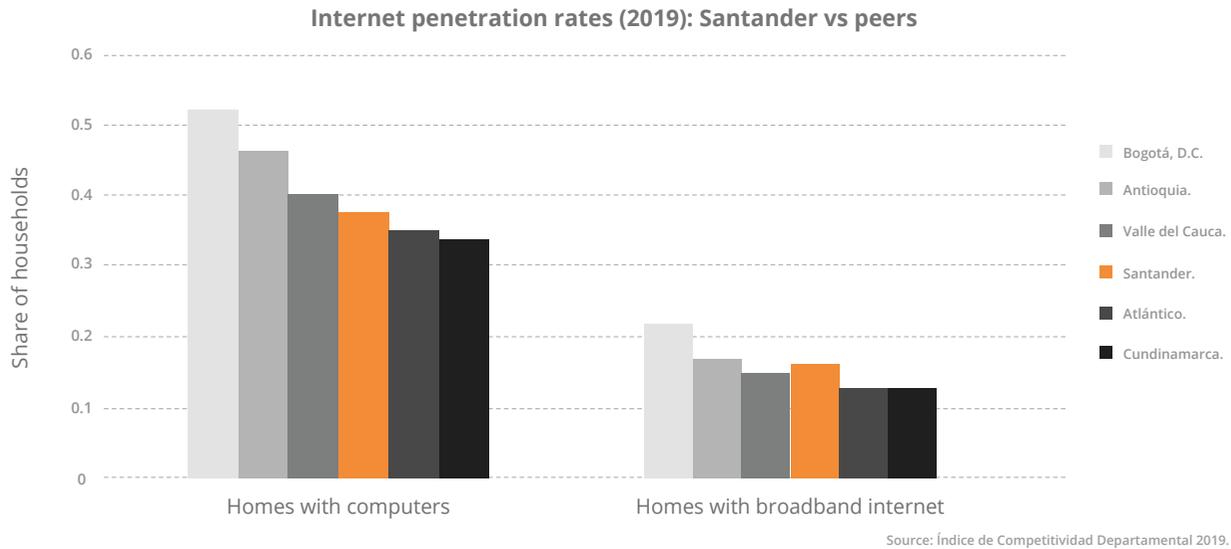


Figure 56

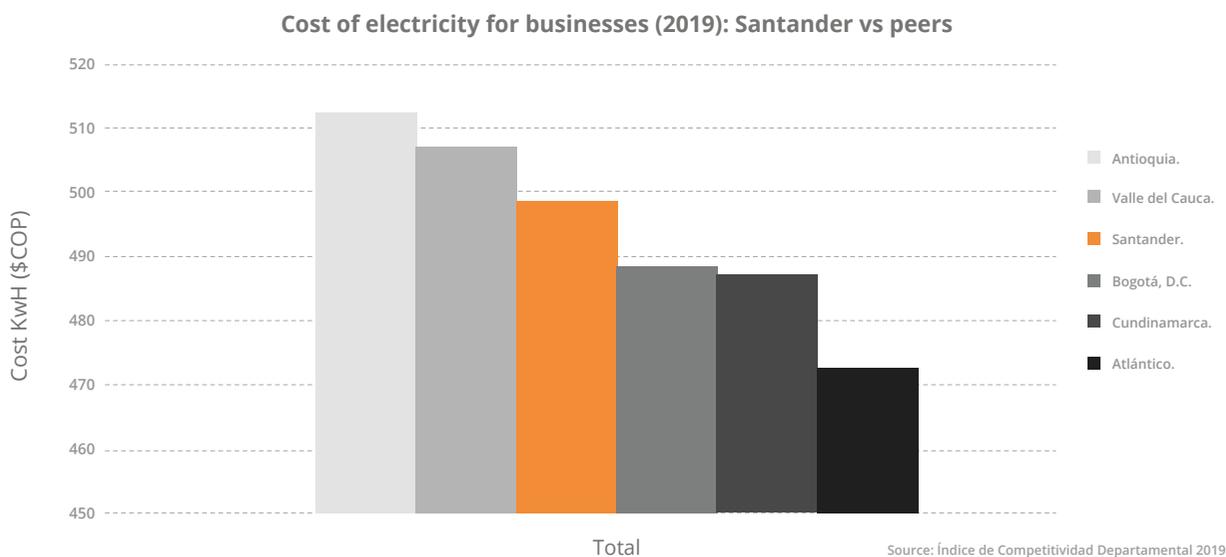


Figure 57

We didn't find any strong evidence to show that public services are a significant constraint for growth in Santander. Additionally, the evidence we gathered through semi-structured interviews in several sectors of Santander's economy suggests that the private sector does not consider public services to be a challenge for their operations.



Geography and Road Infrastructure

Santander is a landlocked and mountainous department, which complicates its connectivity to trade hubs (ports) and the flow of people and goods. Bucaramanga is in a disadvantage when compared to peers in terms of access to trade flows. When comparing distance to the nearest port, Santander lags behind its peers.

Travel times (2021): Santander vs Bogotá

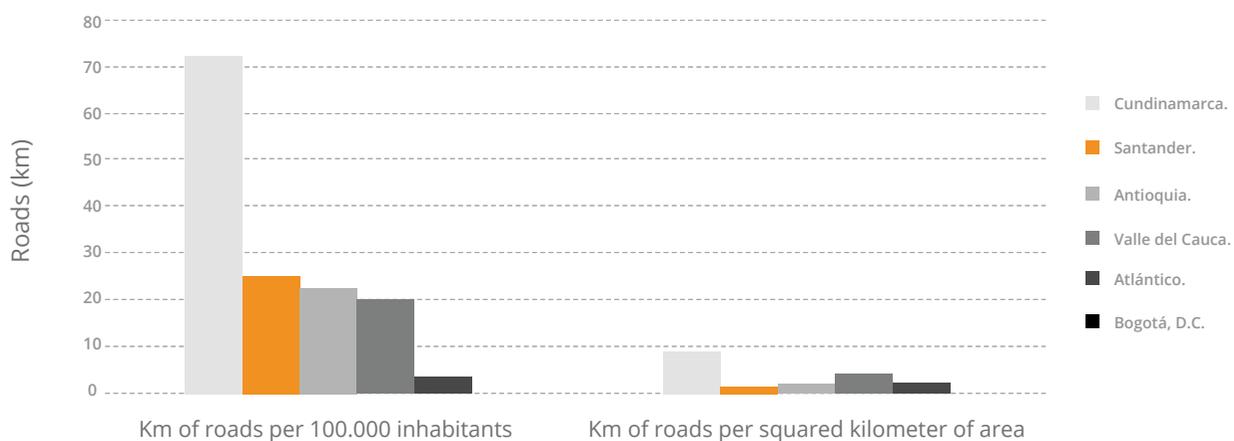
Route	Time ³
Bogotá - Buenaventura	11h 20m
Bogotá - Santa Marta	15h 54m
Bucaramanga - Santa Marta	9h 25m
Bucaramanga - Buenaventura	15h 44m

Source: Google Maps.

Table 4

Santander has an adequate amount of roads (Figure 58), but infrastructure quality is significantly below compared to peers (Figure 59). Santander is only below Cundinamarca in km of roads per 100,000 inhabitants. However, it displays a significantly lower quality in primary and secondary roads. Low quality of roads can negatively affect travel times and increase costs for activities that need to use the road network to import inputs and export products.

Road quantity (2019): Santander vs peers



Source: Índice de competitividad departamental.

Figure 58

³This estimates provide the amount of time that a car takes to perform the trip. Therefore, the estimates for the trucking fleet are even higher than those included in this figure.

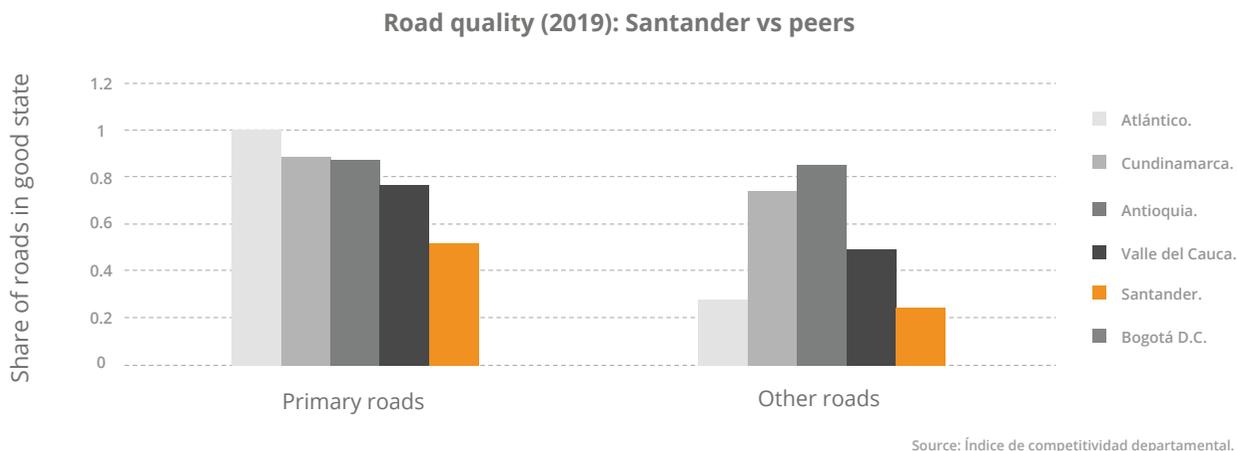


Figure 59

Santander faces high transport costs to reach a port (Figure 60), probably a consequence of its landlocked location and poor road infrastructure. These costs may be easily absorbed by a more complex economy like Bogota's, but it can hinder growth for a simpler economy like Santander's. Out of all the land shipping costs a Colombian firm has to face, 66% of them are a function of distance and travel time, and include gas, tolls, maintenance and wages (Figure 61). Considering that travel speeds in Colombia are two times slower than average US travel speeds and that Bucaramanga is 3 hours farther away from an ocean port than the capital of its peers, we can conclude that the higher costs are mainly driven by slow speed and long-distance.

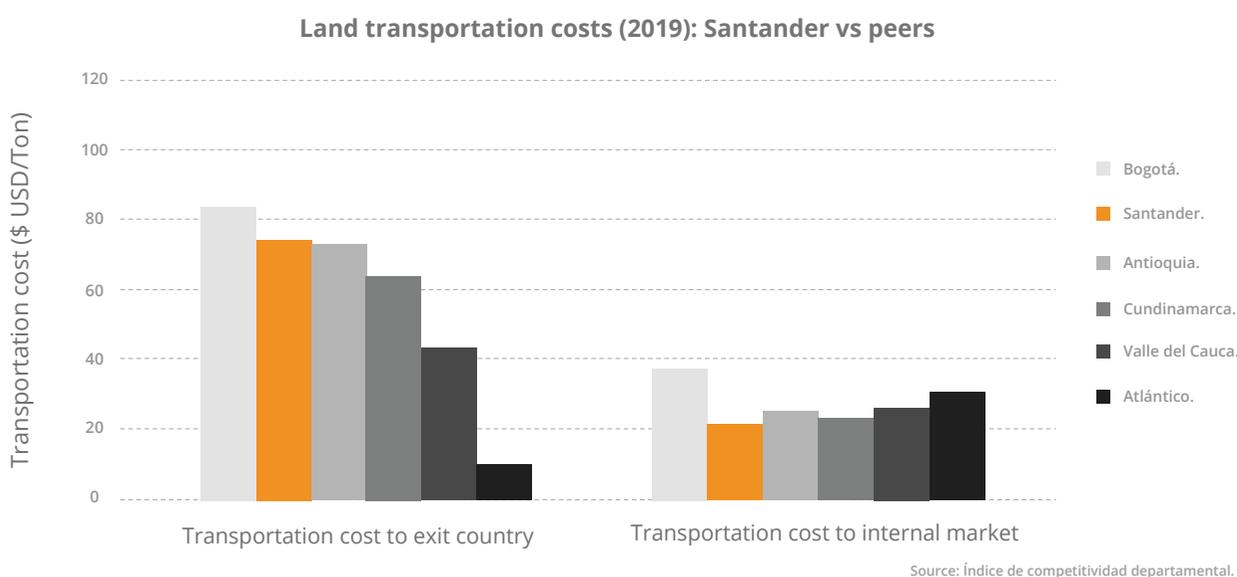
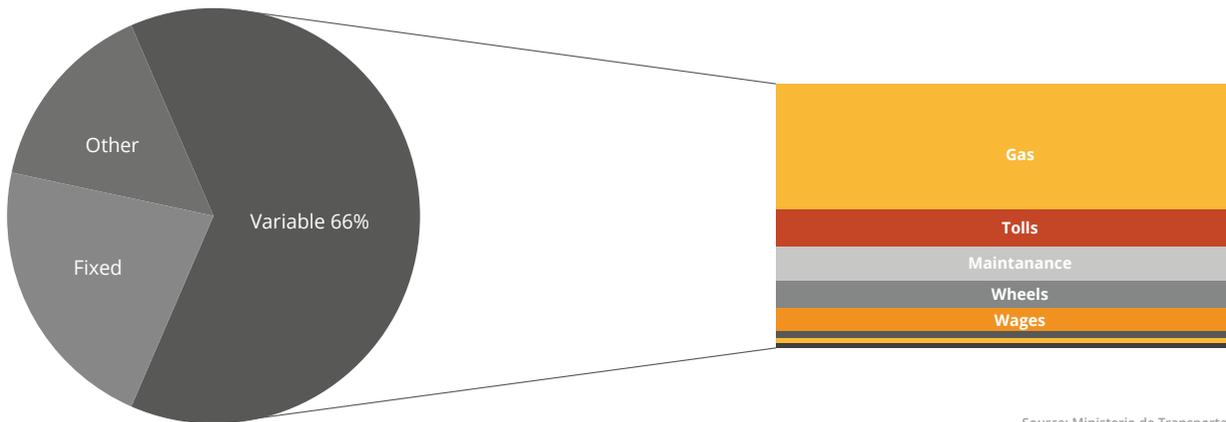


Figure 60

Land Shipping costs (2019): Colombia



Source: Ministerio de Transporte.

Figure 61

We find evidence that Santander’s export basket is not intensive in truck transportation, even more so than Colombia (Figure 62). This means businesses in Santander produce goods whose inputs are locally sourced and don’t require significant truck transportation. When we compare Colombia to other emerging markets such as Mexico, Brazil, and India, we find that Colombia’s export basket is not intensive in truck transport. Moreover, within Colombia, Santander is even less intensive in truck transport and well below the Colombian average. This is a sign that truck transportation and infrastructure might be limiting the growth of certain sectors and the production of certain goods.

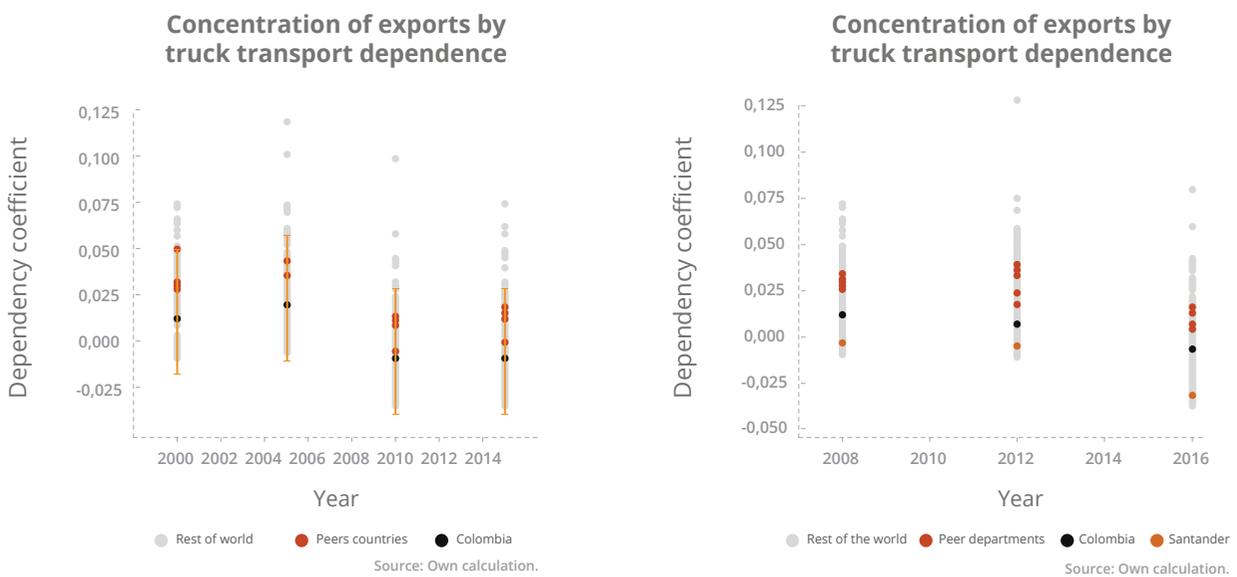


Figure 62

Santander’s exports have thrived in sectors that are not infrastructure intensive (Figure 63). This means that the economic activities that do not face this constraint have outperformed those that do face it. Santander ranks 5th in service exports per capita, ranks 17th in non-oil

exports, and has outperformed every peer regarding growth in services exports. This dynamic behavior in sectors that are not intensive in road transportation is exactly what we would expect if infrastructure was a binding constraint.

Normalized growth of service exports (2014 - 2019): Santander vs Peers

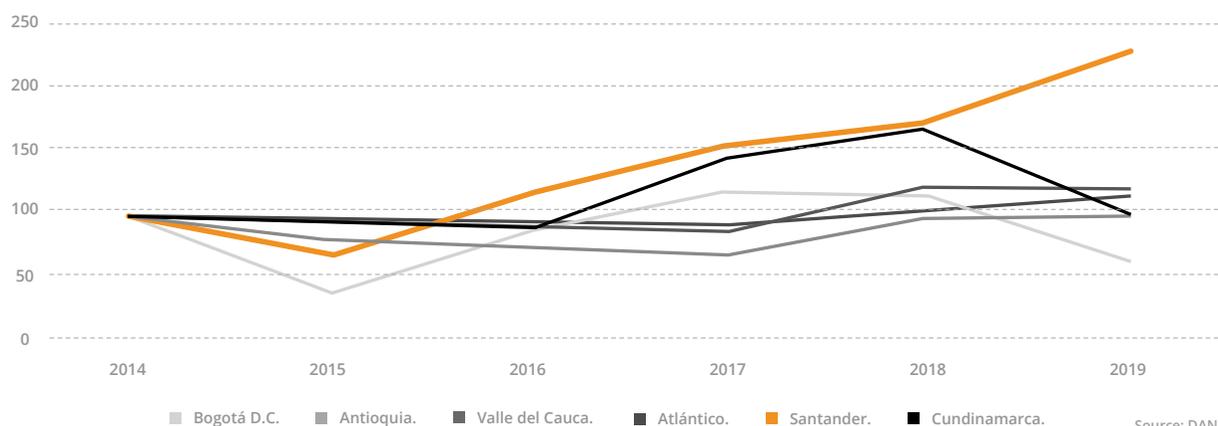


Figure 63

We learned from interviews that the companies that successfully export have succeeded in Santander by overcoming the infrastructure constraint. One such example is Orange Exports, one of the 13 agroindustry packing plants in Santander, and the only plant that exports year-round. Orange Exports has overcome the large transportation costs by adding value to the agro-products they export through the certification of their suppliers’ sustainable and organic farms. To guarantee export-quality, Orange Exports oversees the production process up until one year before the farm can sell its products. Through ensuring a position in higher added-value markets, Orange Exports bypasses the infrastructure constraint. However, if it was easy to overcome the challenge then we would see multiple agroindustry packing plants

successfully exporting from Santander, which is not the case.

We conclude that high transportation costs, driven by poor road infrastructure and geographic location, are limiting the growth of Santander’s non-oil sector by constraining its export capacity and increasing the cost of importing required production inputs. Geography and road infrastructure fulfills the three tests for a constraint: i) The cost to move goods in and out of Santander are higher than for other peers, ii) business activity in Santander has displaced itself to industries and products that don’t require roads, iii) the successful companies in the department have all found ways to overcome the high transportation costs.



Coordination

I Coordination

In this section, we examine if Santander is suffering from market coordination and self-discovery failures that prevent movement towards more complex activities that can drive growth. As we have documented in the previous sections, Santander's export capacity is limited (exports vanish when we exclude oil), and it is lagging its peers in terms of productive capabilities; both in the product and the industry space analysis.

Coordination and Self Discovery Explained

Coordination refers to the alignment of needed inputs and the capacity to produce a good or provide a service.

Imagine an investor who knows that a certain new activity could be produced with a comparative advantage in Santander. To materialize that investment and be able to export, she will face obstacles related to the availability of complementary inputs, such as transportation, logistics, phytosanitary standards, marketing, and distribution. While she will not be able to sort out all these obstacles by herself, coordination among different investors, or between investors and state actors might facilitate the emergence of these inputs for the new activity to thrive. This is the context in which coordination failures arise. One way to identify whether there are coordination failures is when significant state involvement is required for the emergence of new industries.

Self-discovery costs refer to the costs associated with testing whether one can produce a new good or provide a new service with the resources and capacities of an economy that currently doesn't produce the good or service.

Now, imagine an investor facing many new projects that could be potentially undertaken. These projects involve resources, but also time and effort to adapt best-practice technologies to the local context. Some of the projects will succeed and some will fail. If it fails, the cost will be paid by the investor alone, while if he succeeds, the investor will reap the benefits for a short time, as new entrants might come into the new profitable activity. Thus, the first investor will bear the cost and share the benefits, if successful. Put in economic terms, the private benefit of exploring new potentially non-traditional (non-oil in this case) profitable activities is lower than the social benefit. Thus, these exploration activities will be underprovided, and we will see lower than optimal levels of experimentation and discovery.

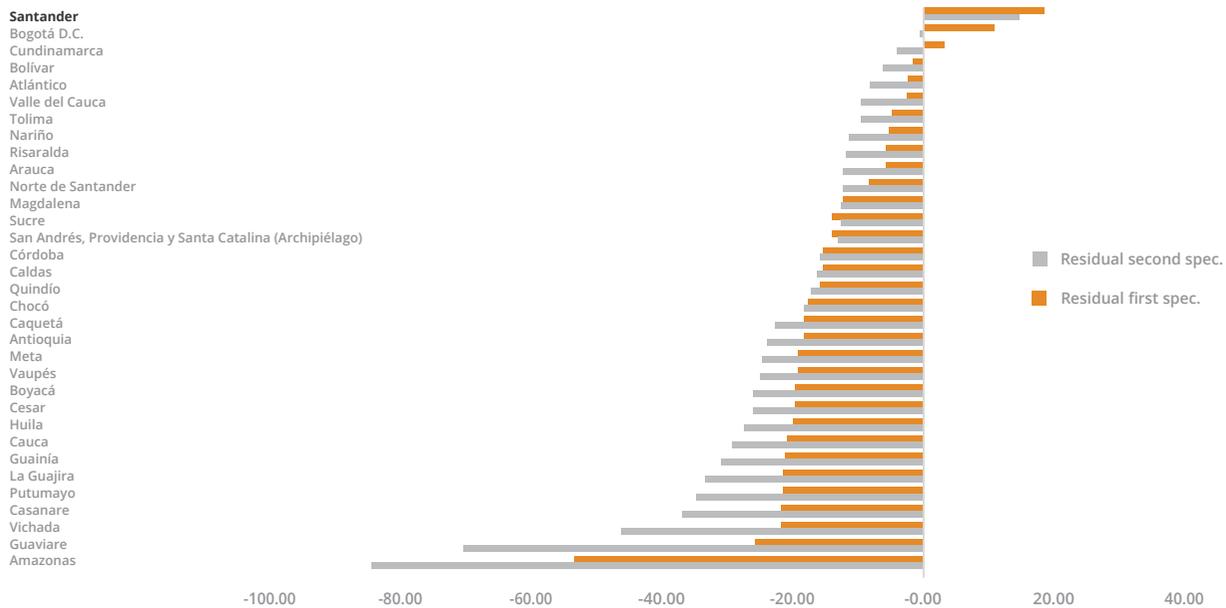
Evidence

As a first step towards understanding if Santander is experiencing the failures described above, it is interesting to test whether Santander’s monkeys (firms or investors) are jumping (or discovering) new productive activities that they can competitively export or produce. To do this, we regressed a metric of the number of products added to the export basket of the department as a function of the department’s earlier position in the product space (ECI and COI in the baseline year, 2008)³. This specification allows us to assess whether Santander has discovered more or fewer products than its peers and other Colombian regions by looking at the residual of the regression. As for the dependent variable, we tried two different alternatives; first, we considered a new product as one that was added between 2008 and 2017 when

its Revealed Comparative Advantage (RCA) went from 0 (RCA smaller than 1) to 1 (RCA equal or bigger than 1), and second, when its RCA went from 0 to more than 0.75 (a less exigent definition for revealed comparative advantage). As expected, both baseline ECI and baseline COI are positively associated with the number of products added in time.

Santander is adding more products than expected for its baseline ECI and COI levels, and over-performing in terms of monkeys jumping to new trees, as seen in the positive sign of the residuals in both first and second specifications in Figure 64. This result is consistent with what we can see in Figures 65 and 66, as Santander performs as expected in terms of number of added products for its ECI level in the baseline year 2008 and performs better than expected for its COI level in the baseline year 2008.

Residuals from regressing new products added on baseline ECI and COI (2008 - 2017)



Source: Own elaboration based on information from Colombian DATLAS.

Figure 64

³Number_jumps_{i, y+10}= b0 + b1*ECI_{i, y} + b2*COI_{i, y} + u_i

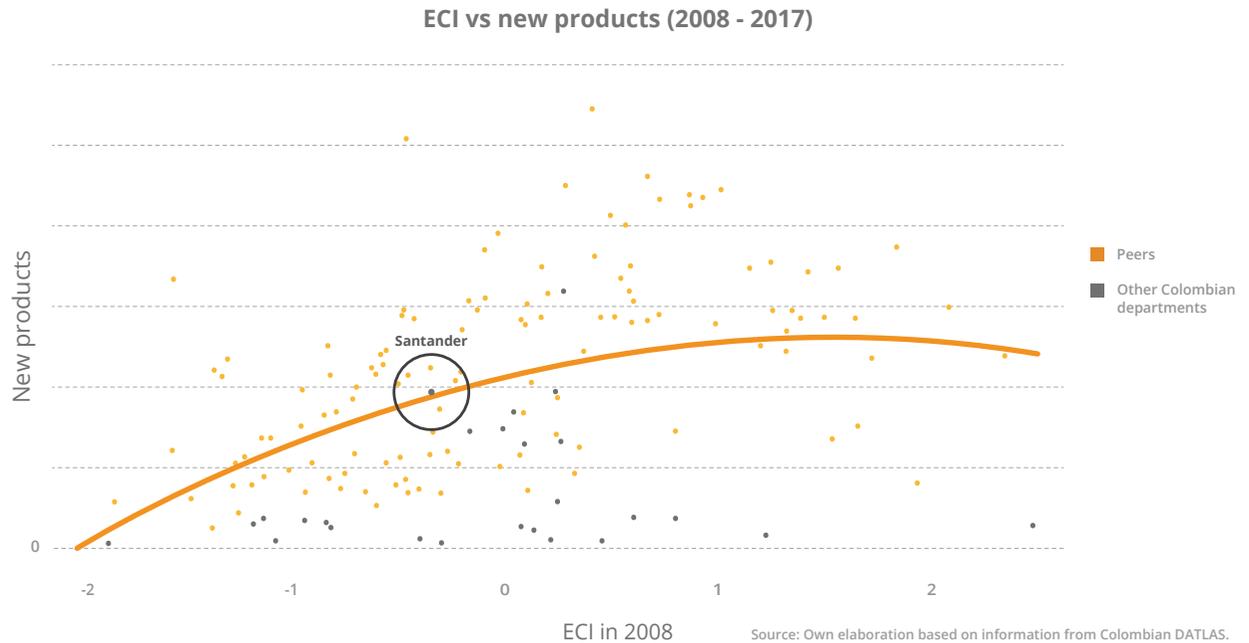


Figure 65

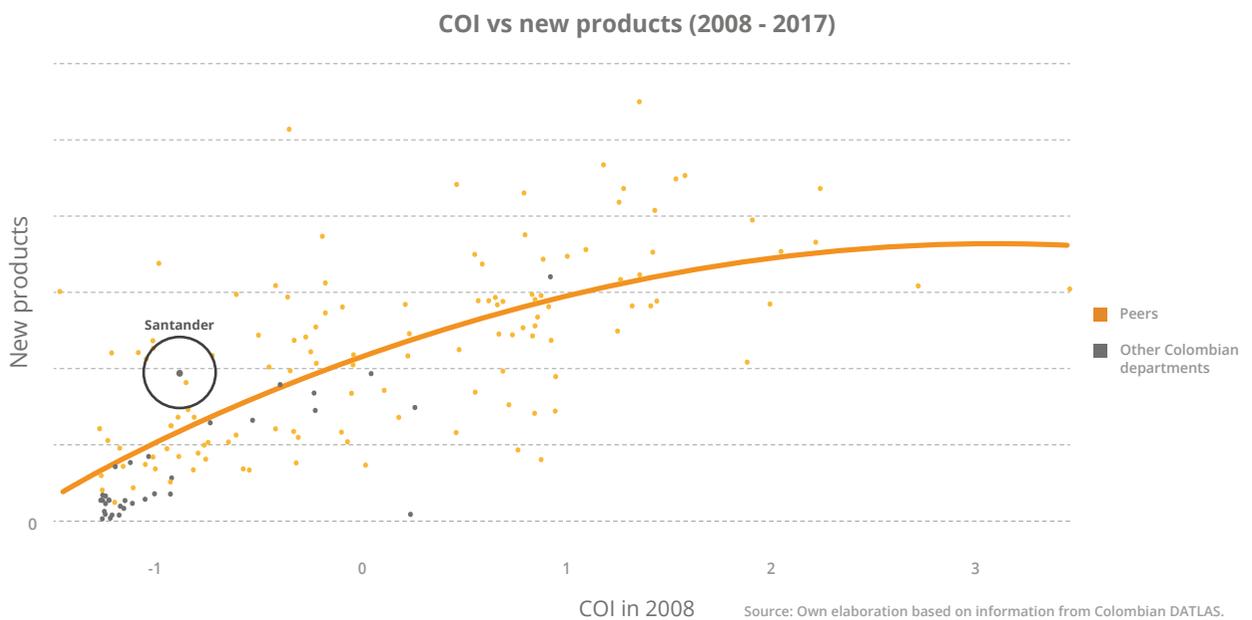


Figure 66

When replicating the same exercise in the industry space, Figure 67 shows that one can reach a similar conclusion; Santander’s monkeys have jumped (discovered new industries) more than one would expect when considering its baseline ECI and COI. These results are consistent with what we can see in Figures 68 and 69, as Santander shows, for both product and industry space, a higher-than-expected number of new products/activities, considering ECI and COI levels for the baseline year 2008.

Residuals from regressing new activities added on baseline industry ECI and COI (2008 - 2017)

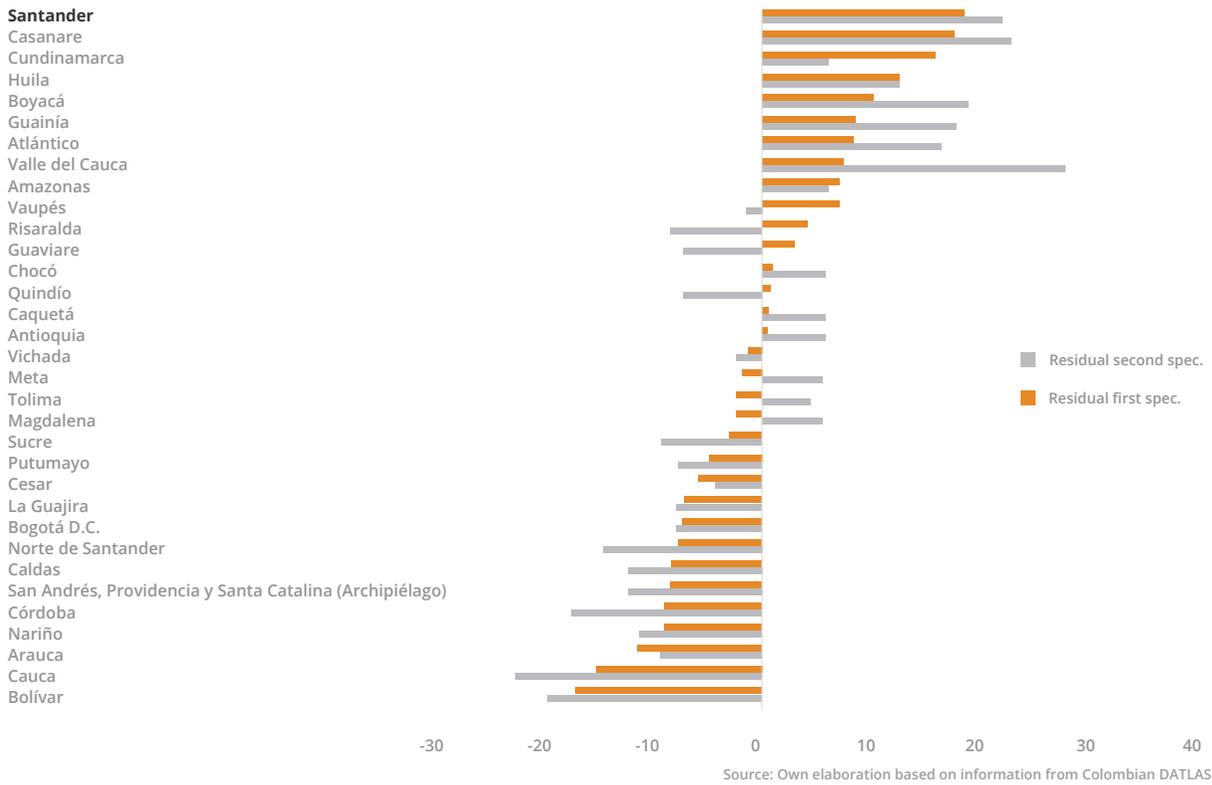


Figure 67

Industry baseline ECI vs new industries (2008 - 2017)

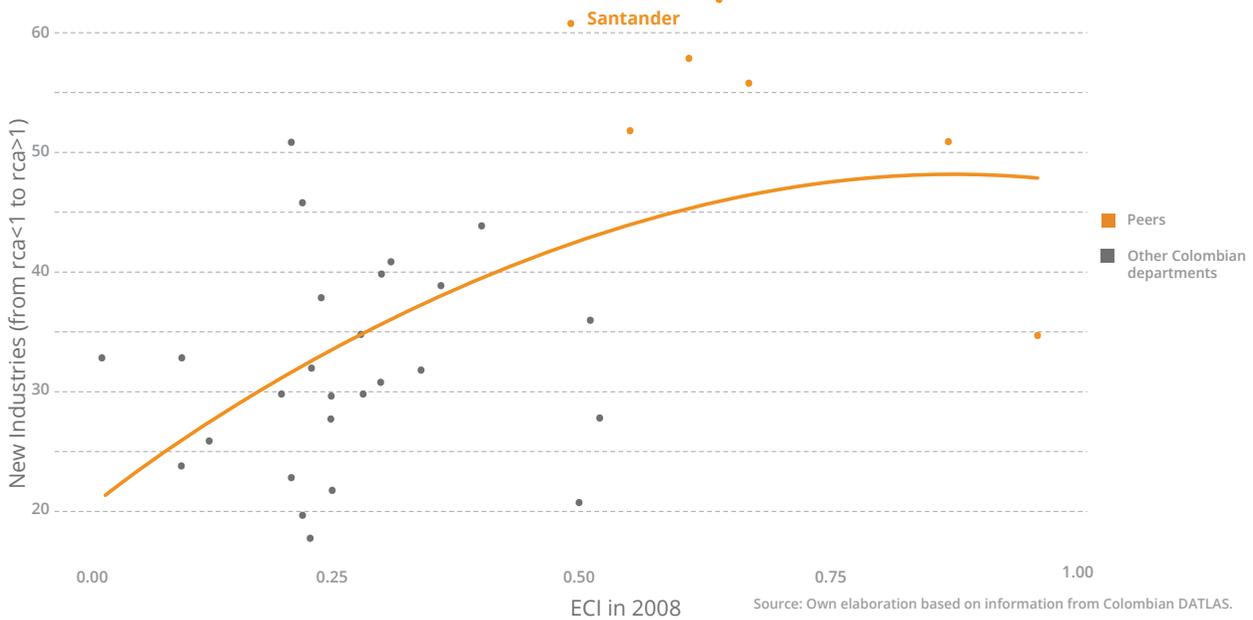


Figure 68

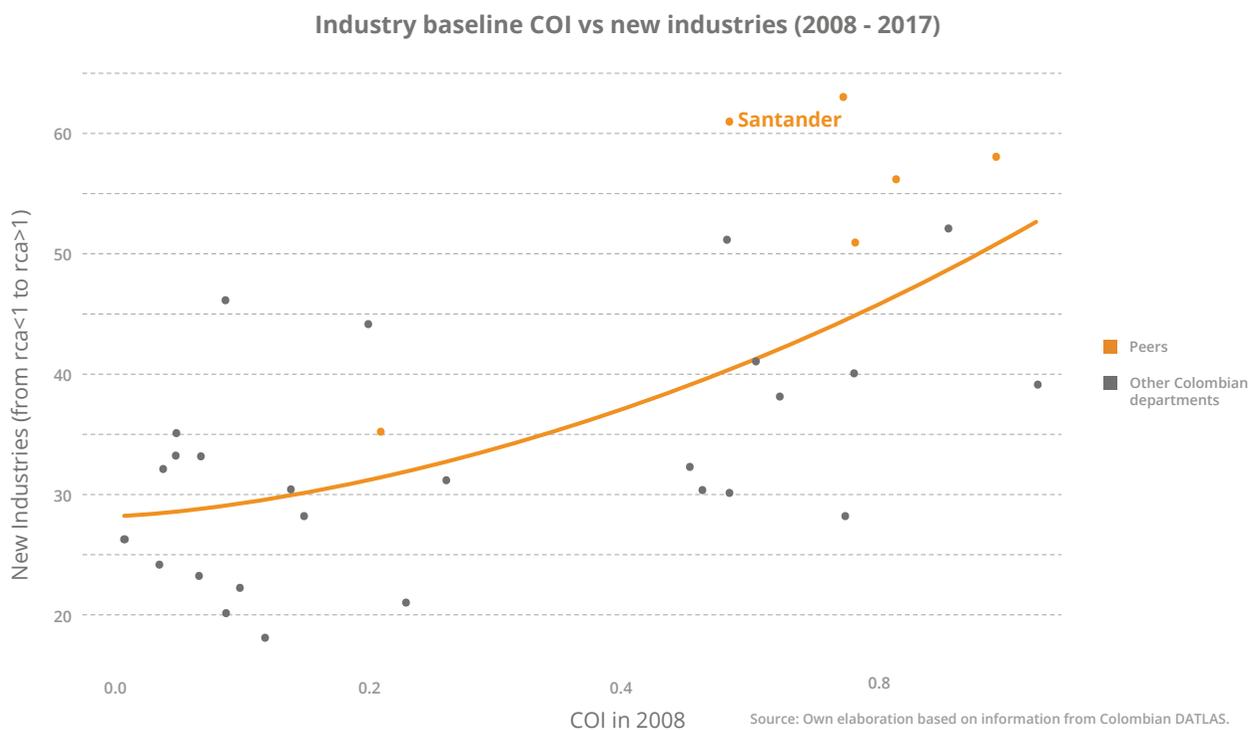


Figure 69

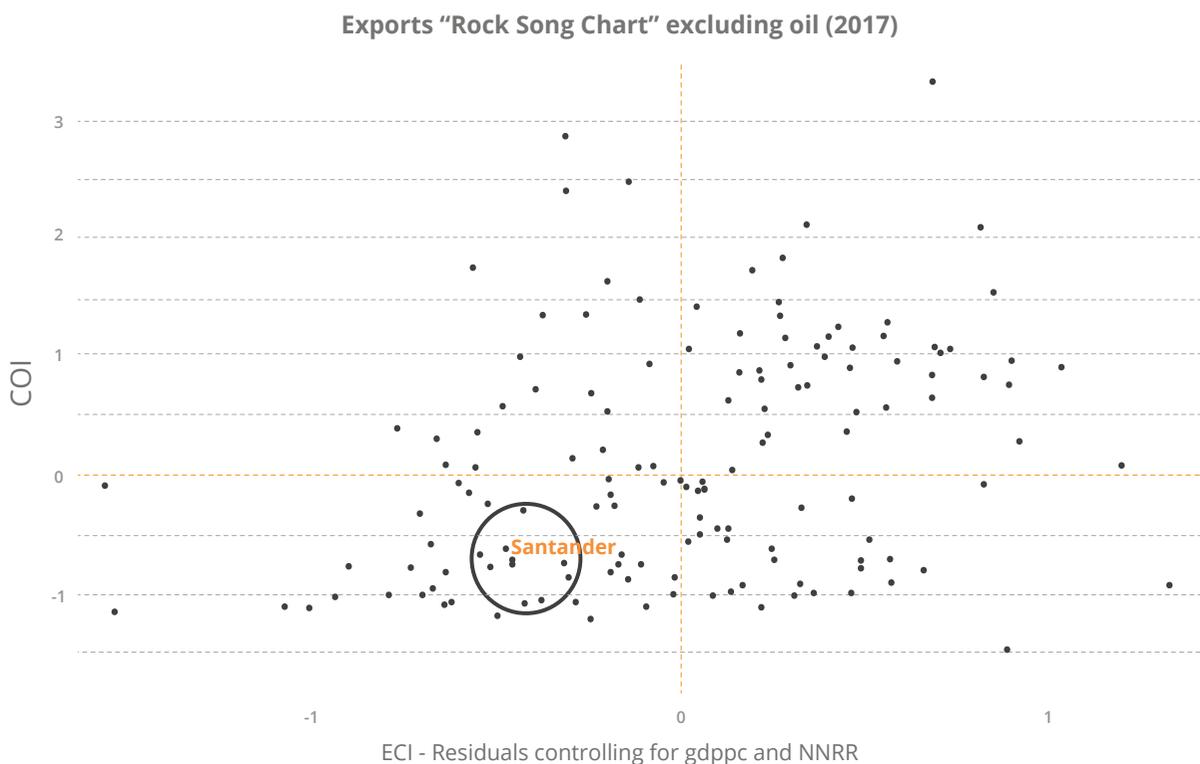
In a similar exercise, we found no evidence of Santander being particularly bad at making jumps in general, regardless of the density to the product in baseline (closeness to the product), or at making jumps conditional on the density of the product. The exercise tested if Santander depends more or less on new trees being closer than other Colombian departments. We regressed a dichotomous variable that takes a 1 value if in the period 2008-2017 product i in region j went from zero RCA to being competitively exported (with RCA higher than 1) on the following explanatory variables⁴; density⁵ for the product i in region j in the baseline year 2008, RCA for product i in region j in the baseline year 2008, region for region or department j that takes a value of 1 for each department and the interaction between variables region and density for product i in region j .

Summarizing, we have shown that Santander’s problems have more to do with the lack of nearby trees and not so much with lazy monkeys. One way to interpret these results is to take the jumpiness in Santander’s monkeys as showing that the problem is not in the monkeys (firms or investors), but rather in the absence of nearby trees to jump to. Given that there is not an evident problem with the discovery process of firms in Santander, and that Santander remains at the periphery of the product space, limited mainly by its position (low ECI, low COI), we will argue that the main challenge is rather within the positioning in the product space, which requires strong coordination to make long jumps.

To increase its economic complexity and further stimulate growth, Santander needs to make long jumps into more complex products, a challenge that requires a coordinated effort that involves public and private stakeholders.

Figure 70 shows that Santander is in a “strategic bets” position, in which it needs to make long jumps to far away products if it wants to increase its economic complexity. This happens because it is in a peripheral position in the product space, in which there

are no complex products nearby. Table 5 shows that nearby products are, in general, of low product complexity (PCI), which suggests that Santander will not easily increase its economic complexity if it keeps jumping to nearby products (short jumps). Table 6 shows that the products Santander has added in the 2008-2017 period are, on average, not improving its average PCI (average PCI of newly added products is -0.075, and average PCI in 2008 was -0.240).



Source: Own elaboration based on information from Colombian DATLAS.

Figure 70

⁵ $jump_{ij} = f(density_{ij}, rca_{ij}, dpto_j, dpto_i * density_{ij})$

⁶ Density refers to how close a country's current capabilities are from a certain product that it is currently not making/ competitively exporting (how close are my monkeys from that empty tree). Mathematically, it is calculated by adding the proximities between a country's competitively exported products ($RCA \geq 1$) and a specific other product and dividing that by the sum of proximities between all products in the product space and the same specific other product.

PCI of 20 closest products (2017): Santander

Product name	Section	PCI (2017)
Vegetables, n.e.s. in chapter 07; fresh or chilled	Agriculture	-1.45
Fruit, nuts and other edible parts of plants; prepared or preserved in ways n.e.s., whether or not containing added sugar or other sweetening matter or spirit, not elsewhere	Agriculture	-1.60
Blouses, shirts and shirt-blouses; women's or girls', knitted or crocheted	Textiles	-1.60
Molasses; resulting from the extraction or refining of sugar	Agriculture	-1.60
Ambergris, castoreum, civet and musk; cantharides; bile, dried or not glands, other animal products used in preparation of pharmaceutical products, fresh chilled, frozen or	Agriculture	-1.61
Suits, ensembles, jackets, blazers, trousers, bib and brace overalls, breeches and shorts (other than swimwear); men's or boys' (not knitted or crocheted)	Textiles	-1.62
Soap; organic surface-active products and preparations for use as soap, in the form of bars, cakes, moulded pieces or shapes, containing soap or not; paper, wadding, felt and	Chemicals	-1.65
Fruit, fresh; n.e.s. in chapter 8	Agriculture	-1.86
T-shirts, singlets and other vests; knitted or crocheted	Textiles	-1.94
Suits, ensembles, jackets, dresses, skirts, divided skirts, trousers, bib and brace overalls, breeches and shorts (not swimwear), women's or girls', knitted or crocheted	Textiles	-2.02
Sheep or lamb skin leather, without wool on, excluding leather of heading no. 4108 or	Agriculture	-2.09
Plants and parts of plants (including seeds and fruits), used primarily in perfumery, pharmacy; for insecticidal, fungicidal or similar purposes, fresh or dried, whether or not	Agriculture	-2.34
Sacks and bags, of a kind used for the packing of goods	Textiles	-2.36
Crustaceans, in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or boiling in water, chilled or not, frozen, dried,	Agriculture	-2.58
Oil seeds and oleaginous fruits, others n.e.s. in chapter 12; whether or not broken	Agriculture	-2.59
Bananas, including plantains; fresh or dried	Agriculture	-2.66
Raw hides and skins n.e.s in headings no. 4101, 4102; fresh, salted, dried, pickled or otherwise preserved, not further prepared, whether or not dehaired or split	Agriculture	-2.66
Palm oil and its fractions; whether or not refined, but not chemically modified	Agriculture	-2.99
Gold (including gold plated with platinum) unwrought or in semi-manufactured forms, or	Stone	-3.13
Manioc, arrowroot, salep, Jerusalem artichokes, sweet potatoes and similar roots and tubers with high starch or inulin content; fresh or fried, whether or not sliced or in the	Agriculture	-3.81

Source: Own elaboration based on information from Colombian DATLAS.

Table 5

Average PCI in 2008 vs average PCI of newly added products (2008 - 2017): Santander

Average PCI in 2008	Average PCI of the newly added products (2008-2017)
-0.240	-0.075

Source: Own elaboration based on information from Colombian DATLAS.

Table 6

New efforts to coordinate Santander's economy are emerging, but they are still in early stages and require more time to show results.

Some of the most important efforts include the Chamber of Commerce of Bucaramanga's cluster strategy which was launched in 2012, but only picked up steam in 2014, as well as strategies and organizations that promote exports, Foreign Direct Investment (FDI), and increase the department's competitiveness that has emerged in the last

10 years. Additionally, in the last years, 50 of the largest companies created Prosantander, an NGO to promote the development of Santander, and Alianza Santander, a space to align all senators and national representatives from Santander among a shared agenda.

However, coordination struggles are apparent and signs of deeper problems.

As an important business owner in Santander mentioned to us off the record, "Those who could help coordinate our development are not coordinating between themselves. There is a leadership competition going on." Santander has had a particular struggle coordinating public sector stakeholders and aligning them towards a shared objective.

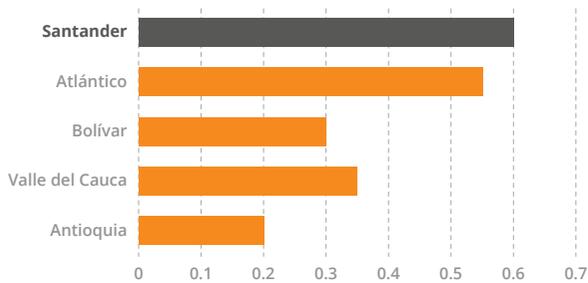
There are several key examples of coordination failures in Santander.

One example is the failure of government and private sector leaders to finish the needed infrastructure projects to fully leverage the existing port on the Magdalena (Colombia’s most important river) and reduce transportation costs. Another casualty of the lack of coordination is the small chemical industry in Santander, which represents less than 5% of the department’s manufacturing added value, and has failed to grow even though it has a comparative advantage offered by the nearby oil refinery. This is probably due to misaligned objectives and poor communication channels between Ecopetrol, an oil SOE managed from Bogota and operator of the largest oil refinery in the country, and regional stakeholders.

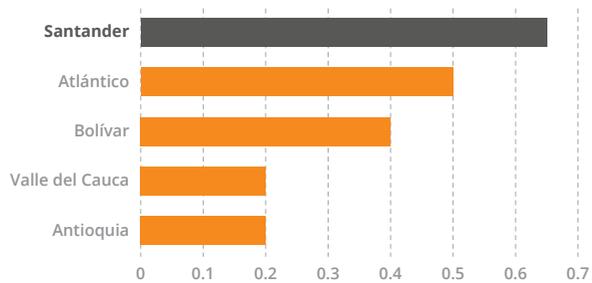
There is qualitative and quantitative evidence to suggest that at the root of this lack of coordination are the Santandereanos’ individualism and distrust.

Results from a Michael Porter study of Colombia in the 1990s shows that people from Santander tend to be more individualist and have a stronger preference for doing business with friends than peers in Atlantico, Bolivar, Valle del Cauca, and Antioquia. Complementing these statistics, a foreign business owner in Santander told us that “business owners in Santander still see each other as competition, instead of seeing China or Brazil as the real competitors.” And another important business person told us that “the people here don’t let others advance; the competition between us hinders our progress.”

Proportion who believe that individuals are responsible for their own situations (1994)



Proportion who prefer to do business with friends (1994)



Source: Monitor Company.

Figure 71

In conclusion, we believe that coordination failures, rooted in distrust and individualism, are a binding constraint to Santander’s economic growth.

Even though companies in Santander produce new products when given the opportunity, Santander’s peripheral location in the product space requires even stronger coordination efforts than usual to expand the diversity and complexity of products and services offered.

There are new coordination efforts in the department, but they are still too young to bear significant fruit, and they are lacking in strength and reach. Evidence shows that the coordination challenges identified, might be rooted in the cultural mindset of the Santanderano, which according to the data, are more individualistic and distrusting than people from other peer regions.



*Cristo
Petrolero
Syndrome*

CRISTO PETROLERO SYNDROME

For a long time, Santander has been at the heart of Colombian history, at the crossroads of its progress. It was in Socorro, Santander that the first declaration of independence of Nueva Granada was signed. It was where the trade and flow of people between Colombia and Venezuela met. In the 1850s, Santander had a prosperous economy that concentrated 27% of Colombia's population and by the 1880s, it was generating 80% of Colombia's export income (Primmer, 2020).

In the early 1900s, Colombia was engulfed in the War of a Thousand Days sparked by civil unrest and political disagreements, wreaking havoc across the country, and leaving Santander on its knees.

The rebellion against the government started in Santander and took place mostly in Santander and a handful of other regions. This led to the deaths of tens of thousands of Santandereans, the mass migrant of others, and devastation to its economy and road infrastructure. To make things worse, the international price of coffee, Santander's main export product, tumbled to new lows leaving the economy with no easy path towards recovery (Primmer, 2020).

Shortly after, when oil is discovered in the country, "Cristo Petrolero" (Petroleum Christ) answers Santander's prayers, and feeds and shelters its population for the next fifty years.

With the investment of Tropical Oil Company in the 1920s, Colombia started exporting oil from fields in Santander. In 1949, Colombia became the 9th largest oil producer in the world, employing more than 15,000 people in the oil industry, which was significantly concentrated in Santander (Vazquez C., 2012). To commemorate the importance of oil to Santander, the wealth it has brought, the jobs it has created, and the people it has fed, the workers of Colombia's largest oil refinery, located in Barrancabermeja, Santander, built in the city a "Petroleum Christ" or "Cristo Petrolero" as it is called in Spanish.

For the years to follow, Santander enjoyed an oil boom that fueled its economy but ignored the infrastructure and coordination needs of its non-oil economy. Oil money kept the local economy afloat, gave the government ample resources, and kept the general population happy. For a long time, there was no significant rush to foster the growth of other sectors of Santander's economy, to help coordinate its needed inputs, and to establish the ties needed for future success.

After the commodity crash of 2014, lower than average growth pushed Santander to reconsider its economic model and address the needs of its non-oil sector. To make things worse for Santander, in 2011, the national government changed the oil royalty distribution system and started allocating more royalties to the central government instead of handing them over directly to oil-producing regions (Moreno Gonzalez, 2019). Now that the promise of continuous oil revenue is running dry, and "Cristo Petrolero" has stopped answering Santander's prayers and needs, the leaders of Santander need to take a more proactive and hands-on approach to developing its non-oil sector.

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POTENTIAL POLICY SOLUTIONS

To develop its non-oil sector and recover the lost trend in economic growth, Santander should continue fostering the development of non-manufacture exports (services) while it focuses on relaxing the most binding constraint for manufacturing exports. Two address those binding constraints, Santander needs to focus on two policy goals: i) reducing transportations times and costs to and from ports, and ii) improving coordination in the non-oil sector. Additionally, we identified the sectors and products that are closer to Santander's current capabilities that can strengthen Santander productive potential.

Relaxing
the binding
constraints

To facilitate the process of industry creation and to strengthen Santander's productive capabilities through time, all stakeholders should push for proposals aimed at relaxing the binding constraints.

Reducing transportation costs to and from ports

Decreasing the cost that companies face to export and import can unleash the creation of new capabilities that can lead to higher-paying jobs compared to the status quo.

Therefore, we recommend:

1. Prioritizing support to existing infrastructure projects that help reduce travel times to nearby ports, as well as leveraging and developing infrastructure along the Magdalena River.
2. Improving the economies of scale, efficiency, and coordination of the shipping system and truck fleet. This should also include efforts to improve fuel efficiency and reduce the number of empty trucks on the road.

Improving coordination among stakeholders

Improving the coordination among the department's stakeholders will allow Santander to work its way out of its peripheral location in the product space by facilitating the creation of more complex and better-connected products. To accomplish that, we recommend:

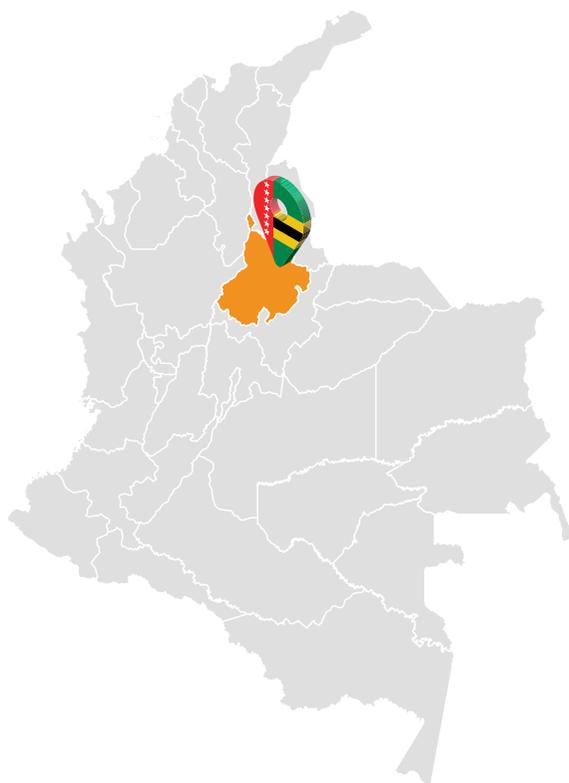
1. Strengthening collaboration among existing institutions, improving communication channels, and prioritizing efforts in selected industries. Santander should focus on building effective communication and trust among key public and private sector stakeholders. It is fundamental for public sector leaders to sit down with private sector players and representatives.
2. Strengthening export promotion policies and coordination among SMEs, ProColombia, and other stakeholders interested in lifting the barriers to increase exports. As well as prioritizing policies that aim to reduce the costs to export or import and address the fear of exports.

Identification and recommendation of sectors

Complimentarily, the growth and diversification of Santander's economy needs to be strengthened through multiple channels. First, complex industries already present in Santander should be fostered. Second, new opportunities that require capabilities close to Santander's existing capabilities should be identified and prioritized. The region's development will depend on its ability to be successful in both undertakings: to increase the dynamism of existing industries and to attract new business modes to exploit the knowledge and capabilities already available or that is relatively easy to develop.

The process we followed to identify industries with the largest potential for development, both for existing industries and for new opportunities, follows a three-step approach:

- 1.** We focused on tradable activities (goods and services). This does not mean that the strategy for productive development should only support tradable activities since the demand for non-tradables will increase in places where tradables are produced. Therefore, non-tradables must also be readily available for deployment.
- 2.** To identify products and sectors that can contribute to Santander's growth, we focused on those that are close to Santander's current productive capabilities. We made a joint analysis of product and industry complexity to identify the tradable sectors in both manufacture and services



that can boost Santander's growth. For the industries already active in Santander, we focused on those that contribute the most to the complexity of Santander's economy and that have more connections with other complex nodes in both the product and industry spaces.

- 3.** We identified new potential opportunities. To accomplish this, we built an index that measures the benefits that new activity can bring to Santander in terms of how closely connected it is to other complex activities (Complexity Outlook Gain), the complexity of the activity, and the distance from current capabilities. We assigned a weight of 50% to distance, 25% to the complexity, and 25% to the Complexity Outlook Gain.

Finally, we grouped the recommended activities in 5 sectors that can boost Santander's economic growth:

	Metalmechanic
	Health Manufacture and Services
	Electric Industry
	Financial Services
	Chemicals

Financial services	Chemicals	Metalmech Industry
Financial leasing.	Mining of chemical and fertilizer minerals.	Manufacture of steam generators, except central heating hot water boilers.
Reinsurance plans.	Chemical elements and compounds for use in electronics.	Manufacture of motor vehicles.
Activities of factoring companies.	Halides and oxides of nonmetal halides.	Halides and oxides of nonmetal halides.
Activities related to the stock market.	Liquid crystal devices.	Manufacture of industrial process control equipment.
Activities auxiliary to financial intermediation.	Sintered metal carbide or cermet tools.	Machinery and mechanical devices.
Activities of trust companies.	Instruments and apparatus for chemical analysis.	Textile machinery.
		Instruments, apparatus and measuring machines.
		Machine tools.
		Machinery to work rubber or plastics.
Health manufacture and services	Electric industry	
Dental practice activities.	Manufacture of electric lamps and lighting equipment.	
X-ray, alpha, beta and gamma radiation apparatus: X-ray tubes, X-ray generators, high voltage generators.	Manufacture of electric motors, generators and transformers.	
Microscopes and diffraction apparatus.	Manufacture of electricity distribution and control apparatus.	
Orthopedic appliances.	Manufacture of electrical equipment.	
	Electromagnets.	
	Electrical machines and appliances.	
	Electrical parts of machinery or apparatus.	
	Electric welding machines and apparatus (electrically heated gas).	

Table 7

Santander should also support activities that already exist in the economy and that are well situated in the product or industry space. If those capabilities are further developed, then the likelihood of developing nearby capabilities increase.

Recommended existing sectors to support	
Manufacture of medical and surgical equipment and orthopedic devices.	Machinery for cleaning, drying and filling.
Manufacture of other general purpose machinery.	Agricultural, horticultural and forestry machinery.
Manufacture of pumps, compressors, taps and valves.	Centrifuges and centrifugal dryers.
Manufacture of carpentry and joinery work.	Milking machine and dairy machinery.
Manufacture of special machinery.	Ethylene polymers.
Orthopedic appliances.	Machinery used in the milling industry.
Base metal or metal carbide electrodes.	Boilers; steam or other steam generator.

Table 8

CONCLUSION

Santander had good economic growth when the price of oil was high, but now that commodity prices have decreased, it must address the binding constraints holding back the growth and exports of its non-oil economy. As presented above, Santander was the second-fastest-growing department among its peer group before the commodity crash of 2014, and since then its economic growth has been significantly lower. The department is missing some of the economic capabilities needed to return to its pre-2014 growth and must address its binding constraints to accumulate the needed capabilities. Specifically, it must focus on reducing the high transportation costs that isolate it from international suppliers and customers and addressing the coordination failures that keep its economy in the peripheries of the product space.

We aim for this report to serve as the basis of future initiatives to improve the connectivity of the department and strengthen spaces of coordination. This document is not exhaustive and doesn't go into the implementation and details of the recommendations, but it does provide some goals to focus on. The idea is that these goals will bring key stakeholders to the table and guide the creation of initiatives to address the problems identified.

These are demanding challenges, but they can be overcome like the challenges Santander has faced in the past. Healing the social, economic, and physical wounds of the War of a Thousand Days back in the early 1900s required not just oil money, but hard work, collaboration, and optimism from the Santanderanos. Rebuilding their economy required the people of Santander to invest and believe in the future of their homeland. It required them to work long and hard, something that has now become ingrained in their character. The challenges faced today are about growing an existing economy, similar to the challenge faced one hundred years ago, and will also require optimism, collaboration, and hard work to be overcome.

If one thing is clear from our work, it is that Santanderanos need to work together to overcome the challenges they face. Fulfilling the recommendations presented above, of strengthening coordination efforts, and reducing transportation costs, will not be enough and will not be possible if there is no trust and shared sense of purpose among the leaders of the department. The leaders of the department need to realize that true success for Santander lies in the shared success of all its people, that they must put aside their differences, build a shared vision, and bring it to life.

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APPENDIX

Dutch Disease

The Natural Resource Curse and Dutch Disease describe a phenomenon related to economic growth and large natural resources endowments. Although Auty (1993) coined the term natural resource curse, Sachs and Warner (1995) showed evidence that countries with large natural resource endowments tend to grow slower than countries with smaller endowments. However, this relationship is not always the case. Sachs (2007) argues that if natural resource proceeds are properly invested as a part of a national development strategy, then countries can remove the curse component of owning natural resources.

One of the main consequences of the presence of natural resources is the crowding out of the manufacturing sector. This can be particularly damaging for an economy because, as Matsuyama (1992) argues, it is likely that the manufacturing sector is characterized by learning by doing, as opposed to primary sectors. One implication is that policy efforts to diversify into manufacturing are justified, whereas a commodity boom that crowds out manufacturing can indeed be harmful to sustainable economic growth.

There are several crowding out mechanisms that can lead to Dutch Disease, but most of them, such as currency and price distortions, happen at a national level. Frankel (2012) describes the dutch disease as a process in which real appreciation of the currency crowds out non-commodity tradable goods, not just by the boom in the commodity sector, but also by an induced boom in the non-tradable sector. The boom takes place because the ratio of non-tradable to tradable prices increases, encouraging production to shift out from non-commodity tradables (attracted by higher returns in the other sectors).

We found several potential symptoms of Dutch Disease in Santander. The first signal is the visual correlation between growth and oil prices and the existence of a structural break in economic growth the year in which oil prices plummeted. Second, Santander's large dependence on oil-related economic activities. Indeed, the size of the non-oil manufacturing sector in Santander is small when compared to peers. Finally, we can also see how the non-tradable sector had a boom (housing in particular) when oil prices were high and had a contraction when oil prices fell.

However, we were not able to quantitatively identify a crowding-out mechanism that explained Santander's small manufacturing sector relative to those of its peers. Since the manufacturing sectors of the peer economies were of a healthier size, if we were to find a crowding-out mechanism, it needed to be one that only affected Santander. That immediately ruled out the financial sector and macroeconomic conditions, since those are standard throughout Colombia. We examined potential crowding out through wages, labor force participation, and land prices, but found no evidence for them. However, we qualitatively examined a potential crowding out through policy attention, where Santander's leaders paid more attention to the needs of its oil producers than those of its manufacturing one, thus resulting in something similar to what we describe in the "Cristo Petrolero Syndrome." It's important to mention that this analysis is not 100% conclusive, and pinpoint the crowding-out mechanism requires further examination.

⁷ The "Dutch Disease" is named after the overvaluation of the Dutch Guilder in the wake of a boom in the Netherlands' natural gas earnings in the 1960s (Sachs, 2007).

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