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Abstract

Local governments are primary providers of basic services to their communities, and any decision they make will echo in the economy as a whole. That is why healthy and sustainable local public finances should be a national priority. With the purpose of contributing to the discussion on subnational fiscal health, a recently developed approach by Slack (2017) is applied to the 23 main Colombian cities. After preparing a brief and general profile of each city, five dimensions are analyzed in-depth: external, financial, tax and revenue, debt, and infrastructure. Results highlight the high complexity of what making a fiscal health diagnosis of local governments implies. Colombian cities do not seem to face profound fiscal health issues. Nevertheless, there is evidence of regional differences, where coastal lagged behind Caribbean and Pacific cities seem to suffer of structural and long-term weaknesses. On the other hand, inner Eastern and Central cities' issues are more related to cash-flows and short-term sustainability.

Key words: local public finances, regional economics, Colombia

JEL Classification: H72, R51

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La salud fiscal en las principales ciudades de Colombia*

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Resumen

Los gobiernos locales son los principales proveedores de los servicios básicos en sus comunidades y, por tanto, cualquier decisión que adopten se verá reflejada en la economía como un todo. Esta es la razón por la que finanzas públicas locales sostenibles y saludables deberían ser una prioridad nacional. Con el propósito de contribuir a la discusión sobre salud fiscal subnacional, en este documento se aplica, para las principales ciudades de Colombia, la metodología reciente de Slack (2017) en la construcción de indicadores de salud fiscal. Luego de preparar un perfil general de cada una de las ciudades, se analizan más detalladamente el comportamiento de indicadores en cinco dimensiones: externa, financiera, impuestos e ingresos, deuda, e infraestructura. Los resultados dejan en evidencia la alta complejidad que implica el análisis y diagnóstico sobre salud fiscal de los gobiernos locales. Las ciudades colombianas no parecen enfrentar, en general, profundos problemas de salud fiscal. Sin embargo, existe evidencia de patrones regionales, en donde las ciudades pertenecientes a las regiones Pacífica y Caribe parecen mostrar fragilidad estructural de largo plazo. Por otro lado, los desafíos de las regiones del interior, Oriental y Central en particular, están más relacionadas con los flujos de caja y la sostenibilidad de corto plazo.

Palabras clave: finanzas públicas locales, economía regional, Colombia

Clasificación JEL: H72, R51

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1. Introduction

Subnational governments as individuals do, face the financial constraints imposed by the scarce resources in the economy. This fact leaves local governments the challenge of looking for the best way to get a steady balance between a consistent revenue flow and meeting their commitments (Jacob and Hendrick, 2013). Nevertheless, governors and mayors have just few available tools to determine if their entities are facing financial pressure, how much more they can compromise and whether or not these commitments are translated into higher risk (McDonald, 2018). The literature has come up with the concept of fiscal health to refer to the situation under which governments are capable of balancing revenue streams and their financial obligations (Helpap, 2016). Another approximation to the concept relates to the ability of local governments to provide public services to the community regardless of budgetary decisions made by local financial authorities (Ladd and Yinger, 1989). Derived from it, local responsible authorities have the power to make their jurisdictions more attractive and influence mobility and migration decisions, and hence to attract higher quality's labor force, more competitiveness and long term investments (Honadle *et al.*, 2004).

What can be seen is that the concept of fiscal health has been evolving from the simplistic measure of how revenues exceed spending obligations (Berry, 1994; Badu and Li, 1994; Bird, 2015). For this reason, in part due to worldwide crises affecting national and subnational finances, the concept is being much harder to define, to understand and to measure. For example, it is being recognized that fiscal health does not only have to do with the balance between revenue streams and spending commitments, but also with cash, budgetary, long-run solvency, and many other factors affecting governments and residents' social and the economic reality (Groves *et al.*, 2003).

For the particular case of Colombia, measures of fiscal health have not been widely used in the literature as such, or as a policy making instrument. However, the general concept has been present as fiscal performance since the early 2000, by means of congressional mandate to the central government (Law 617/2000). The purpose of this decision was to closely monitor the management and financial viability of departments and municipalities. The National Planning Department (DNP, by its Spanish acronym) carries out this monitoring by means of the calculation of the Fiscal Performance Index (IDF, by its Spanish acronym). The

index is made up of six components: self-financing of operating expenses, support of debt service, dependence of national transfers and royalties, own-source revenue generation, extent of investment, and savings capacity. After they are collected, a single index is computed for each department and municipality ranging from 0 to 100, with the lowest score given to those subnational governments with the poorest performance.

Despite its advances, the IDF was facing conceptual and methodological challenges that reduced its explanatory capacity, making it more difficult to use for public policy purposes. On these grounds DNP design a new indicator, Municipal Performance Measurement (MDM, by its Spanish acronym), with updated evaluation standards and where subnational performance is focused on results-oriented public management. Within the main differences between IDF and MDM is that while the former does not measure development achievements, the latter takes into account well-being indicators, such as basic services access and coverage, as well as considers territorial heterogeneities¹.

The other fiscal performance tool in Colombia is the annual territorial fiscal viability report, made by the General Fiscal Support Direction (DAF, by its Spanish acronym) from the Ministry of Finance. These reports make brief and clear diagnostics of subnational governments using socioeconomic indicators such as population, Gross Domestic Product (GDP), unemployment, inflation, poverty, inequality, as well as the most relevant fiscal performance characteristics, with the purpose of having a general view of the financial solvency of subnational governments. Within the most important fiscal dimensions included are: compliance with fiscal responsibility adjustments, credit risk rating, and the risks and challenges faced by subnational governments.

With the purpose of contributing to the discussion on fiscal health in Colombia, and in recognition to the complexity of getting to find a reasonable diagnosis of subnational governments, this paper computes and analyzes a total of 15 indicators for the main 23 municipalities in the country. This document follows the approach by Slack (2017) that, to the best of our knowledge, is for the first time implemented in Colombia. The methodology

¹ The two dimensions consider the following variables: (1) public management: own-source revenues mobilization, execution of resources, open government and transparency, and territorial ordering; (2) results: education, health, public services, security and urban coexistence.

covers and takes into account the multiple methods and measures developed so far, and end up with six sets of indicators: profile, external, financial, tax and revenue, debt, and infrastructure. With them, the objective is to be able to offer a deeper diagnostic on fiscal health to each municipality, and also to each of them relative to the others, and in time over the recent years.

Throughout recent history, Colombia has been able to improve the collection of databases at national and subnational levels from which the central government and control agencies have been able to track specific indicators, in particular those related to solvency, fiscal performance, and expenditure management. Nevertheless, a significant part of this information is still underused and with a huge potential as predicting instruments. This is of particular importance for subnational governments since they are administratively weak and prone to face fiscal health issues. The approach presented in this paper represents an effort to investigate how fiscally healthy are the main cities in Colombia by means of the most recent strategy and a collection of datasets. It is worth mentioning the advantages of using multiple dimensions' indicators in contrast with single dimensions' measures. In particular, McDonald (2017) found that considering a series of indicators better describe the structural financial situation of local governments than single indexes do, and allows control authorities to identify and predict potential bankruptcy events.

Results make evident the extensive heterogeneity among Colombian cities, even those with similar characteristics. Also, that the process of making fiscal health diagnoses is extremely complex and is more effectively implemented in a multidimensional set up. In terms of fiscal health, for the 23 cities analyzed, results show that there are no deep or generalized problems with public finances of subnational governments. However, there seems to be regional heterogeneities where the two coastal lagged behind regions, Caribbean and Pacific, face longer-term and more structural problems, in particular with tax base and their capacity to get tax and non-tax revenues. On the other hand, richer and more able regions, Central and Eastern, deal with short-term restrictions such as those related to liquidity and cash flow.

The paper is organized as follows. The second section reviews the evolution of the concept and measurements used to analyze fiscal health in subnational governments. Third section provides a brief context of Colombian subnational public finances, their evolution and

regulations implement to keep them in track. The fourth presents data sources and the criteria used to select the sample of cities. Fifth and sixth sections present fiscal health's main results, profile and fiscal indicators, respectively. Seventh section shows relative positions of each of the 23 cities in terms of each fiscal health indicator, and answers the question of whether or not persistence characterizes their fiscal circumstances. Last section is dedicated to conclude.

2. Measuring fiscal health

Persistent tensions that subnational governments have to deal with are those between financial constraints and residents' needs for public goods and services which, in turn, has been the main motivation to get into an appropriate and relevant way to measure fiscal health. Even though the concept has had a growing presence in the recent literature, its origins dates back to the beginning of the Twentieth Century, with a new rise in the early seventies (Arnett, 2014; McDonald, 2018). Over the years, and even today, other terms have been widely used in theoretical and empirical work to represent fiscal health: fiscal stress/distress, fiscal strain, fiscal performance, financial conditions, and financial position (Huang and Ho, 2013).

2.1. A review of previous approaches

As the definition has evolved over time so has been its empirical implementation. Some of the best-known and most used mechanisms are: ratio analysis, Brown's ten-point test (Brown, 1993), and Wang, Dennis and Tu's solvency test (Wang *et al.*, 2007), from which extensions and modifications have also been widely used.

The first one focuses on the entity's financial position by means of comparing the relationship of financial statement accounts of each entity with respect to other similar subnational entities (Kieso *et al.*, 2011; McDonald, 2018). Although, it is widely recognized that this strategy requires the analysis of multiple variables, there is no consensus on the composition or the number of ratios to capture all dimensions of local government's real circumstances. It is also argued that the interpretation of ratios is difficult as they may reflect uncertain results as some of them could be showing trends to positive fiscal health while, at the same time, others may reflect transit toward fiscal stress (Stone *et al.*, 2015).

The second mechanism, built on the ratio analysis, sought to offer a simpler and easier to interpret measurement. Brown (1993) developed its strategy working on five dimensions: revenues, expenditures, operating position, debt, and pension liabilities. Once the ratios are defined and computed, they are placed into quartiles with the purpose of finding out which group each subnational government belongs to relative to its comparable counterparts. Each quartile is given a score from -1 (to the first) to 2 (to the fourth), and then they are added up to produce a single indicator ranging between -10 and 20. Although this strategy is simple and easy to implement, it relies on just one instrument to understand a complex issue.

The third approach, developed by Wang *et al.* (2007), rests on the use of 11 indicators distributed in four dimensions: cash, budget, long-term, and service. Although this is based on previous approaches, the authors aimed at determining the actual financial situation of local governments instead of looking for where they are heading. They argue that this approach reveals more accurately their potential long-term financial situation (McDonald, 2018). A single score is then obtained after adding up the previous four resulting after computing one per dimension.

2.2. This paper's approach

It is widely agreed that measuring subnational governments' fiscal health is very complex and it requires not one but multiple indicators to understand the current situation of local governments and its short and medium term perspectives. In order to contribute to the discussion, Slack (2017) builds up on previous approaches and proposes an integrated strategy to determine how fiscally healthy are cities in Latin America and the Caribbean.

The procedure suggested by the author is built according to the following stages. First, a set of five characteristics is used to frame the profile of the cities: population, income per capita, unemployment rate, expenditures per capita, and taxes per capita (Table 1, panel a). Then, a group of about 20 cities is chosen according to similar characteristics, population size in particular.

Table 1. Indicators to measure fiscal health

a. Profile indicators

Measure	Indicator	Rationale
Population	Population	Allows cities to compare themselves to cities of similar size
Income per capita	Income/Population	Allows cities to compare themselves to cities of similar wealth
Unemployment rate	Number of unemployed persons/size of workforce	Allows cities to compare themselves to cities with similar economic conditions
Expenditures per capita	Expenditures/population	Allows cities to compare themselves to cities with similar expenditure responsibilities
Taxes per capita	Taxes/population	Allows cities to compare themselves to cities with similar taxes

b. Fiscal Indicators

Measure	Indicator	Rationale
Population growth	Average growth of population over last two years	Suggests whether a city is growing and its ability to pay for services
Tax base growth	Average growth of tax base over last two years	Suggests ability to pay for services and meet financial obligations in the future
Operating deficit	Operating expenditures - operating revenues	Indicator of extent to which revenues cover operational expenses only or are available for capital funding or other purposes
Net financial assets	Financial assets/financial liabilities	Measure of a city's liquidity or ability to pay short-term obligations. Financial liabilities include, for example, temporary loans, accounts payable, deferred revenue, long-term liabilities and post-employment benefits (accumulated sick leave, accrued vacation pay, accrued pensions payable)
Own-source revenues relative to total revenues	Own-source revenues/total revenues	Reliance on own-source revenues (rather than transfers) reduces the vulnerability of cities to a reduction in transfers that will have to be made up by an increase in own-source revenues or a reduction in expenditures
Taxes receivable relative to taxes levied	Taxes receivable/taxes levied	Increasing levels of tax arrears indicate cash-flow problems for a city and its ratepayers. This measure may also reveal a weakness in the tax base
Debt to tax ratio	Size of debt/tax revenues	Measures the ability of the city to pay back with tax revenues. Standard measure of a government's fiscal sustainability
Debt charges relative to own-source revenues	Debt charges (including principal plus interest)/municipal revenues less transfers	Indicates the extent to which cities are able to repay debt from taxes and other own-source revenues
Asset consumption ratio	Closing amortization balance/closing cost balance minus land	Measure of infrastructure needs and urgency by estimating the age of a city's physical assets and how much of its assets need to be repaired or replaced. For example, if 40 percent of municipal assets (excluding land) has been amortized, the average remaining life of the assets is only 60 percent of the average expected useful life. If a city is maintaining its assets, the asset consumption ratio will be low. Land is excluded because it is not amortized
Extent of investment in capital assets	Closing cost balance/closing net book value	Provides an indication of the extent to which cities have been investing in capital assets by comparing the original cost of the capital assets (closing cost balance) with the original cost less accumulated depreciation (net book value). To preserve the value of its assets, a city would have to invest at least the amount of depreciation each year. A closing net book value that is equal to the closing cost balance (100%) would mean the city is preserving the full value of its assets by investing in maintenance and repairs

Source: Slack (2017).

Third, collect all the possible information to compute as many of the proposed indicators listed in Table 1 – panel b. The next step is to compute and compare all the fiscal indicators across the cities, find out the differences between them, and try to make clear where the differences come from. Finally, the methodology recommends continuing collecting all these indicators and following them over time.

According to this approach no benchmark, national or international, is used to compare the results, not even necessarily the national average, since they are not equivalent to each other in different countries, and the national average does not reveal all the information needed for accurate diagnostic purposes. Instead Slack (2017) proposes to compare the set of indicators across the different dimensions with each of the 20 cities with similar characteristics.

3. Colombia in a brief context

Colombia is a particular country in Latin America, fiscally speaking, since it is the unitary government with the highest decentralization of spending, with about 10.4% of the GDP, similar to a federal country like Mexico (10.6%) (BID, 2012). From another point of view, subnational governments perform around 40% of the total public expenditures. Decentralization in Colombia has meant a milestone in management and performance of subnational governments. Since the enactment of the Political Constitution in 1991, departments and municipalities started to have significant participation in the current national revenues, as high as 46% at the time, with the main purpose of improving coverage in health and education sectors (Bonet *et al.*, 2016a).

During the last 27 years, this transfers' scheme has suffered several changes. The first one occurred at the end of the nineties when the economic crisis affected the finances of subnational governments compromising the fiscal stability of the country. This was of particular relevance since transfers for departments and municipalities were tied as a fixed participation on the current national revenues. Through subsequent reforms, the system changed, first temporarily tied to the inflation, and then tied to current national revenue's growth during the previous four years, mechanism which is still at work. Decentralization has not been unknown in the region, in fact Colombia was responding to a general trend observed in Latin America, where countries were looking not only for improving subnational

finances but for also contributing with a general economic development and a higher quality of life.

As for its territorial organization, the country is made up by 32 departments (states) plus the country’s capital city Bogotá, and 1,101 municipalities (Figure 1). Colombia, with over 40 million people, is self-recognized as a country of regions, with a high heterogeneity in terms of population, income, poverty, and general development. Most of the people live in urban areas (76%) and generate 85% of the national GDP (DNP, 2014). The National Department of Statistics (DANE, by its Spanish acronym) closely follows the 13 main cities and metropolitan areas, all of them with around 400,000 inhabitants, for which reports large set of socioeconomic indicators. Also, an additional group of ten municipalities is included to make up the set of 23 main cities (all of them being capital of department) for which DANE also reports a generous collection of statistics.

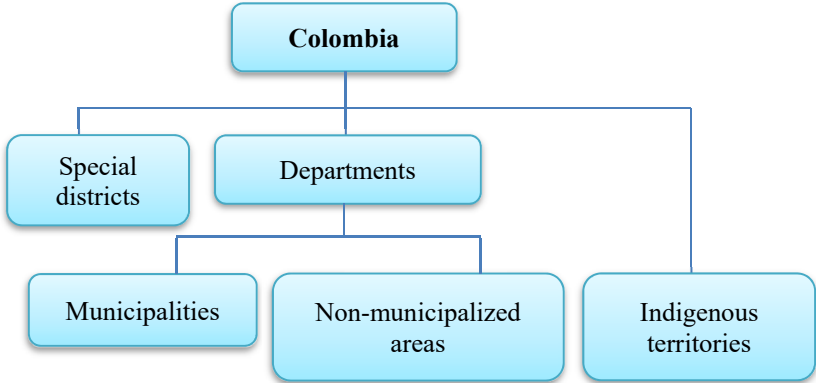
Figure 1. Colombia’s territorial organization



Source: Authors’ elaboration.

Administratively, according to the Political Constitution, the status of territorial entities is given to departments, districts, municipalities, and indigenous territories (Figure 2). This category gives them autonomy to manage resources to be able to improve their residents' welfare and quality of life.

Figure 2. Administrative and territorial structure



Source: Departamento Administrativo nacional de Estadística (DANE). Authors' elaboration. <http://geoportal.dane.gov.co:8084/Divipola/>

Departments are made up by municipalities, which in turn are made up by smaller territories called population centers, and classified as municipal “corregimientos”, and other settlements, for a total of 8,059 subdivisions in the country. There are 20 “corregimientos” that do not belong to any municipality and are classified as non-municipalized areas. Districts are a special (second level) class of municipalities with an independent legal, political, fiscal, and administrative regime. In Colombia there are seven Districts: Bogotá, the capital city which is under a special regime; the tourist and cultural districts of Cartagena de Indias and Riohacha; the sports, cultural, tourist, business and services district of Cali; the tourist, cultural and historical district of Santa Marta; the industrial and port district of Barranquilla; and the industrial, port, bio-diverse and ecotourism port of Buenaventura. Finally, indigenous territories are by definition communal with not alienable properties where residents are only allowed to carry out environmentally friendly activities. In Colombia, indigenous reservations cover approximately 323,000 km², 0.3% of the country (Pérez *et al.*, 2017).

4. Data and sample selection

Colombia has several public institutions that are responsible for collecting and organizing subnational governments' information. In terms of fiscal and financial issues of public entities, the Ministry of Finance and Public Credit designed and developed the Treasury and Public Information Consolidator (CHIP, by its Spanish acronym). This system takes care of economic, financial, social and environmental information of public institutions. CHIP also comprises data on the Unique Territorial Form (FUT, by its Spanish acronym), through which territorial entities are also responsible of reporting basic and budgetary information.² This database is delivered to the national government, and is under the custody of the General Accounting Office. The National Planning Department (DNP) also participates with the processing and technological support of these databases. For the purpose of this research, several components from CHIP are used: income, operating expenses, investment expenses, debt service, public debt, and the public accounting information. The latter including balances and movements of all subnational governments' accounts. Table 2 shows details of the data source and definitions for the whole set of profile and fiscal indicators used to advance in a fiscal health diagnosis for subnational governments.

The National Department of Statistics (DANE) is the main source of demographic information. National censuses and population projections for the total 1,101 municipalities are collected, processed, and published by this institution. Nevertheless, this is not the only sort of data they are in charge of. There is a wide set of surveys of all kinds that closely monitor most of the social, economic and cultural sectors in the country. For the particular purpose of the present project, annual population projections reported by DANE are used for computing population growth and per capita versions of some indicators.

Also from this office it is used the GDP. Apart from the usual aggregated value computed at national level for the different sectors of the economy, DANE also produces and publishes a departmental GDP, an uninterrupted time series which is available from 1980 for the 32 departments and the capital city. Its calculation is coherent with the national GDP and is based on international concepts and definitions comprised in the National Accounts System. Also, in an effort to improve subnational accounts on aggregated value, and in compliance

² The system through which FUT is managed is known as SISFUT.

with Law 1551/2012, since 2013 DANE also produces and publishes a municipal GDP, as a disaggregation of the national and departmental aggregated value (DANE, 2016).

Table 2. Data source and definitions

	Indicator	Source	Variables used in the calculation
Profile	1. Population	DANE - Population projections	Population projections estimated by "Misión de Ciudades - DNP" (by Álvaro Pachón)
	2. Income per capita	CHIP - (FUT Income) DANE - Population projections	Total income (tax + non-tax) / total population
	3. Unemployment rate	DANE - Unemployment rate	Unemployment rate
	4. Expenditures per capita	CHIP - (FUT Operating expenses) CHIP - (FUT Investment expenses) CHIP - (FUT Debt service expenses) DANE - Population projections	(Operating expenses + Investment expenses + Debt service expenses) / total population
	5. Taxes per capita	CHIP - (FUT Income) DANE - Population projections	Tax income/total population
External	6. Population growth	DANE - Population projections	Computed as the bi-annual average of the population growth rates
	7a. Tax base growth (property tax base)	IGAC and the corresponding local cadasters for Bogotá, Cali, Medellín	Computed as the bi-annual average of the cadastral appraisal Se calcula el promedio bianual de las tasas de crecimiento de los avalúos catastrales
	7b. Tax base growth (GDP proxied by the industry and commerce tax)	CHIP - (FUT Income) DANE - Departmental Accounts	First, a proxy of municipal GDP is estimated as follows: we compute the participation of each municipality's industry and commerce tax (ICA) in the total sum of that tax for all municipalities within their corresponding department. Then, the resulting participation is multiplied by their corresponding departmental GDP, which correspond to a proxy of the municipal GDP. Then, the growth rate is computed and after that the bi-annual average growth rate.
Financial	8. Operating deficit	CHIP - (FUT Income) CHIP - (FUT Operating expenses) CHIP - (FUT Investment expenses) CHIP - (FUT Debt service expenses) CHIP - (FUT Public debt) DANE - Inflation	1. The total income is computed. 2. The total expenses is computed (Operating expenses + Investment expenses + Debt service expenses) 3. Interest paid in each year is multiplied by the corresponding inflation rate, which corresponds to the inflation component of interest payments. 4. Operating deficit is computed as: total expenses - inflation component of interest payments - total income.
	9. Net financial assets	CHIP - (Public accounting information)	1. Financial assets are computed as: cash + investments and derivative instruments + income receivable + debtors + inventories 2. Financial liabilities are computed as: public credit operations and Central Bank financing + financing operations and derivative instruments + income payable + labor and social security commitments + other bonds and securities issued 3. Net financial assets are computed as: financial assets / financial liabilities
Tax and revenue	10. Own-source revenues relative to total revenues	CHIP - (FUT Income)	1. Own-source revenue is computed as: tax revenue + non-tax revenue - transfers 2. Total revenue is computed as: current revenues + capital revenues 2. The quotient between the two is computed: own-source revenue / total revenue
	11. Taxes receivable relative to taxes levied	CHIP - (Public accounting information) CHIP - (FUT Income)	1. Income receivable corresponding to current-term taxes is taken for each year (taxes receivable) 2. Total tax revenue is taken (taxes levied)
Debt	12. Debt to tax ratio	CHIP - (FUT Public debt) CHIP - (FUT Income)	1. Size of debt is taken as the deb balance of the corresponding year. 2. Total tax revenue is taken 3. The quotient between the two is taken: size of debt / total tax revenue
	13. Debt charges relative to own-source revenues	CHIP - (FUT Public debt) CHIP - (FUT Income)	1. Debt charges are computed as the sum of the credit disbursement and the interest paid in the corresponding year 2. Own-source revenues are computed as the sum of the tax and no-tax revenue 3. The quotient between the two components is computed: debt charges / own-source revenues
Infrastructure	14. Asset consumption ratio	CHIP - (Public accounting information)	1. Closing amortization balance is computed as follows: the sum of the accumulated depreciation (property, plant and equipment), accumulated amortization (public, historical and cultural use goods), amortization of real state given in administration, amortization of real state given in commodatum, and accumulated amortization of intangibles (software, licenses, etc.) 2. Closing cost balance is computed as follows: the sum of goods for public use in service, concession, historical and cultural in service, goods for public use, cultural and historical given in administration, and other assets (real estate given in administration, commodate and concession) 3. Land is computed as follows: the sum of land (exploited), land (non-exploited), and land (investment properties) 4. Asset consumption ratio is computed as: closing amortization balance/(closing cost balance - land)
	15. Extent of investment in capital assets	CHIP - (Public accounting information)	1. Closing cost balance is computed as follows: the sum of goods for public use in service, concession, historical and cultural in service, goods for public use, cultural and historical given in administration, and other assets (real estate given in administration, commodate and concession) 2. Closing net book balance is computed as: closing cost balance - closing amortization balance 3. Extent of investment in capital assets is computed as: Closing cost balance / closing net book balance

Source: Authors' elaboration.

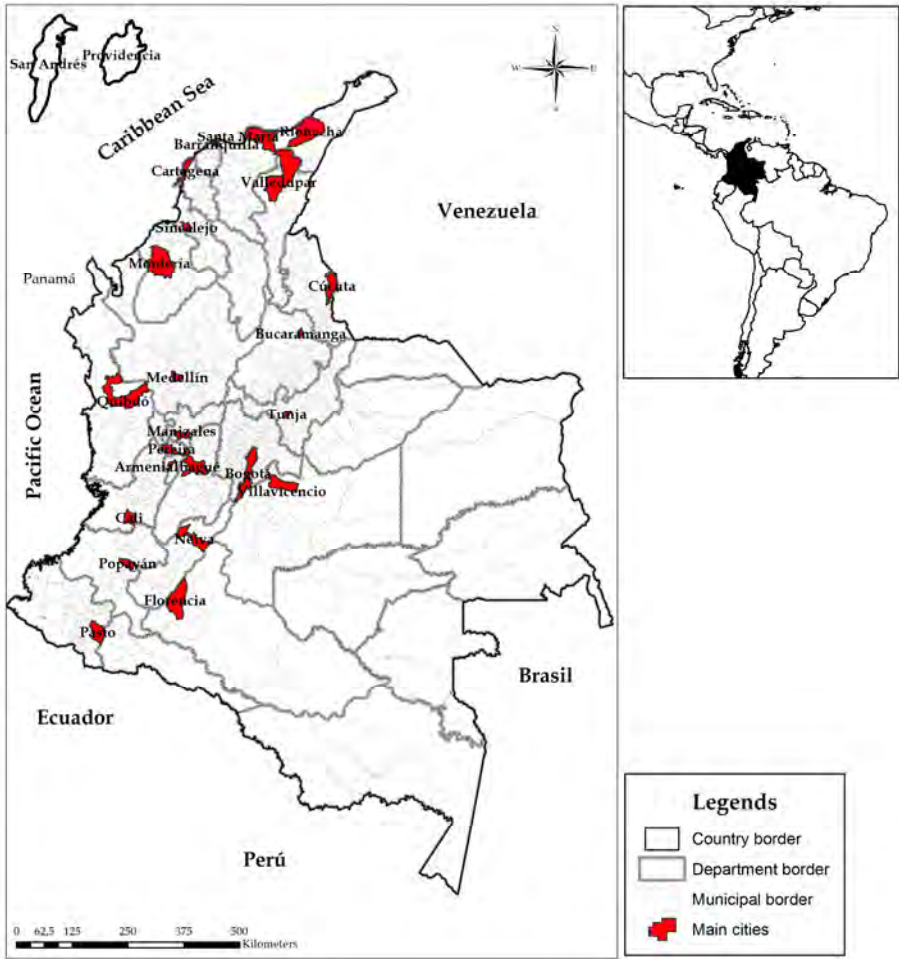
In this document, municipal GDP is used as a proxy of the tax base together with municipal cadastral appraisals. Because DANE's municipal GDP is not available for a long period of time, in this paper we compute a version of this indicator based on the departmental GDP and municipalities' budgetary information, in particular the industry and commerce tax (ICA). It is computed as the participation of each municipality's ICA in the total sum of the tax for all municipalities within their corresponding department. Then, the resulting participation is multiplied by their corresponding departmental GDP.

Another variable that uses DANE's information as its main source is the unemployment rate. This is computed based on household surveys, which have been evolving in Colombia since the end of the sixties when the first attempt of this kind was undertaken in Colombia. First, it was the National Household Survey (ENH, by its Spanish acronym), a multipurpose survey with the main objective of collecting data on the labor market variables, as well as other socioeconomic information of national interest. The ENH started collecting quarterly data in 1976 with variable coverage in the four main cities (Bogotá, Medellín, Cali and Barranquilla), and half-yearly for another group of three (Bucaramanga, Manizales y Pasto). Then, since 2000 a new stage of household surveys was performed, the Continuous Household Survey (ECH, by its Spanish acronym), covering the 13 main cities and metropolitan areas, and differentiates between urban and rural areas. A third stage started in 2006, and is still at work, the Integrated Household Survey (GEIH, by its Spanish acronym), which introduced a series of reforms and coverage increase, collecting quarterly information for 23 cities and metro areas. This survey integrated three different surveys: ECH, Income and Expenses Survey (EIG, by its Spanish acronym), and the Quality of Life Survey (ECV, by its Spanish acronym) (DANE, 2009).

Georeferenced data uses as its main source the Agustín Codazzi's Geographical Institute (IGAC, by its Spanish acronym), which is in charge of producing the official cartography as well as collecting data on the real estate's cadastral appraisals. There are just few exceptions where cadastral data is self-collected and managed by municipalities themselves: Bogotá, Cali, and Medellín. The growth rate of cadastral appraisals is used as a proxy of the property tax base.

In terms of the number of cities used in this research, a first stage was considering all the capitals of departments, under the argument of their geo-political importance and their regional representativeness. Nevertheless, when having a closer look at the data needed to compute fiscal health indicators, there was a set of nine capitals for which, in many cases, there was not enough information or it was not continuously reported to national authorities. In some other cases, even when reported, the information shows unexpected high variability and outliers difficult to explain. These capitals belong to a group of departments known as *Nuevos Departamentos*: Arauca, Casanare, Putumayo, Amazonas, Guanía, Guaviare, Vaupés, Vichada, all of them located in the mid and southeast of the country.

Figure 3. Spatial location of the 23 Colombia’s main cities



Note: For the purpose of this document, the following is the regional classification of the cities: Caribbean: Riohacha, Santa Marta, Barranquilla, Valledupar, Cartagena, Sincelejo and Montería; Eastern: Tunja, Bogotá, Villavicencio, Cúcuta and Bucaramanga; Central: Medellín, Manizales, Florencia, Neiva, Armenia, Pereira and Ibagué; Pacific: Popayán, Quibdó, Pasto and Cali.

Source: DANE. Authors’ elaboration.

For this reason, the final sample of municipalities used for computing fiscal health indicators is the group of 23 capitals of departments, for which the information is mostly available (Figure 3). DANE, for example, considers this set of cities and their metro areas within the GEIH, allowing getting detailed information used to compute socioeconomic indicators such as those of labor market and quality of life. As can be seen in the map, the sample of cities even though has significant socio-demographic representativeness, given that most of the population lives in this half of the territory, it is not representative from a regional point of view since there is no a single city from the less populated half of the country.³

5. Brief profile of selected cities

This section gives a first glimpse at the sample of selected cities. In the previous section it was shown the geographical context and the regional representativeness, while the present is dedicated to the general demographic and socioeconomic context, as well as to a comparison among cities. For this purpose, five indicators are considered: population size, income per capita, unemployment rate, expenditures per capita and taxes per capita.

Population is no doubt an always-considered way to have a first idea on how a city or a group of cities have been evolving over time. Urban and regional researchers have developed and used new theories on how cities' population behave over time and if there is evidence about their relationship with each other. For example, Zipf's Law, an empirical urban regularity argues that the biggest city in a country should be twice as big as the second, three times the third, and so on (Pérez and Meisel, 2014).

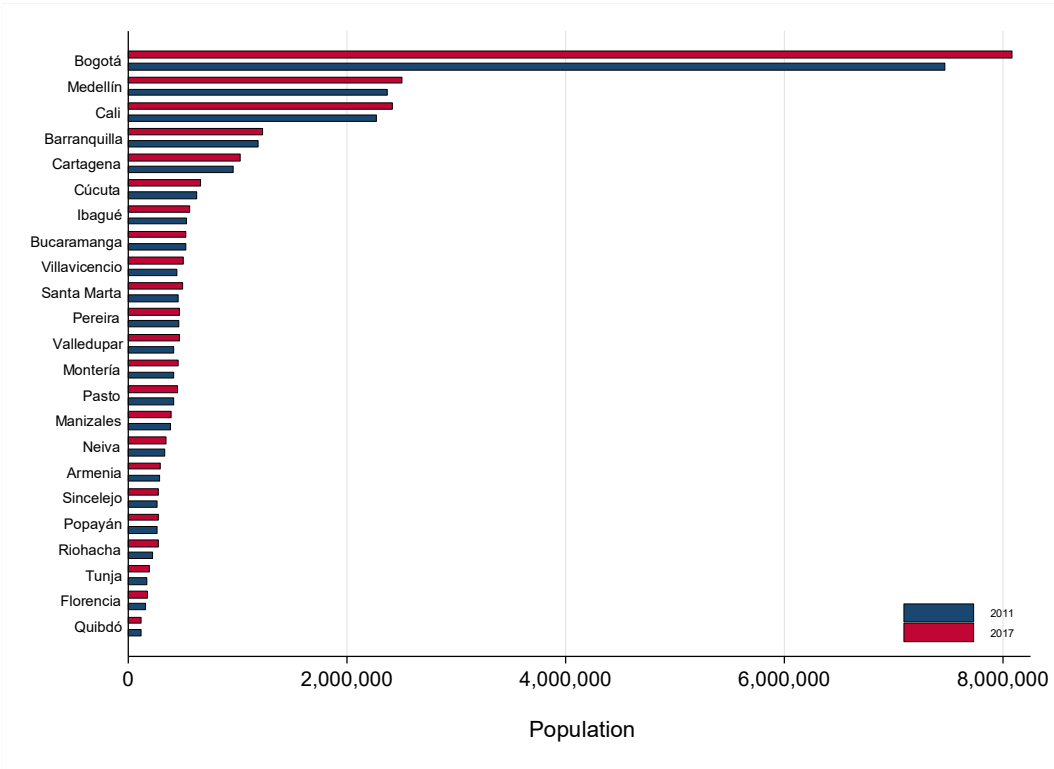
Figure 4 shows a comparison of city sizes between 2007 and 2017 using the 23 selected cities, and some characteristics arise. First, there is a clear supremacy of the capital city (Bogotá), with over eight million (M) people. A second characteristic is that there are at least three additional clusters of cities. The second is made up of two cities of similar sizes (about 2.5 M), Medellín and Cali. A third group is formed by Barranquilla and Cartagena (with over 1.0 M people), located both of them in the Caribbean coast. A fourth group is made up of the other nineteen cities (with less than 1.0 M). As expected, city size in Colombia is closely

³ The population in this part of the country is less than 5%.

related to social and economic development. Cities within the highest part of the table are strongly related to industrial activities, manufacturing, services, and tourism.

Regarding Zipf’s Law mentioned above, Pérez and Meisel (2014), using an adjusted version of the rank-size relationship, found that city size distributions in Colombia follow a Zipfian power law at national level and partially at the regional level since 1964. The importance of this finding is that it allows determining whether or not urban population in a region or a country have a common growth path, which in turn allows to predict how urban development can be affected by exogenous shocks. Moreover, the authors found that whereas the smallest and biggest cities are more likely to remain so in the future, medium-sized cities have a higher probability of facing a downward mobility.

Figure 4. Population – 23 Main cities (2011 vs 2017)

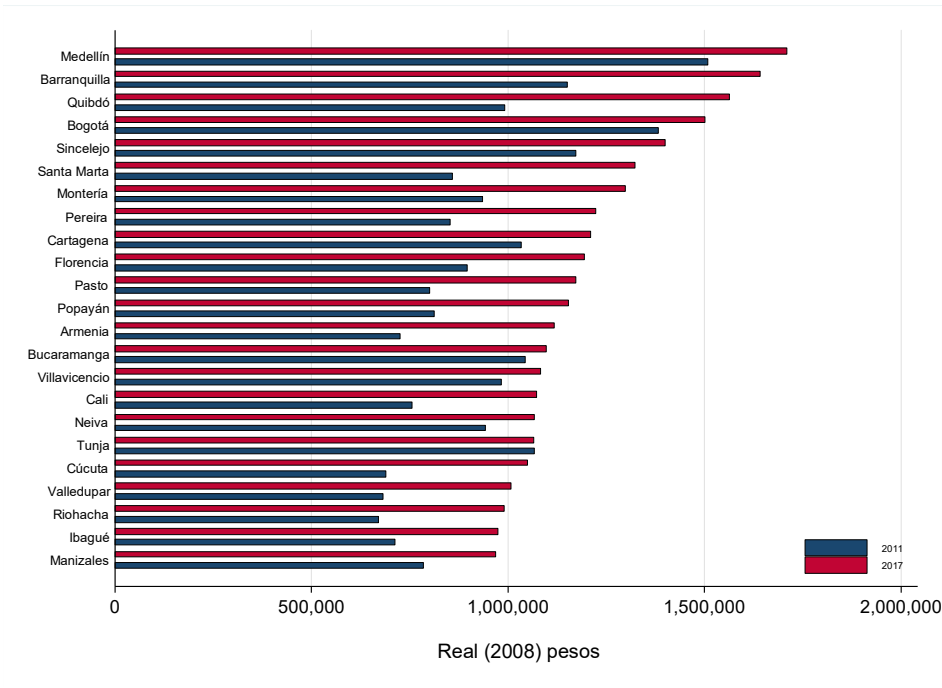


Note: For the purpose of this document, the following is the regional classification of the cities: Caribbean: Riohacha, Santa Marta, Barranquilla, Valledupar, Cartagena, Sincelejo and Montería; Eastern: Tunja, Bogotá, Villavicencio, Cúcuta and Bucaramanga; Central: Medellín, Manizales, Florencia, Neiva, Armenia, Pereira and Ibagué; Pacific: Popayán, Quibdó, Pasto and Cali.

Source: DANE. Authors’ elaboration.

Income per capita is the second profile variable (Figure 5). In this case it is evident the more homogeneity between the cities, as there is no significant difference between Bogotá and the rest of them as seen with population. In fact, it can be observed that Bogotá is not the city with the highest income per capita among the 23. It is worth mentioning that income in this context refers to cities' total income, which includes not only current income (tax and non-tax) but also capital income such as transfers from the national government. The latter is the main reason why some of the poorest cities appear up in the ranking with the highest income per capita. This is the particular case of Quibdó and Sincelejo. Therefore, this variable is showing the available amount of economic resources that each city has relative to its population. The figure also shows that, except for a few cases, between 2011 and 2017 there was a significant increase in income per capita reaching amounts between COP 1.0 M and COP 1.5M per person.⁴

Figure 5. Income per-capita – 23 Main cities (2011 vs 2017)



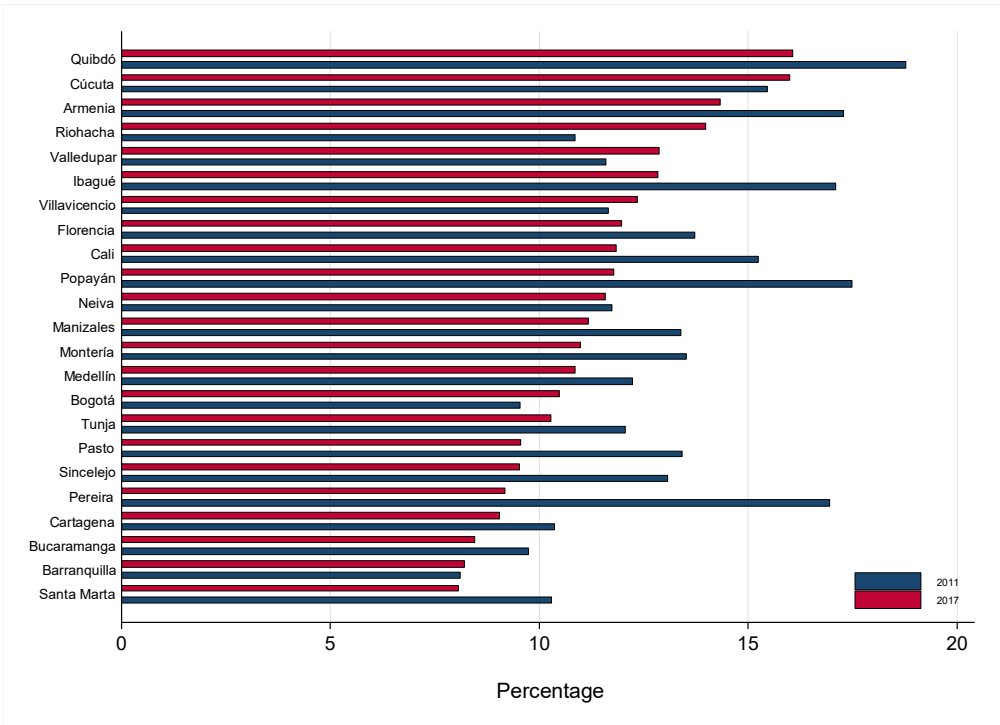
Note: For the purpose of this document, the following is the regional classification of the cities: Caribbean: Riohacha, Santa Marta, Barranquilla, Valledupar, Cartagena, Sincelejo and Montería; Eastern: Tunja, Bogotá, Villavicencio, Cúcuta and Bucaramanga; Central: Medellín, Manizales, Florencia, Neiva, Armenia, Pereira and Ibagué; Pacific: Popayán, Quibdó, Pasto and Cali.

Source: DANE. Authors' calculations.

⁴ For comparison purposes with other countries the recent average exchange rate has been around: 1US\$ = 3,000 Colombian pesos.

Unemployment is the third variable used here to define a first approach of cities' general socioeconomic circumstances (Figure 6). During the last decade, Colombia has been in a constant process of reducing the unemployment rate, and it has also been the pattern of the 23 main cities, with few exceptions: Cúcuta, Riohacha, Valledupar, Villavicencio, Bogotá, and Barranquilla. The latter with a small difference between 2011 and 2017, and with one of the lowest unemployment rates. The average for the whole group was about 11.4% in 2017. Despite the significant reduction in unemployment, meaning that more people have a paid occupation, there is still much to do to improve the quality of these jobs, since labor informality in the main cities is around 50%. This phenomenon is not new in Colombia and is not exclusive of the labor market. Housing informality, which is around 20%, within the thirteen main cities, and might be higher for the total group of sample cities, is a persistent problem in Colombia too (Bonet *et al.*, 2016).⁵

Figure 6. Unemployment rate – 23 Main cities (2011 vs 2017)



Note: For the purpose of this document, the following is the regional classification of the cities: Caribbean: Riohacha, Santa Marta, Barranquilla, Valledupar, Cartagena, Sincelejo and Montería; Eastern: Tunja, Bogotá, Villavicencio, Cúcuta and

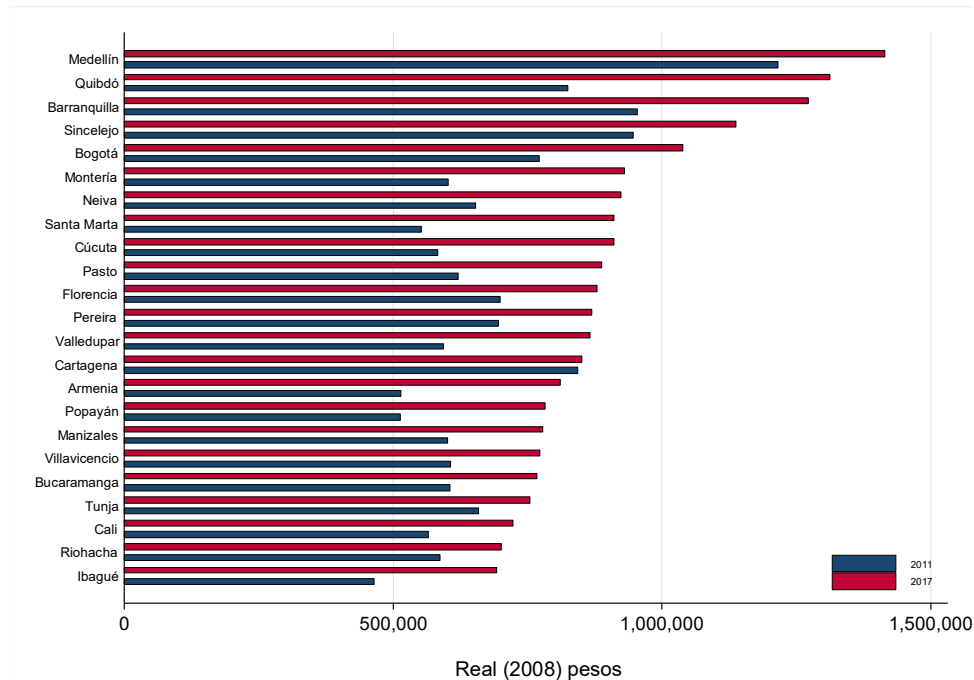
⁵ The authors use characteristics such as inadequate infrastructure, lack of basic services (sanitation and electricity), and irregular/illegal tenancy to define housing informality.

Bucaramanga; Central: Medellín, Manizales, Florencia, Neiva, Armenia, Pereira and Ibagué; Pacific: Popayán, Quibdó, Pasto and Cali.

Source: DANE. Authors' calculations.

Relative size of public expenditures is another central variable to understand the general situation each city is facing (Figure 7). In this case, it is evident the similarity between public expenditures and public income, not only in terms of the position each city holds but also regarding the amounts per capita. The main reason is that subnational governments are tied to limits to their indebtedness (Law 358/1997), limits to the growth of their spending (Law 617/2000), and more recently, they are bounded to fiscal responsibility rules (Law 819/2003)⁶. The top 5 of the cities are the same in the two indicators although in different order (Medellín, Quibdó, Barranquilla, Sincelejo and Bogotá). In terms of the amounts per capita, expenditures are between COP 0.7 M and COP 1.4 M, just below the amounts of per capita income, with an average of COP 0.9 M in 2017.

Figure 7. Expenditures per capita – 23 Main cities
(2011 vs 2017)



Note: For the purpose of this document, the following is the regional classification of the cities: Caribbean: Riohacha, Santa Marta, Barranquilla, Valledupar, Cartagena, Sincelejo and Montería; Eastern: Tunja, Bogotá, Villavicencio, Cúcuta and

⁶ For a deeper explanation on national and subnational fiscal rules, see Lozano *et al.* (2008).

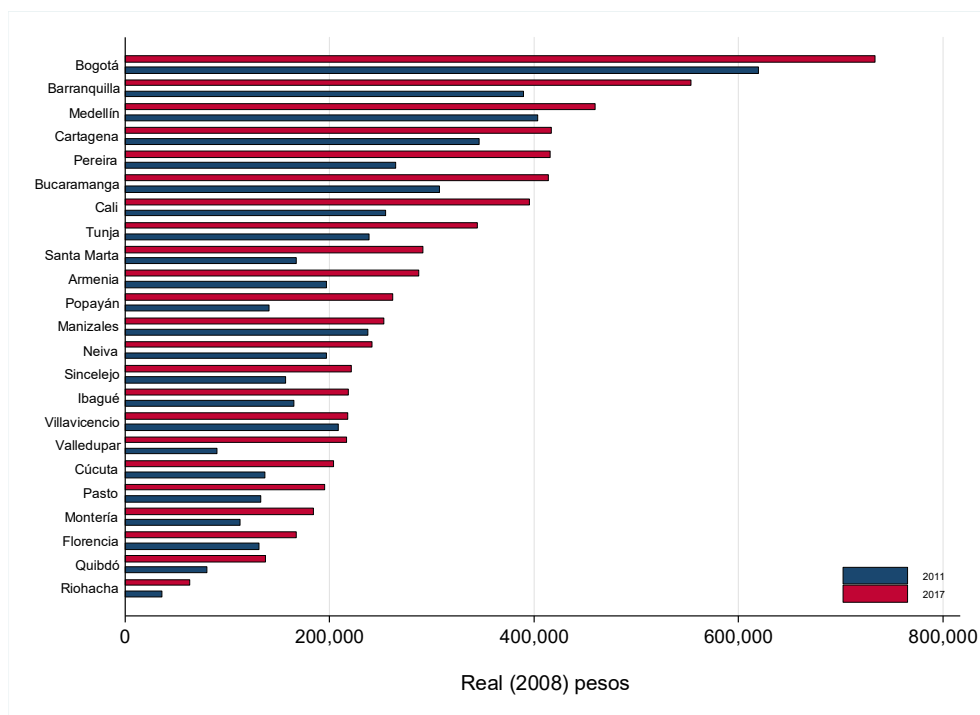
Bucaramanga; Central: Medellín, Manizales, Florencia, Neiva, Armenia, Pereira and Ibagué; Pacific: Popayán, Quibdó, Pasto and Cali.

Source: DANE. Authors' calculations.

The other characteristic that per capita income and expenditure share is that there is not a clear ordering of cities with higher prosperity at the top of the ranking or those in need at the bottom. There is a mixture that can be explained because of the decentralization process, where transfers from the national government are given to subnational governments mostly based on poverty conditions and needs. The rich group of cities justifies themselves their place at the top of the table.

The last variable of this group of profile indicators is taxes per capita (Figure 8). This is a closer to fiscal performance measure since it captures the capacity and potential autonomy of cities to cover their most immediate expenses. The reason is that it does not depend on economic resources transferred by the central government but on its own capability. Considering these characteristics, it is not expected any close relationship with previous profile indicators, with the exception of population and a little less with unemployment. For population, the ranking of cities is very similar to that of taxes per capita, meaning that city size could be, on average, a good predictor of fiscal performance among this sample of cities. Results are showing that, even though there is a close relationship with the city size, there is still a significant heterogeneity across the 23 cities, with an average in 2017 of Colombian pesos (COP) 0.3 M. For example, if comparing the first at the top and the last at the bottom, we observe that Bogotá is capable of collecting sixteen times more taxes than Riohacha. In fact, Colombia does not only suffer of a significant income inequality but also a high and persistent regional inequality, in particular to the detriment of peripheral cities (Bonet and Meisel, 2001; Galvis and Meisel, 2010). As mentioned by the authors, this situation does not happen by chance but is related to: (1) institutional differences where stronger and more stable cities are also those with the best fiscal and financial results; and (2) with the clustering of productive centers in just few regions, making tax bases also spatially concentrated. For the particular case of the peripheral Caribbean region, it has been shown that its persistent lag, relative to inner regions, is mainly due to institutional weaknesses (Bonilla and Higuera, 2018).

Figure 8. Taxes per capita – 23 Main cities
(2011 vs 2017)



Note: For the purpose of this document, the following is the regional classification of the cities: Caribbean: Riohacha, Santa Marta, Barranquilla, Valledupar, Cartagena, Sincelejo and Montería; Eastern: Tunja, Bogotá, Villavicencio, Cúcuta and Bucaramanga; Central: Medellín, Manizales, Florencia, Neiva, Armenia, Pereira and Ibagué; Pacific: Popayán, Quibdó, Pasto and Cali.

Source: DANE. Authors' calculations.

With the purpose of having a more general perspective of the 23 cities in this sample, Table 3 presents the set of profile indicators in a comparison between 2011 and 2017 and their total variation during the period. Interregional population evolution in the whole country follows the usual international pattern where demographic transition is lagged among poorer regions, in this case Pacific and Caribbean regions (Romero, 2017). Nevertheless, within the small sample of cities in this research this is not evident, at least in the short term. We can observe that the highest population variations are not exclusively present within lagged behind regions (Pacific and Caribbean) and neither the lowest are only present among the most prosperous (Eastern and Central).

Table 3. Profile indicators – Percentage variation 2011-2017

Region	Municipality	Population			Income per capita			Unemployment rate			Expenditures per capita			Taxes per capita		
		2011	2017	Variation (2011-2017)	2011	2017	Variation (2011-2017)	2011	2017	Variation (2011-2017)	2011	2017	Variation (2011-2017)	2011	2017	Variation (2011-2017)
		Inhabitants	Inhabitants	(%)	COP\$ (real 2008)	COP\$ (real 2008)	(%)	(%)	(%)	percentage points (pp)	COP\$ (real 2008)	COP\$ (real 2008)	(%)	COP\$ (real 2008)	COP\$ (real 2008)	(%)
Eastern	Bogotá	7,467,804	8,080,734	8.2	1,382,747	1,500,398	8.5	9.5	10.5	0.9	771,886	1,040,529	34.8	619,728	734,491	18.5
	Tunja	174,561	195,538	12.0	1,067,599	1,067,382	0.0	12.1	10.27	-1.8	659,256	754,431	14.4	239,138	345,245	44.4
	Villavicencio	441,996	506,012	14.5	983,446	1,083,207	10.1	11.7	12.4	0.7	606,531	772,817	27.4	208,884	218,426	4.6
	Cúcuta	624,661	662,673	6.1	690,513	1,049,673	52.0	15.5	16.0	0.5	582,987	911,965	56.4	137,067	203,856	48.7
	Bucaramanga	525,119	528,497	0.6	1,045,174	1,096,862	4.9	9.9	8.5	-1.5	605,219	767,691	26.8	307,990	414,694	34.6
Central	Medellín	2,368,282	2,508,452	5.9	1,508,828	1,710,344	13.4	12.3	10.8	-1.5	1,216,078	1,416,255	16.5	403,793	459,921	13.9
	Manizales	390,084	398,830	2.2	783,997	970,284	23.8	13.4	11.2	-2.2	601,436	779,541	29.6	237,704	253,110	6.5
	Florencia	160,409	178,450	11.2	897,309	1,195,384	33.2	13.7	12.0	-1.7	698,608	879,871	25.9	131,030	167,752	28.0
	Neiva	333,030	345,806	3.8	943,650	1,068,792	13.3	11.7	11.6	-0.2	654,278	924,343	41.3	197,361	241,431	22.3
	Armenia	290,482	299,712	3.2	725,336	1,119,123	54.3	17.3	14.3	-2.9	516,097	810,955	57.1	197,493	287,766	45.7
	Pereira	459,667	474,335	3.2	852,854	1,223,894	43.5	17.0	9.2	-7.8	695,495	869,997	25.1	265,313	416,318	56.9
Caribbean	Ibagué	532,020	564,076	6.0	711,828	974,053	36.8	17.1	12.9	-4.3	465,226	693,166	49.0	165,532	218,917	32.3
	Barranquilla	1,193,667	1,228,271	2.9	1,151,192	1,643,222	42.7	8.1	8.2	0.1	953,798	1,272,119	33.4	389,623	554,351	42.3
	Cartagena	955,709	1,024,882	7.2	1,032,997	1,210,899	17.2	10.4	9.0	-1.4	844,067	851,098	0.8	346,713	417,732	20.5
	Valledupar	413,341	473,251	14.5	681,223	1,007,922	48.0	11.6	12.9	1.3	595,073	866,209	45.6	90,356	217,027	140.2
	Montería	415,852	453,931	9.2	936,640	1,298,435	38.6	13.5	11.0	-2.5	602,861	931,078	54.4	112,365	183,836	63.6
	Riohacha	222,354	277,868	25.0	670,937	991,787	47.8	10.9	14.0	3.1	587,673	702,145	19.5	35,975	63,338	76.1
	Santa Marta	454,860	499,391	9.8	859,025	1,322,589	54.0	10.3	8.1	-2.2	552,292	912,096	65.1	167,790	290,970	73.4
	Sincelejo	260,010	282,868	8.8	1,171,960	1,399,168	19.4	13.1	9.5	-3.6	947,207	1,139,313	20.3	157,636	221,153	40.3
Pacific	Popayán	268,036	282,453	5.4	813,628	1,153,124	41.7	17.5	11.8	-5.7	513,273	783,780	52.7	140,562	261,584	86.1
	Quibdó	114,792	116,058	1.1	992,905	1,565,481	57.7	18.8	16.1	-2.7	825,065	1,312,256	59.0	80,246	137,524	71.4
	Pasto	417,484	450,645	7.9	800,579	1,172,601	46.5	13.4	9.5	-3.9	620,600	887,932	43.1	132,738	195,751	47.5
	Cali	2,269,653	2,420,114	6.6	755,900	1,072,709	41.9	15.2	11.8	-3.4	565,728	724,156	28.0	254,777	396,193	55.5

Source: Authors' calculations.

A similar pattern can be extrapolated to income and expenditures amounts per capita. Variations on the other side look like the more lagged behind the cities the higher the variations between 2011 and 2017. This can be seen going down the table since the first two regions (Eastern and Central) are those more able and the last two are the more lagged behind (Caribbean and Pacific). For the unemployment rate, although there are not significant differences across regions, the deepest reductions occurred in Pacific region's cities. Taxes per capita are not so different across regions, but it is evident the less capability in tax collection in poorer cities across all regions: Cúcuta (Eastern region), Florencia (Central region), Riohacha (Caribbean region), and Quibdó (Pacific). Nevertheless, variations between 2011 and 2017 show that, on average, peripheral regions increased their taxes per capita by more than double.

As a general conclusion from profile indicators, there seems to be a convergence pattern or a catch-up effect. It is that poorer regions or cities tend to improve their socioeconomic indicators faster than richer ones. In this case the Caribbean and Pacific regions' cities show higher increases in income, expenditures and taxes per capita, and deeper reductions in unemployment, at least during the last few years.

6. Fiscal health put into practice

After having a general idea of the cities' profiles, the next step is going deeper into more specific fiscal and financial indicators. Following Slack (2017), the first group consists of two external indicators, population growth and tax base growth, as a measure of cities' potential demand for services and its future capability to meet their obligations. The second is the financial group, which considers measures of how revenues are able to cover operational expenses (operating deficit), and cities' capacity to pay their short term commitments (net financial assets). A third set of indicators is tax and revenue, from which it is intended to understand to what extent cities are vulnerable to external shocks represented as transfers from central government (own-source revenues relative to total revenues), and also vulnerability to cash-flow reductions (taxes receivable relative to taxes levied).

Debt is the fourth set of variables. In this case the main purpose is to capture cities' sustainability or their capability to pay their debts with their own taxes (debt to tax ratio), and

also to repay their debts with own-source revenues (debt charges relative to own-source revenues). The last group is reserved for infrastructure, which is novel in this type of analyses. The first measure is intended to capture cities' needs of infrastructure by considering the age and the needs for repairing of physical assets (asset consumption ratio). And the second indicator (extent to investment in capital assets) let us have an idea about the degree at which cities have been preserving the value of their assets by investing on them.

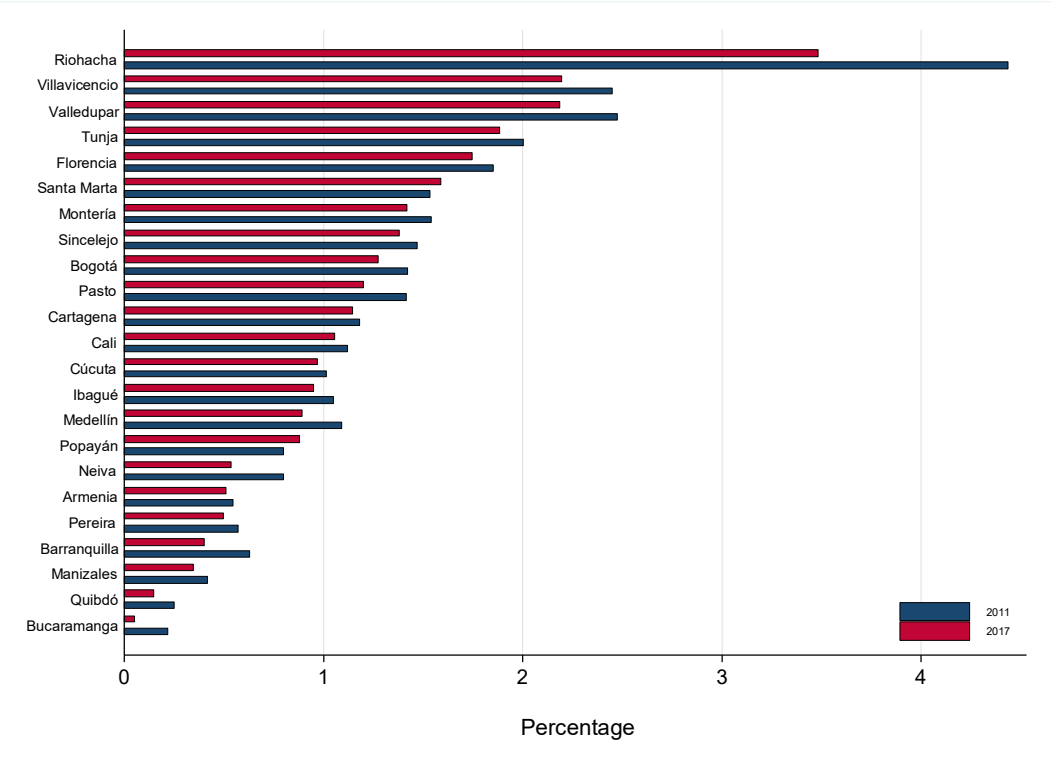
6.1. External indicators

Considering population growth as a factor of fiscal health is key in understanding where the cities are heading to, and what type of urban development is needed. There are at least two approaches through which population growth is relevant for the future of a city. The first one is the relationship between city size and population growth. At this respect urban economists have long argued that in order to understand and predict the future of cities, it is important not only their sizes but also how faster they grow. The empirical regularity known as Gibrat's Law establishes that, in the long run, population will randomly grow with the same mean and variance and also that city size and population growth are independent from each other (Gibrat, 1931). For the particular case of Colombian cities, it was found that, since the second half of the Twentieth Century, there is evidence that Gibrat's hypothesis started to hold, so that cities started to grow at similar rates irrespective of their sizes (Pérez and Meisel, 2014). This means that local governments are more able to influence population growth in their cities by means of public policies, in particular those making them more attractive, in terms of offering a better quality of life to their residents.

The second approach is the relationship between population growth and the cities' socioeconomic development. At this respect, population growth in Colombian cities follow the international pattern where the higher the socioeconomic development the lower the population growth rates (Romero, 2017). In other words, that the interregional demographic transition in the country shows significant disparities, meaning that population in poorer regions (Caribbean and Pacific) is younger than in the more developed ones (Eastern and Central), or that reductions in fertility rates in the poorest started later than in the more developed.

For the particular group of cities in this study, Gibrat’s Law seems to be holding, since there is not any evident relationship between city size and urban population (Figure 9). On the other hand, there is not a clear pattern that lagged behind cities are growing faster than richer ones. For example, Riohacha and Quibdó, two of the poorest, grow very differently, the first at the highest rate and the latter has the second to last growth rate. A similar behavior is followed by the richest (Bogotá, Medellín, Cali, Barranquilla and Bucaramanga), which occupies different positions of the ranking, and not a particular place at the top or at the bottom.

Figure 9. Population growth – 23 Main cities (2011 vs 2017)



Source: DANE. Authors’ calculations.

The second external measure is tax base growth. Because in Colombia the most important taxes within municipalities’ revenues are property tax (on real estate), and industry and commerce tax, two proxies of tax base were computed based on each one of them. For the first one real estate, cadastral appraisals are used, and for the second a version of municipal GDP that, as mentioned before, was computed based on municipalities’ industry and commerce (ICA) tax participation on departmental GDP.

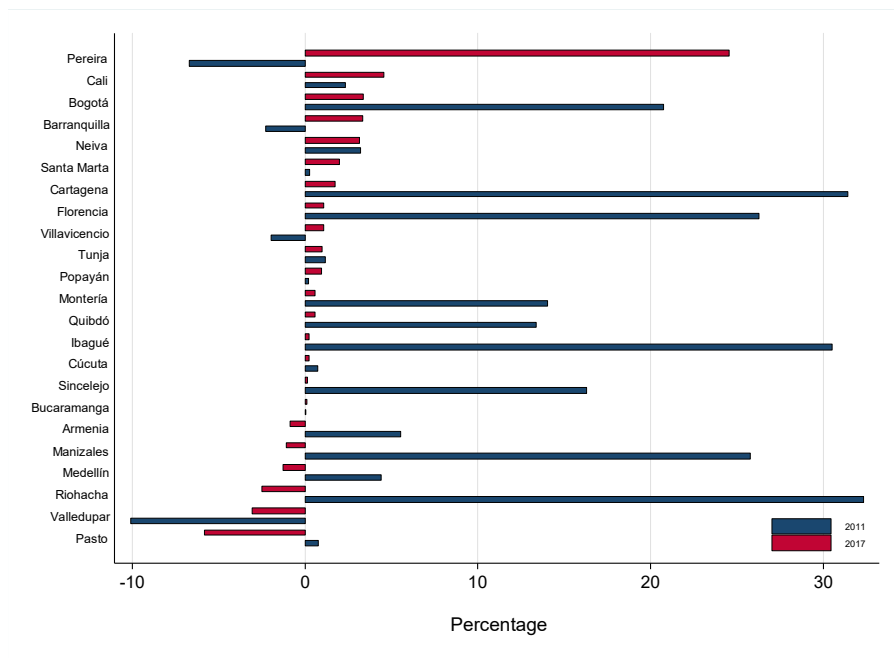
After computing biannual average growth rates for the last two years (2016-2017), in a comparison for the first two (2010-2011), the results show significant differences, in particular property taxes (Figure 10). For example, for most of the cities (rich and poor) property tax bases grew at higher rates few years ago than it did last year, where Pereira showed the highest rate (25%) compared with the rest of the cities, which grew below 5% and even negatively in few others. These high increases happen time to time in cities because most of them are not capable of making yearly cadastral updates. Nevertheless, these are only two pictures from which it is not possible to foresee any trend. To overcome this difficulty, Annex 2B shows time trends of property tax bases' biannual growth between 2011 and 2017. Time series in general show a downward trend for most of the cities, after common peaks around 30%-40% between 2012 and 2014. It is worth mentioning that cadastral appraisals should be updated every five years (Law 14/1983), which help to explain similar patterns for most of the cities⁷. However, due to lack of technical capacity or budgetary constraints, not all municipalities meet the standard as frequently as it should be.

GDP growth rate (panel b) on the other hand show a more stable behavior when comparing results in 2011 and 2017, with no evident pattern between rich and poor cities. But a clearer perspective can be seen from time trends (Annex 2C), where rich cities (Bogotá, Medellín, Barranquilla, Cartagena and Cali) have been growing at positive rates (around 4%), while the poorest (Florencia, Quibdó, Cúcuta and Sincelejo) are moving from negative to positive figures after a several years' downward trend. In summary, tax base growth has been showing a general downward trend when measured through property tax base (cadastral appraisals), and a steadier to slightly positive when GDP is considered.

⁷ In Colombia, there is bill that seeks to reform cadastral legislation where a multi-purpose cadaster would replace the current one where, among other issues, the cadaster update period would also change.

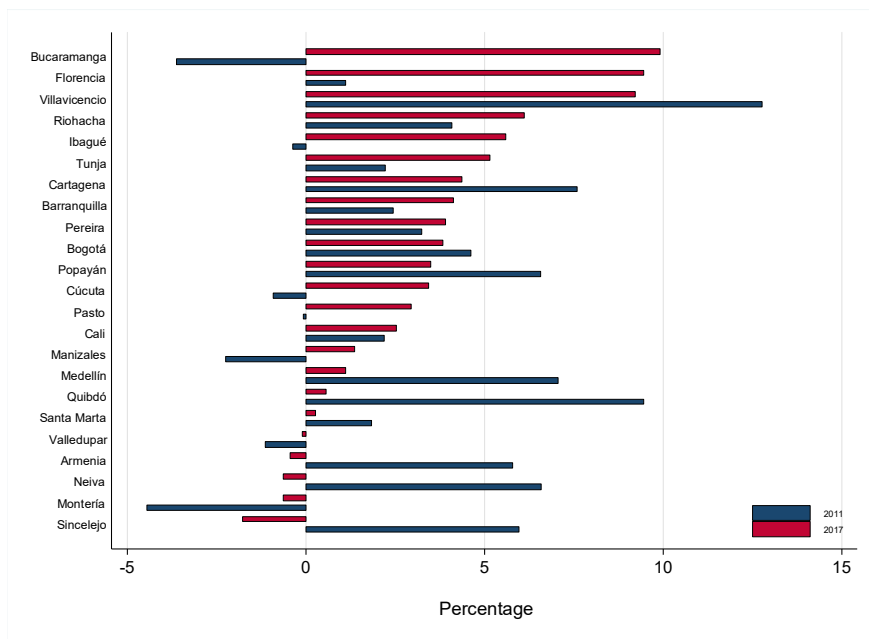
Figure 10. Tax base growth – 23 Main cities
(Average bianual (2016-2017) growth)

a. Property tax base growth



Source: DANE. Authors' calculations.

b. GDP growth



Source: DANE. Authors' calculations.

In order to have a more detailed perspective of the two tax-base instruments used for the analyses, Table 4 shows cadastral appraisals and GDP for individual cities in real COP, as well as the total variation between 2011 and 2017. These results offer two additional dimensions, the levels of the indicators instead of their biannual growth, and the regional pattern. It is evident that both cadastral appraisals and GDP have increased in real terms for the whole set of cities, with just few exceptions. Also, at regional level no patterns can be derived from total variations, nor in cadastral appraisals neither in GDP, since rich and poor regions show similar variations.

Table 4. Tax base - Percentage variation 2011-2017

Region	Municipality	Tax base					
		Property			Industry and commerce tax		
		2011	2017	Variation (2011-2017)	2011	2016	Variation (2011-2017)
		Millions COP\$ (real 2008)	Millions COP\$ (real 2008)	(%)	Millions COP\$ (real 2005)	Millions COP\$ (real 2005)	(%)
Eastern	Bogotá	220,319,760	379,159,104	72.1	118,508,000	143,750,000	21.3
	Tunja	1,898,490	3,379,768	78.0	2,247,353	3,301,712	46.9
	Villavicencio	4,516,665	7,792,901	72.5	6,717,206	7,165,139	6.7
	Cúcuta	3,582,839	10,970,544	206.2	5,826,757	5,984,143	2.7
	Bucaramanga	6,754,601	12,187,721	80.4	9,065,596	12,554,390	38.5
Central	Medellín	38,797,388	58,467,928	50.7	37,674,188	40,682,856	8.0
	Manizales	6,806,739	6,722,034	-1.2	4,862,557	5,711,258	17.5
	Florencia	1,397,079	1,784,843	27.8	1,457,751	1,930,264	32.4
	Neiva	2,520,308	4,127,790	63.8	5,120,644	5,420,486	5.9
	Armenia	3,445,510	3,871,183	12.4	2,749,069	2,965,220	7.9
	Pereira	8,506,849	14,904,739	75.2	5,253,009	6,437,277	22.5
	Ibagué	5,385,615	6,227,842	15.6	5,704,097	6,898,776	20.9
Caribbean	Barranquilla	16,772,205	24,390,514	45.4	15,575,786	19,609,802	25.9
	Cartagena	24,651,336	30,521,052	23.8	16,954,838	19,936,600	17.6
	Valledupar	3,246,254	5,952,208	83.4	3,437,056	5,179,337	50.7
	Montería	4,003,282	5,916,591	47.8	3,880,851	5,614,649	44.7
	Riohacha	1,511,974	1,489,749	-1.5	1,074,019	1,444,160	34.5
	Santa Marta	4,112,942	8,143,893	98.0	4,501,128	4,643,254	3.2
	Sincelejo	1,507,683	1,701,631	12.9	2,654,645	2,526,642	-4.8
Pacific	Popayán	2,276,270	3,784,164	66.2	1,884,483	2,403,675	27.6
	Quibdó	823,982	1,314,130	59.5	1,206,133	1,056,691	-12.4
	Pasto	2,855,507	5,720,800	100.3	4,678,964	5,515,251	17.9
	Cali	23,368,238	41,936,356	79.5	25,918,208	30,143,718	16.3

Source: Authors' calculations.

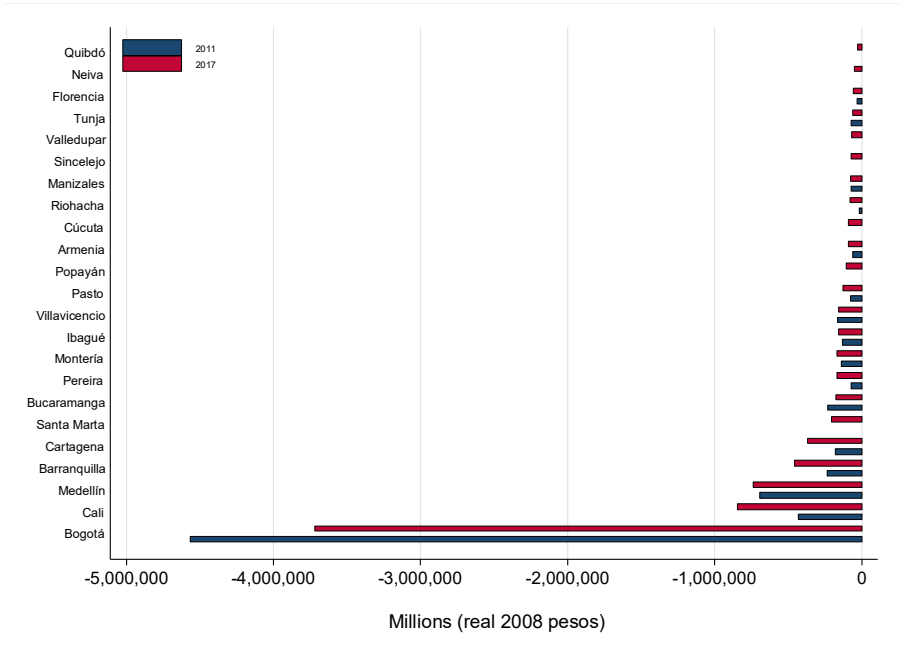
6.2. Financial circumstances

Within financial indicators operating deficits and net financial assets are included. The first one (Figure 11), computed as the difference between operating expenditures and operating revenues, is intended to capture how local governments are able to cover their most

immediate expenses or, in other words, how healthy their short-term fiscal sustainability is. In this case, as expected, higher income cities should reveal lower deficits (or higher surpluses) and being at the bottom part of the ranking, and the opposite for lower income or poorer cities.

A first point to note is that none of the 23 cities is facing a deficit. Second, Bogotá, Cali, Medellín and Barranquilla, are those with highest operating surpluses, where the capital city stands out far beyond its counterparts. On the other hand, Quibdó, Florencia, Sincelejo and Riohacha are among those at the top of the table with the lowest operating surpluses. In terms of changes between 2011 and 2017, with few exceptions, there were generalized increases in operating surpluses.

Figure 11. Operating deficit – 23 Main cities (2011 vs 2017)

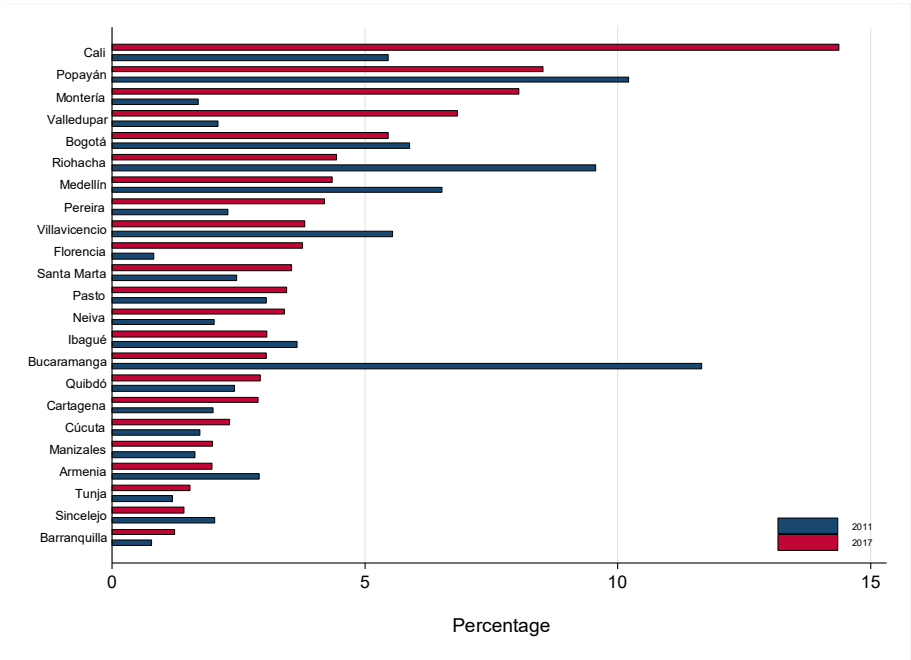


Source: DANE. Authors’ calculations.

The second financial indicator, net financial assets (Figure 12), refers to the ratio between financial assets to financial liabilities. In this case positive balances would suggest that cities have higher capacity to commit their short-term obligations. Nevertheless, results have to be interpreted with caution since lower relative ratios do not necessarily imply lower financial

capacity but possibly an adequate strategy of short-term budget programming. There are two particular cases, Cali and Barranquilla, which showed high operating deficits, but are in opposite positions with respect of the net financial assets. These results might suggest that the first one uses its surpluses for longer-term purposes, and the second just to cover short-term imbalances, but still both within positive figures.

Figure 12. Net financial assets – 23 Main cities (2011 vs 2017)



Source: DANE. Authors’ calculations.

When computing total variations (2011-2017) for both indicators (Table 5), we see a positive behavior in the cities, with all of them facing operating surpluses, and most of them showing real increases in both operating surpluses and net financial assets, results which are generally consistent to time trends (Annexes D and E). Regionally, there seems to be a particular pattern, where operating surpluses and net financial assets have had, on average, higher increases in lagged behind regions (Pacific and Caribbean) than in the richest ones (Eastern and Central). In summary, fiscal health measured through financial indicators show a general positive balance for the whole group of cities, with some sort of convergence in favor of lagged behind regions.

Table 5. Financial circumstances - Percentage variation 2011-2017

Region	Municipality	Financial circumstances					
		Operating deficit			Net financial assets		
		2011	2017	Variation (2011-2017)	2011	2017	Variation (2011-2017)
		Millions COP\$ (real 2008)	Millions COP\$ (real 2008)	(%)	(%)	(%)	(%)
Eastern	Bogotá	-4,565,304	-3,718,660	-18.5	5.9	5.5	-7.2
	Tunja	-71,365	-61,255	-14.2	1.2	1.5	28.8
	Villavicencio	-166,659	-157,154	-5.7	5.6	3.8	-31.6
	Cúcuta	-96,817	-91,331	-5.7	1.7	2.3	33.1
	Bucaramanga	-231,127	-174,517	-24.5	11.7	3.1	-73.8
Central	Medellín	-693,952	-739,555	6.6	6.5	4.4	-33.4
	Manizales	-71,332	-76,218	6.8	1.6	2.0	21.2
	Florencia	-31,921	-56,331	76.5	0.8	3.8	355.2
	Neiva	-69,191	-50,047	-27.7	2.0	3.4	68.3
	Armenia	-60,825	-92,582	52.2	2.9	2.0	-31.9
	Pereira	-72,614	-168,042	131.4	2.3	4.2	83.3
	Ibagué	-131,340	-158,572	20.7	3.7	3.1	-16.3
Caribbean	Barranquilla	-236,124	-457,108	93.6	0.8	1.3	60.0
	Cartagena	-181,174	-369,114	103.7	2.0	2.9	44.0
	Valledupar	65,931	-67,110	-201.8	2.1	6.8	225.8
	Montería	-138,813	-166,895	20.2	1.7	8.0	371.8
	Riohacha	-18,514	-80,495	334.8	9.6	4.4	-53.5
	Santa Marta	-175,031	-205,160	17.2	2.5	3.6	44.5
Pacific	Sincelejo	-60,409	-73,526	21.7	2.0	1.4	-30.4
	Popayán	-70,355	-104,332	48.3	10.2	8.5	-16.6
	Quibdó	-51,171	-29,389	-42.6	2.4	2.9	20.5
	Pasto	-75,168	-128,422	70.8	3.1	3.5	13.2
	Cali	-432,278	-843,777	95.2	5.5	14.4	163.4

Note: For the following municipalities the percentage variation of the “operating deficit” corresponds to a different period of time because of availability restrictions of the data: Popayán (2013-2017); Valledupar, Quibdó, Neiva, Cúcuta and Sincelejo (2012-2017), and Santa Marta (2016-2017).

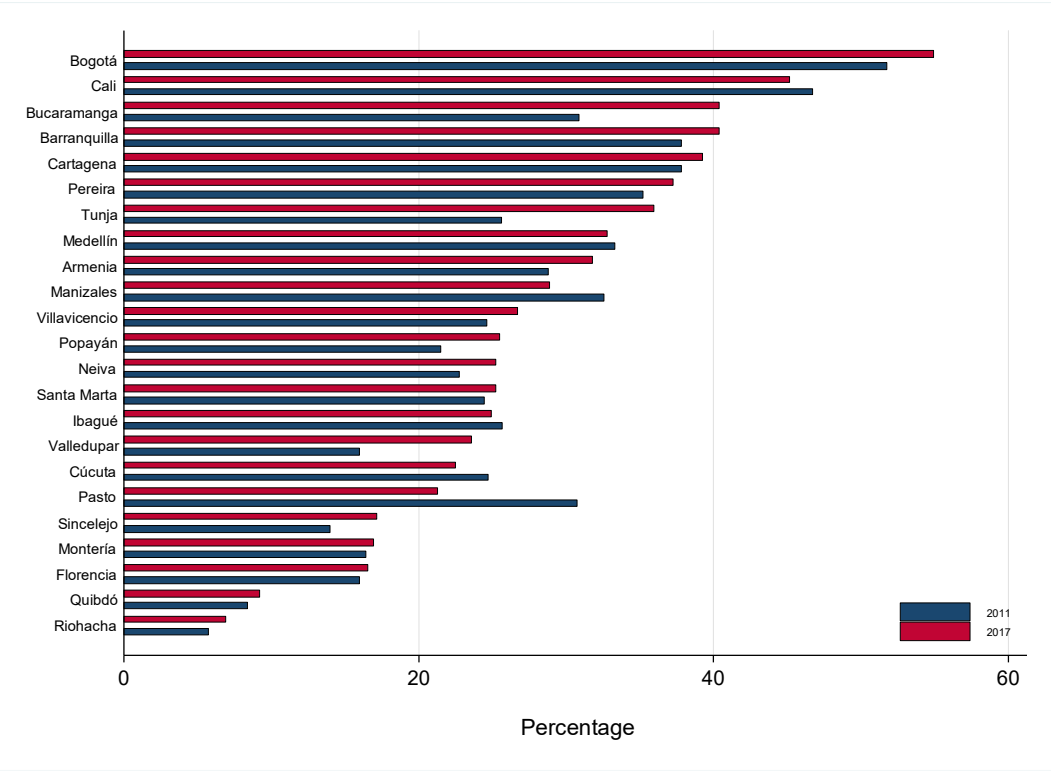
Source: Authors’ calculations.

6.3. Taxes and revenues

The third set of financial circumstances has to do with the potential capability of the cities to get their own resources, and to what extent they are able to rely on these revenues. Figure 13 shows how important own-source revenues are within total revenues. Another way to interpret these results is to what extent local governments depend on national transfers, since the two main components of total revenues are taxes and transfers. On average for the whole set of municipalities in Colombia, transfers (national and royalties) represent over 60% of total revenues (Bonet *et al.*, 2018). It is worth mentioning that transfers’ dependency does not necessarily translate into what is known as fiscal laziness, where municipalities reduce their own-source revenues as they receive more transfers from central government. In fact,

in Colombian municipalities there is no evidence that such phenomenon is at work, since both transfers and own-source revenues have had positive and significant growth rates during the last decades (Bonet *et al.*, 2017). It is worth mentioning that the deepening of decentralization process in Colombia at the end of the nineties, brought about several reforms to keep in track finances of subnational governments. One of those was the strengthening of own-source revenues (Law 488/1998 and Law 788/2003), by means of offering new tax and not-tax collection mechanisms (BID, 2010).

Figure 13. Own-source revenues relative to total revenues – 23 Main cities
(2011 vs 2017)

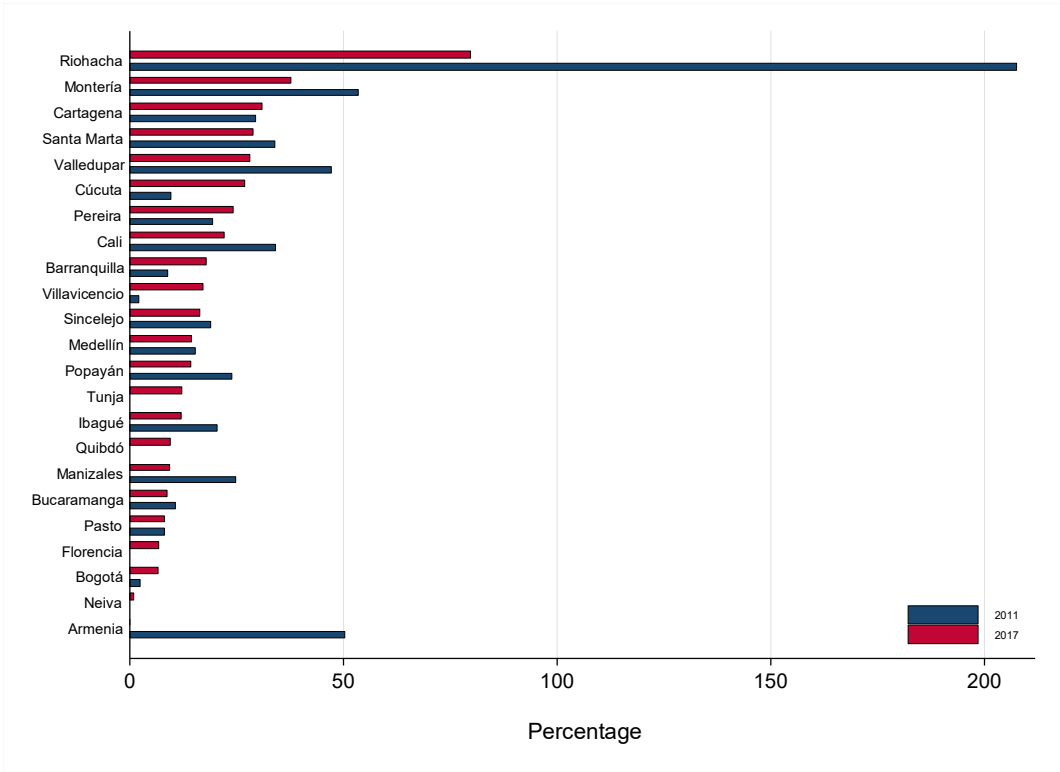


Source: DANE. Authors' calculations.

For the particular sample of cities under study, results revealed that on average own-source revenues represent 26.2% of total revenues and, as expected, the richest cities are also the strongest in terms of their reliability on their own resources. On the other hand, the poorest cities are also the weakest and the most dependent on national transfers, over 90% in the case of Riohacha and Quibdó.

The other indicator, taxes receivable relative to taxes levied, shows no particular pattern distinguishing rich and poor cities. In some sense, this measure might be revealing institutional and administrative strengths or weaknesses, which is not necessarily common among rich or poor cities, since the richest can also acknowledge this sort of difficulties. In fact, Figure 14 shows that among the cities with the lowest proportion of taxes receivable are Bogotá (one of the richest) and Florencia (one of the poorest). It is worth mentioning that there has been evidence of less tax collection efforts during regional electoral years, such as in 2011 (Granger *et al.*, 2018).⁸

Figure 14. Taxes receivable relative to taxes levied – 23 Main cities (2011 vs 2017)



Source: DANE. Authors’ calculations.

Total variations shown in Table 6 let clearly see two opposite patterns in tax and revenue indicators, with mostly positive real increases of own-source revenues when compared to

⁸ The regional electoral years since the Constitution in 1991 are: 1992, 1994, 1997, 2000, 2003, 2007, 2011 and 2015.

total revenues, meaning a lower transfers' dependence. On the other hand, there was an almost generalized reduction in cities' capability to collect taxes levied. Within the few showing up positive figures are Bogotá, Villavicencio, Cúcuta, and Barranquilla, which seem to have strengthened their tax collection capacity between 2011 and 2017. Time trends in Annex F and G do not show any other different pattern from the ones found in total variations and neither regional differences or across socioeconomic conditions.

Table 6. Taxes and revenues - Percentage variation 2011-2017

Region	Municipality	Tax and Revenue					
		Own source revenues relative to total revenues			Taxes receivable relative to taxes levied		
		2011	2017	Variation (2011-2017)	2011	2017	Variation (2011-2017)
		(%)	(%)	(%)	(%)	(%)	(%)
Eastern	Bogotá	51.8	54.9	6.1	2.5	6.6	168.1
	Tunja	25.6	36.0	40.5	16.0	12.3	-23.2
	Villavicencio	24.6	26.8	8.5	2.2	17.2	677.8
	Cúcuta	24.7	22.5	-9.1	9.7	26.8	176.9
	Bucaramanga	30.9	40.4	30.8	10.6	8.6	-18.8
Central	Medellín	33.4	32.8	-1.6	15.5	14.3	-7.1
	Manizales	32.6	28.9	-11.3	24.9	9.4	-62.2
	Florencia	16.0	16.6	3.7	22.2	6.8	-69.3
	Neiva	22.8	25.3	11.1	13.6	0.9	-93.5
	Armenia	28.8	31.9	10.7	50.3	0.0	-99.9
	Pereira	35.2	37.3	5.9	19.3	24.2	25.3
Caribbean	Ibagué	25.6	24.9	-2.8	20.6	12.2	-40.8
	Barranquilla	37.9	40.4	6.6	8.9	17.9	101.7
	Cartagena	37.9	39.2	3.7	29.4	31.1	5.8
	Valledupar	16.0	23.6	47.6	47.0	28.2	-40.0
	Montería	16.5	17.0	3.1	53.6	37.7	-29.6
	Riohacha	5.8	6.9	19.2	207.4	79.8	-61.5
	Santa Marta	24.5	25.3	3.2	33.9	28.9	-14.9
Pacific	Sincelejo	14.0	17.2	22.5	18.9	16.4	-13.5
	Popayán	21.6	25.5	18.2	23.9	14.3	-40.2
	Quibdó	8.4	9.2	9.7	66.8	9.5	-85.7
	Pasto	30.7	21.3	-30.7	8.1	8.1	1.0
	Cali	46.7	45.2	-3.3	34.0	22.1	-35.0

Note: For the following municipalities the percentage variation of “taxes receivable relative to taxes levied” corresponds to a different period of time because of availability restrictions of the data: Tunja and Florencia (2012-2017); Quibdó and Neiva (2013-2017).

Source: Authors' calculations.

As mentioned before, fiscal health is a very complex issue and results should not be considered individually. For example, even though Cúcuta and Pasto were the two cities with the highest tax base growth between 2011 and 2017, their own-source revenue participation on the total revenue had the lowest growths. Then, it is evident that collecting taxes is not enough for keeping healthy fiscal indicators, a proper management is also necessary.

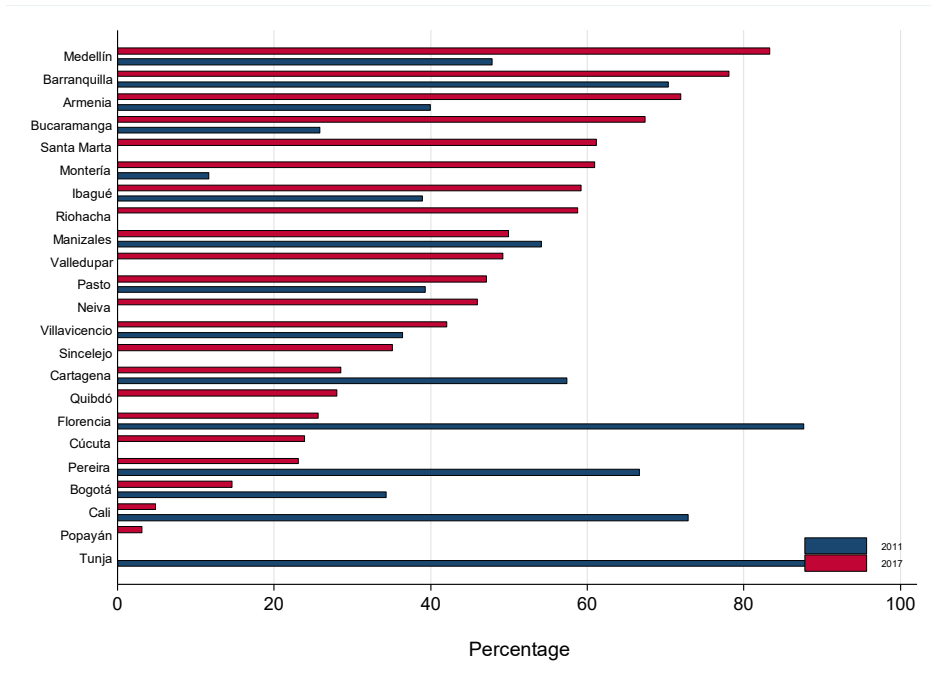
6.4. Debt

Debt is the fourth component of the fiscal health analysis, with two indicators, debt to tax ratio and debt charges relative to own-source revenues. Through them, it is intended to capture cities' pay back capability either with taxes or with own-source revenues. It is worth mentioning that decentralization in Colombia brought about a series of changes that helped out subnational governments (departments and municipalities) to keep on track their finances and fiscal situations, being indebtedness one of the most important ones (Bonet *et al.*, 2016a). In particular, after almost a decade of the enactment of Political Constitution in 1991 and the consequent deepening of decentralization process, when many subnational governments overflowed their expenses and indebtedness, new legislation gave raise to fiscal responsibility norms (BID, 2010). In order to stop the worsening of subnational governments' finances, new measures started up by imposing boundaries to their indebtedness capacity and the regulation of subnational credits (Law 358/1997), carrying out measures to rationalize the spending (Law 617/2000), as well as strategies to restructure indebtedness of territorial and regional entities (Law 819/2003).

After this brief introduction, let us see how debt indicators have been behaving in each of the main cities relative to the others. For debt to tax ratio in Figure 15, the first general observation is that in none of the cities debt overpasses their tax collection capacity. Second, when considering both 2011 and 2017, there is not a particular pattern among poor and rich cities. For example, in 2017 while Bogotá and Cali were at the bottom with the lowest debt to tax ratio two other rich cities, Medellín and Barranquilla, were at the top.

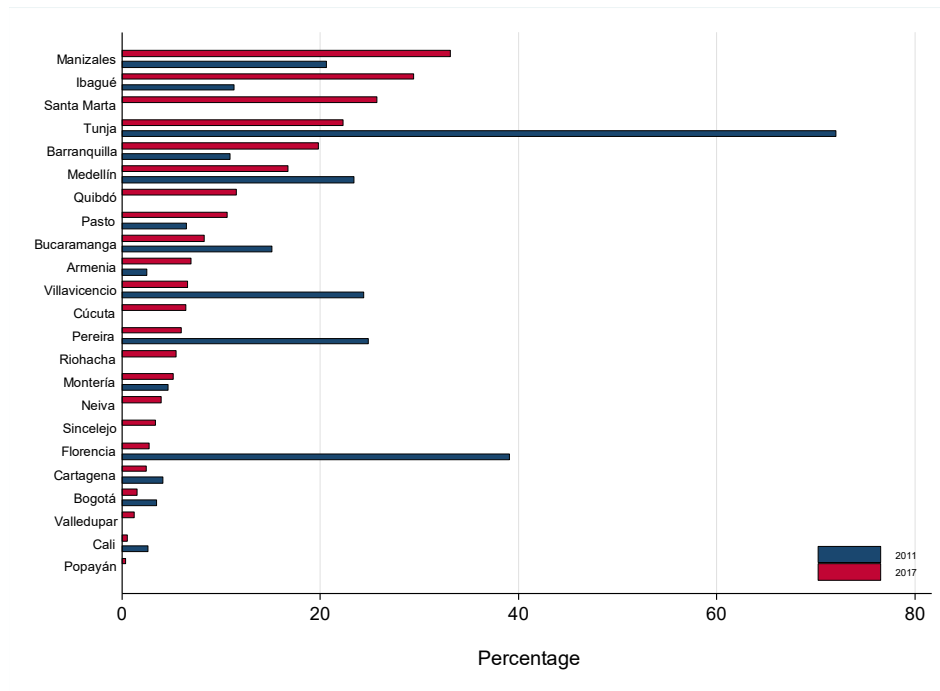
For the second indicator, debt charges relative to own-source revenue, ratios are even lower than debt to tax ratios, with almost all of them below 30% in 2017. As with the other debt indicator, in this case there is no evident relationship between socioeconomic conditions of the cities and debt charges ratios, or any particular evidence of generalized increases or falls.

Figure 15. Debt to tax ratio – 23 Main cities
(2011 vs 2017)



Source: DANE. Authors' calculations.

Figure 16. Debt charges relative to own-source revenue – 23 Main cities
(2011 vs 2017)



Source: DANE. Authors' calculations.

Total variations between 2011 and 2017 (Table 7) and time trends (Annexes 2H and 2I) show similar patterns in both debt ratios, where there are no connections between debt health and the economic position of the cities. For example, debt to tax ratio in Barranquilla and Medellín shows an increasing path reaching ratios close to 80% in 2017. On the other hand, two other rich cities, Bogotá and Cali reported a downward trend until reaching 15% and 5% in 2017, respectively. A similar case takes place with poor cities, where some have increased their debt to tax ratio (Riohacha) and others have reduced it (Florencia and Quibdó).

Table 7. Debt - Percentage variation 2011-2017

Region	Municipality	Debt					
		Debt to tax ratio			Debt charges relative to own-source revenue		
		2011	2017	Variation (2011-2017)	2011	2017	Variation (2011-2017)
	(%)	(%)	(%)	(%)	(%)	(%)	
Eastern	Bogotá	34.3	14.7	-57.2	3.5	1.5	-56.1
	Tunja	93.0	38.8	-58.2	72.0	22.3	-69.1
	Villavicencio	36.4	42.1	15.7	24.4	6.6	-72.8
	Cúcuta	12.0	23.9	98.3	2.7	6.4	141.9
	Bucaramanga	25.9	67.4	159.9	15.1	8.2	-45.4
Central	Medellín	47.9	83.4	74.3	23.4	16.8	-28.3
	Manizales	54.1	49.9	-7.7	20.7	33.1	60.3
	Florencia	87.6	25.7	-70.7	39.1	2.7	-93.0
	Neiva	26.5	46.0	73.7	4.4	4.0	-8.2
	Armenia	39.9	72.0	80.4	2.5	7.0	181.5
	Pereira	66.7	23.1	-65.4	24.9	6.0	-75.7
	Ibagué	39.0	59.3	52.1	11.3	29.4	161.1
Caribbean	Barranquilla	70.3	78.2	11.1	10.9	19.9	81.7
	Cartagena	57.4	28.6	-50.2	4.1	2.4	-41.0
	Valledupar	100.8	49.2	-51.2	10.3	1.2	-88.4
	Montería	11.6	61.0	423.9	4.7	5.2	10.6
	Riohacha	60.6	58.7	-3.1	63.0	5.5	-91.3
	Santa Marta	35.0	61.2	74.8	31.3	25.7	-17.7
Pacific	Sincelejo	54.7	35.1	-35.8	2.1	3.4	61.4
	Popayán	3.9	3.1	-20.9	3.6	0.3	-91.2
	Quibdó	39.3	28.0	-28.7	-	11.6	-
	Pasto	39.3	47.2	19.9	6.5	10.6	63.5
	Cali	73.0	4.9	-93.2	2.6	0.5	-81.2

Note: For the following municipalities the percentage variation of “debt to tax ratio” corresponds to a different period of time because of availability restrictions of the data: Popayán (2014-2017); Valledupar, Neiva, Cúcuta, Sincelejo (2012-2017); Quibdó (2012); Riohacha (2015-2017); Santa Marta (2016-2017); Tunja (2011-2016). At the same time, the percentage variation of “debt charges relative to own-source revenues” corresponds to different periods of time: Popayán (2014-2017); Valledupar, Neiva, Cúcuta, Sincelejo (2012-2017); Quibdó (2017); Riohacha (2015-2017); Santa Marta (2016-2017).

Source: Authors’ calculations.

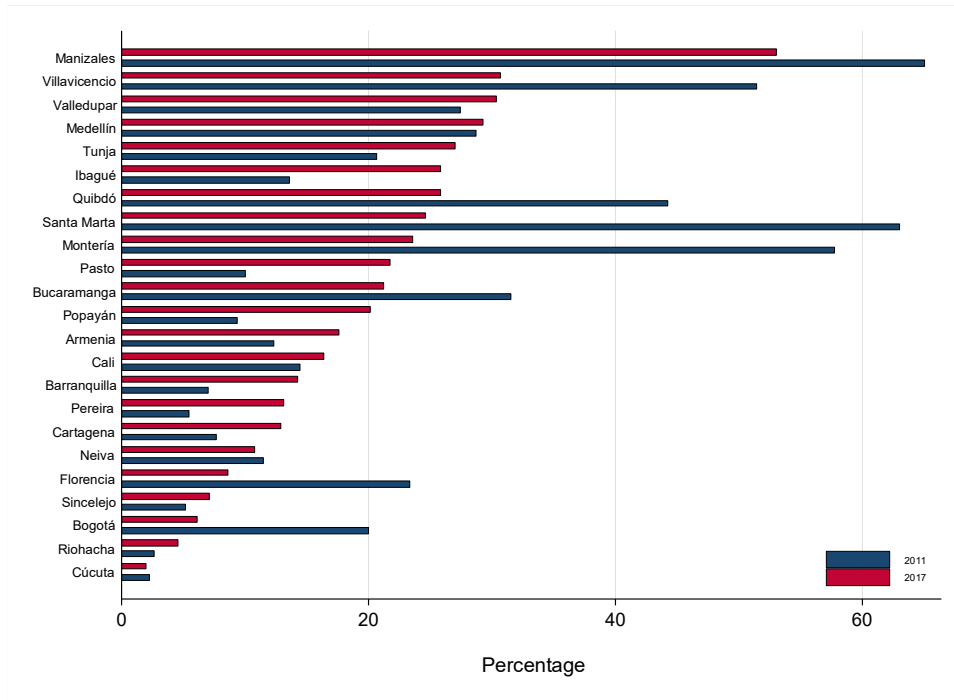
Trends in debt charges relative to own-source revenues show generalized lower levels (with an average of 8.4% in 2017), with a mix of upward and downward trends between the richest and the poorest cities. A particular characteristic for both debt ratios is that indebtedness in general seems to be under control, most likely because of the aforementioned implementation of fiscal responsibility legislation.

6.5. Infrastructure

The last two measures of fiscal health are those related to infrastructure, but going beyond infrastructure as such, and more focused on cities' assets consumption. The purpose is to understand to what extent cities are paying attention to the maintaining and repairing of their physical assets throughout investing and preserving their value. The first one is the asset consumption ratio (Figure 17), which intends to measure what percentage of the assets in a city have to be repaired, so that the higher the ratio the lowest the city's capability to repair and maintain their physical assets. The results are showing that there was an improvement between 2011 and 2017 since last year fewer cities showed big ratios. In 2017, with the exception of Manizales (53%), the rest of the cities were all below 30%, with a general average around 18%.

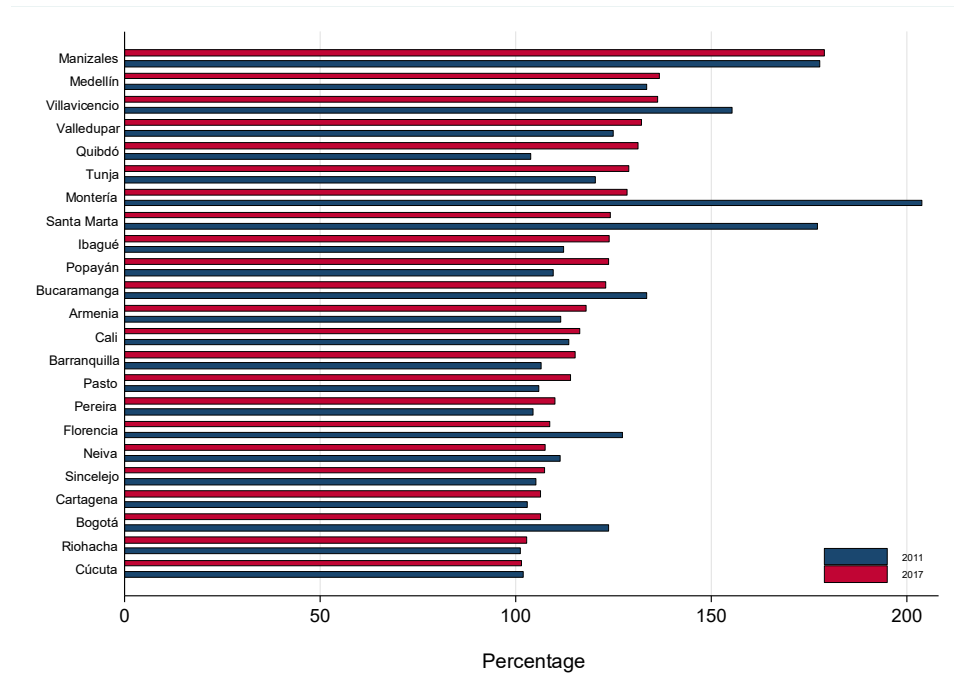
The second indicator is the extent of investment in capital assets (Figure 18), a ratio comparing the original cost of the assets and the original cost less accumulated depreciation. In this case, by construction, the closer to 100% the highest the capacity of the city to preserve the value of its assets. Values over 100% indicates that cities are moving away from the value of their assets, or that the effort they are making to preserve assets' values is not enough. In this case, apart for few exceptions (Manizales, Villavicencio, Montería and Santa Marta) the group of cities shows ratios below 150%, in particular in 2017 where the average was 124.6%. The only city that still faces very low relative capacity to preserve the value of its assets is Manizales (179.1%).

Figure 17. Asset consumption ratio – 23 Main cities
(2011 vs 2017)



Source: DANE. Authors' calculations.

Figure 18. Extent of investment in capital assets – 23 Main cities
(2011 vs 2017)



Source: DANE. Authors' calculations.

Table 8 shows a general framework of the two infrastructure indicators in 2011 and 2017, as well as the corresponding total change during the period. In terms of the ratios, it is possible to see a higher dispersion in asset consumption ratios with values as low as 2.3% in Cúcuta or 6.1% in Bogotá, and as high as 53% in Manizales. The extent of investment in capital assets increased in 15 out of the 23 cities, with Quibdó (the poorest city) with the highest increase between 2011 and 2017 (26.3%) meaning that the city has worsened the value of its assets. On the other hand, Montería showed the highest reduction in the period (-37%).

Table 8. Infrastructure - Percentage variation 2011-2017

Region	Municipality	Infrastructure					
		Asset consumption ratio			Extent of investment in capital assets		
		2011	2017	Variation (2011-2017)	2011	2017	Variation (2011-2017)
		(%)	(%)	(%)	(%)	(%)	(%)
Eastern	Bogotá	20.0	6.1	-69.4	123.9	106.5	-14.1
	Tunja	20.6	27.0	30.8	120.3	129.0	7.2
	Villavicencio	51.4	30.7	-40.3	155.3	136.4	-12.2
	Cúcuta	2.3	2.0	-13.6	101.9	101.6	-0.3
	Bucaramanga	31.6	21.2	-32.8	133.6	123.0	-7.9
Central	Medellín	28.7	29.2	1.9	133.6	136.8	2.4
	Manizales	65.0	53.0	-18.4	177.6	179.1	0.8
	Florencia	23.4	8.6	-63.0	127.3	108.8	-14.6
	Neiva	11.5	10.8	-6.3	111.5	107.4	-3.7
	Armenia	12.3	17.6	43.1	111.6	117.9	5.7
	Pereira	5.5	13.1	138.3	104.3	110.1	5.5
	Ibagué	13.7	25.9	89.6	112.2	124.0	10.5
Caribbean	Barranquilla	7.0	14.3	103.3	106.5	115.2	8.1
	Cartagena	7.7	12.9	68.4	103.1	106.5	3.4
	Valledupar	27.5	30.4	10.4	124.9	132.1	5.8
	Montería	57.7	23.6	-59.2	203.7	128.6	-36.9
	Riohacha	2.6	4.6	74.3	101.3	102.8	1.4
	Santa Marta	63.1	24.6	-61.0	177.3	124.4	-29.8
	Sincelejo	5.2	7.1	37.5	105.2	107.4	2.1
Pacific	Popayán	9.4	20.2	115.7	109.5	123.9	13.1
	Quibdó	44.3	25.9	-41.5	104.0	131.4	26.3
	Pasto	10.0	21.8	117.6	106.1	114.2	7.7
	Cali	14.5	16.4	13.1	113.7	116.4	2.4

Source: Authors' calculations.

By regions, it was found a systematic difference between one of the richest region (Eastern) and one of the poorest (Pacific) where, with the exception of Tunja, the first region showed reductions in both the asset consumption ratio and the extent of investment in capital assets, improving the maintaining and repairing of their physical assets. On the contrary, cities

belonging to Pacific region (except for asset consumption in Quibdó) increased their ratios, to the detriment of their assets, by increasing the percentage of assets to be repaired and reducing their capacity to preserve the value of their assets.

7. How healthy are the main cities in Colombia?

So far we have analyzed cities' profiles and fiscal indicators showing details on their particular estimates in a comparison between 2011 and 2017, as well as time trends during the whole period. This allowed us to observe an individual diagnosis of each city in each indicator and draw conclusions about how fiscally healthy each city is according to a particular dimension. Nevertheless, and given that there is not a national or international particular benchmark value for each indicator, it was not possible to observe cities' relative fiscal health. This section fulfills this purpose.

By using relative positions within each indicator, the second part of this section is dedicated to answer the question whether or not cities' positions have been persistent over time. In other words, whether or not healthy and unhealthy cities in the past are likely to remain the same in the future. This is useful for policy makers to foresee cities' short and medium-term relative fiscal health.

7.1. Relative position

Percentile shares are useful to quantify the proportions of fiscal health indicators that go to different groups defined in terms of their relative position in the distribution. For the purpose of this study, and for each profile and fiscal indicator, quintiles are used to classify each city within the first, second, third, fourth or fifth group. Nevertheless, in order to make the classification clearer to analyze, quintiles 1 and 2 were grouped as “weak/very weak”, quintile 3 as “average”, and quintiles 4 and 5 as “strong/very strong”. In order to keep consistency among the whole set of indicators, the following were inverted in such a way that the higher the value of the indicator the stronger the city's fiscal health is: unemployment, operating deficit, taxes receivable relative to taxes levied, debt to tax ratio, debt charges relative to own-source revenues, asset consumption ratio and extent of investment in capital assets.

7.1.1. Profile indicators

Table 9 shows profile indicators for each city and its relative position with respect to the rest of them. They are also grouped according to the region they belong to. According to city sizes, the 23 under study are not clustered in particular regions, although it is noticeable that most populated cities tend to belong to Central and Eastern regions, situation that has not changed during the last few years.

This double dimension comparison, where cities can compare themselves in 2017 and can also contrast this situation with 2011, is a useful mechanism for rulers to focus on the big picture and realize where their efforts should be put. General results can be divided into two groups, those cities that have not changed over the years, whether they are in good or bad position, and the other where improvements or deteriorations took place.

Within the first group, cities that have managed to keep high relative positions between 2011 and 2017, in terms of income per capita, unemployment, expenditures per capita and taxes per capita, are: Bogotá, Cali, Barranquilla and Cartagena (except for expenditures per capita). These cities are not only characterized by being some of the most populated but also some of the richest. The second group is made up of the cities that, being in relative disadvantage in 2011 have not been able to overcome their situation over the years: Quibdó, Riohacha (except for unemployment that worsen even more), Ibagué (except for taxes per capita that worsen even more), Manizales (except for taxes per capita that worsen even more) and Cúcuta (except for expenditures per capita that improved).

Some other cities that stand out, either because they improved or worsened significantly, are Villavicencio, which worsened across income per capita, unemployment, expenditures per capita and taxes per capita, and on the other hand Pasto and Santa Marta which improved in three out of four indicators.

Table 9. Profile indicators – Relative position

a. 2011/12

b. 2017

Region	Municipality	2011/12					2017				
		Population	Income per capita	Unemployment rate	Expenditures per capita	Taxes per capita	Population	Income per capita	Unemployment rate	Expenditures per capita	Taxes per capita
Eastern	Bogotá	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
	Tunja	Weak	Strong	Average	Strong	Strong	Weak	Strong	Strong	Strong	Strong
	Villavicencio	Average	Strong	Strong	Average	Strong	Strong	Strong	Strong	Strong	Strong
	Cúcuta	Strong	Weak	Weak	Weak	Weak	Strong	Strong	Strong	Strong	Strong
	Bucaramanga	Strong	Strong	Strong	Average	Strong	Strong	Average	Strong	Strong	Strong
Central	Medellín	Strong	Strong	Average	Strong	Strong	Strong	Strong	Average	Strong	Strong
	Manizales	Weak	Weak	Average	Weak	Strong	Weak	Strong	Average	Strong	Average
	Florencia	Weak	Average	Weak	Strong	Weak	Weak	Strong	Average	Strong	Strong
	Neiva	Weak	Strong	Strong	Strong	Average	Weak	Strong	Average	Strong	Average
	Armenia	Weak	Weak	Weak	Strong	Average	Weak	Average	Strong	Strong	Strong
	Pereira	Strong	Average	Weak	Strong	Strong	Average	Strong	Average	Strong	Strong
Caribbean	Ibagué	Strong	Weak	Weak	Weak	Average	Strong	Strong	Strong	Strong	Strong
	Barranquilla	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
	Cartagena	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Average	Strong	Strong
	Valledupar	Average	Weak	Weak	Weak	Weak	Average	Strong	Strong	Average	Strong
	Montería	Weak	Average	Weak	Average	Weak	Weak	Strong	Average	Strong	Strong
	Riohacha	Weak	Weak	Strong	Weak	Weak	Weak	Strong	Strong	Strong	Strong
	Santa Marta	Strong	Average	Strong	Weak	Average	Strong	Strong	Strong	Strong	Strong
Pacific	Sincelejo	Weak	Strong	Average	Strong	Weak	Weak	Strong	Strong	Strong	Average
	Popayán	Weak	Weak	Weak	Weak	Weak	Weak	Average	Strong	Strong	Average
	Quibdó	Strong	Strong	Weak	Strong	Strong	Weak	Strong	Strong	Strong	Strong
	Pasto	Average	Weak	Weak	Average	Weak	Average	Strong	Strong	Strong	Strong
	Cali	Strong	Weak	Weak	Weak	Strong	Strong	Strong	Strong	Strong	Strong

■ (Weak/very weak)
 ■ (Average)
 ■ (Strong/very strong)

7.1.2. Fiscal indicators

Within the group of fiscal indicators there are five dimensions: external, financial, tax and revenue, debt, and infrastructure. Table 10 presents an overview of the three external variables, population growth, property tax base, and the GDP growth as an additional measure of tax base. Results are showing that Bogotá, Cartagena and Cali (except for an improvement in property tax base) have managed to keep up within the best positions of the ranking during the last few years, opposite to what happened to Valledupar with no changes either but within the lowest part of the ranking.

Table 10. External – Relative position 2011-2017

Region	Municipality	2011/12			2017		
		Population growth	Tax base growth (property)	Tax base growth (GDP)	Population growth	Tax base growth (property)	Tax base growth (GDP)
Eastern	Bogotá	Strong/very strong	Strong/very strong	Strong/very strong	Strong/very strong	Strong/very strong	Strong/very strong
	Tunja	Strong/very strong	Average	Average	Strong/very strong	Strong/very strong	Strong/very strong
	Villavicencio	Strong/very strong	Weak/very weak	Weak/very weak	Strong/very strong	Weak/very weak	Strong/very strong
	Cúcuta	Weak/very weak	Weak/very weak	Weak/very weak	Average	Weak/very weak	Average
	Bucaramanga	Weak/very weak	Weak/very weak	Weak/very weak	Weak/very weak	Weak/very weak	Strong/very strong
Central	Medellín	Average	Strong/very strong	Strong/very strong	Strong/very strong	Strong/very strong	Strong/very strong
	Manizales	Weak/very weak	Strong/very strong	Weak/very weak	Strong/very strong	Strong/very strong	Weak/very weak
	Florencia	Strong/very strong	Strong/very strong	Strong/very strong	Strong/very strong	Strong/very strong	Strong/very strong
	Neiva	Weak/very weak	Average	Strong/very strong	Weak/very weak	Strong/very strong	Weak/very weak
	Armenia	Weak/very weak	Strong/very strong	Strong/very strong	Weak/very weak	Strong/very strong	Weak/very weak
	Pereira	Weak/very weak	Strong/very strong	Average	Strong/very strong	Strong/very strong	Strong/very strong
Caribbean	Ibagué	Average	Strong/very strong	Weak/very weak	Average	Average	Strong/very strong
	Barranquilla	Weak/very weak	Weak/very weak	Average	Weak/very weak	Strong/very strong	Strong/very strong
	Cartagena	Average	Strong/very strong	Strong/very strong	Average	Strong/very strong	Strong/very strong
	Valledupar	Weak/very weak	Weak/very weak	Weak/very weak	Weak/very weak	Weak/very weak	Weak/very weak
	Montería	Strong/very strong	Strong/very strong	Weak/very weak	Strong/very strong	Average	Weak/very weak
	Riohacha	Strong/very strong	Strong/very strong	Strong/very strong	Strong/very strong	Weak/very weak	Strong/very strong
Pacific	Santa Marta	Strong/very strong	Weak/very weak	Weak/very weak	Strong/very strong	Strong/very strong	Weak/very weak
	Sincelejo	Strong/very strong	Strong/very strong	Strong/very strong	Strong/very strong	Strong/very strong	Weak/very weak
	Popayán	Weak/very weak	Weak/very weak	Weak/very weak	Weak/very weak	Average	Average
	Quibdó	Weak/very weak	Strong/very strong	Strong/very strong	Weak/very weak	Average	Weak/very weak
	Pasto	Strong/very strong	Weak/very weak	Weak/very weak	Strong/very strong	Weak/very weak	Average
	Cali	Average	Average	Strong/very strong	Average	Strong/very strong	

A different story is that of cities for which changes in external indicators have been significant. Moving up in the table are Tunja, Pereira and Barranquilla, which have managed to increase property and GDP growth of their cities placing them at the top of the ranking. For the particular case of Barranquilla, this city has not only had a significant increase in new infrastructure projects, but also has modernized and improved strategies to keep its cadaster up to date. All this has no doubt helped to make positive changes in tax base growths.

On the other side are those cities where the growth of tax base has been slower than the rest of the cities. This is the case of Medellín, Armenia, Sincelejo and Quibdó which, having had upper positions in the ranking in 2011, fell down to the lowest part in 2017. By regions, there is no evidence of spatial clustering, neither across particular socioeconomic circumstances.

The second group of fiscal indicators is that classified as Financial (operating deficit and net financial assets), by which it is intended to capture whether or not cities are able to generate extra resources, and also their ability to pay short-term obligations (Table 11). In this case the biggest and richest cities, Bogotá, Medellín and Cali, are those not only with the best financial performance (measured by both indicators) but also have maintained their position over the years. Barranquilla and Cartagena, two other cities within the most populated and with more favorable economic conditions, show good performance in keeping low their operating deficit but with low relative levels of liquidity too, which might put in risk their capacity to pay short term obligations. However, this is not necessarily the case if cities are making investments that will generate high economic returns in the future.

Table 11. Financial – Relative position 2011/12 - 2017

Region	Municipality	2011/12		2017	
		Operating deficit	Net financial assets	Operating deficit	Net financial assets
Eastern	Bogotá	Green	Green	Green	Green
	Tunja	Red	Red	Red	Red
	Villavicencio	Green	Green	Yellow	Green
	Cúcuta	Yellow	Red	Red	Red
	Bucaramanga	Green	Green	Green	Red
Central	Medellín	Green	Green	Green	Green
	Manizales	Red	Red	Red	Red
	Florencia	Red	Red	Red	Green
	Neiva	Red	Red	Red	Yellow
	Armenia	Red	Green	Red	Red
	Pereira	Yellow	Yellow	Green	Green
Caribbean	Ibagué	Yellow	Green	Yellow	Yellow
	Barranquilla	Green	Red	Green	Red
	Cartagena	Green	Red	Green	Red
	Valledupar	Red	Yellow	Red	Green
	Montería	Green	Red	Green	Green
	Riohacha	-	Green	Red	Green
Pacific	Santa Marta	-	Yellow	Green	Yellow
	Sincelejo	Red	Red	Red	Red
	Popayán	-	Green	Yellow	Green
	Quibdó	Red	Yellow	Red	Red
	Pasto	Yellow	Green	Yellow	Yellow
Cali	Green	Green	Green	Green	

(Weak/very weak)
 (Average)
 (Strong/very strong)

These five cities kept their positive financial circumstances over the years. However, there is another group of cities that kept their positions in the ranking, but with lower performance: Tunja, Manizales and Sincelejo. The rest of the cities had ups and downs over the years with no particular circumstances, with the exception of Pereira moving up from middle to the upper side of the ranking.

Taxes and revenues is the other group of indicators capturing an additional dimension of fiscal health (Table 12). The two indicators included are related to cities’ potential capability of generating economic resources and how they are using taxation to accomplish that purpose. Bogotá, again, showing good performance and persistence in staying at the top of the table, this time accompanied by Bucaramanga, Manizales and Armenia. Cartagena and Cali this time with high performance in terms of own-source revenues and poor performance on their capacity to collect their taxes.

Table 12. Tax and revenues – Relative position 2011-2017

Region	Municipality	2011/12		2017	
		Own-source revenue relative to total revenue	Taxes receivable relative to taxes levied	Own-source revenue relative to total revenue	Taxes receivable relative to taxes levied
Eastern	Bogotá	Green	Green	Green	Green
	Tunja	Yellow	Yellow	Yellow	Yellow
	Villavicencio	Yellow	Red	Yellow	Red
	Cúcuta	Yellow	Red	Yellow	Red
	Bucaramanga	Green	Green	Green	Green
Central	Medellín	Green	Yellow	Green	Yellow
	Manizales	Green	Green	Green	Green
	Florencia	Red	Yellow	Red	Green
	Neiva	Red	-	Yellow	Green
	Armenia	Green	Green	Green	Green
	Pereira	Green	Green	Green	Red
	Ibagué	Yellow	Red	Red	Green
Caribbean	Barranquilla	Green	Green	Green	Red
	Cartagena	Green	Red	Green	Red
	Valledupar	Red	Red	Red	Red
	Montería	Red	Red	Red	Red
	Riohacha	Red	Red	Red	Red
	Santa Marta	Red	Yellow	Yellow	Red
	Sincelejo	Red	Yellow	Red	Yellow
Pacific	Popayán	Red	Red	Yellow	Yellow
	Quibdó	Red	-	Red	Green
	Pasto	Green	Green	Green	Green
	Cali	Green	Red	Green	Red

(Weak/very weak)
 (Average)
 (Strong/very strong)




The Caribbean coast stood out this time by having four out of its seven capitals classified between the middle to the lowest part of the rankings: Valledupar, Montería, Riohacha and

Sincelejo. This situation is not new for these cities since the results have not changed when compared with 2011, it is low reliance on their own-source revenues and potential future cash-flow problems.

The fourth collection of indicators is related to debt, where both its size and its corresponding charges are used to understand how cities are doing on this matter. Debt to tax ratio is the usual indicator intended to measure fiscal sustainability, while debt charges relative to own-source revenues proxies the repay capability of cities through taxes (Table 13). Results stand out Bogotá as the only city keeping up in having good debt management over the years. This, together with previous findings on tax and revenue, leave the capital city in an advantageous position where it is clearly not only able to get the resources it needs but also maintaining high pay back capacity.

Table 13. Debt – Relative position 2012-2017

Region	Municipality	2012		2017	
		Debt to tax ratio	Debt charges relative to own-source revenue	Debt to tax ratio	Debt charges relative to own-source revenue
Eastern	Bogotá				
	Tunja				
	Villavicencio				
	Cúcuta				
	Bucaramanga				
Central	Medellín				
	Manizales				
	Florencia				
	Neiva				
	Armenia				
	Pereira				
Caribbean	Ibagué				
	Barranquilla				
	Cartagena				
	Valledupar				
	Montería				
	Riohacha	-	-		
	Santa Marta	-	-		
Pacific	Sincelejo				
	Popayán	-	-		
	Quibdó				
	Pasto				
	Cali				

	(Weak/very weak)		(Average)		(Strong/very strong)
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Within the cities that have shown persistent lower relative positions between 2011 and 2017 are Bucaramanga and Medellín. These two middle to high income cities reveal that fiscal sustainability have worsened since 2011, moving from average to weak/very-weak situation relative to the other 23 cities. Moreover their weakness with the pay back capability using their own resources has shown high persistence. As the previous two, there is another set of cities that have moved down their debt indicators to the lower quintiles, Manizales, Barranquilla, and specially Ibagué which passed through from strong/very-strong in 2011 to weak/very-weak in 2017.

On the other hand, improvements in debt management took place in cities like Florencia (moved from bottom to top) and Cartagena (moved from middle to top). Other cities had also some partial improvements in one or the other debt measures, such as Tunja, Cali and Pereira.

By regions, the two lagged behind Pacific and Caribbean, show particular differences when considering the most recent data. On the one hand it is evident the relative disadvantage of most of the Caribbean cities in terms of their fiscal sustainability (debt to tax ratio), while they seem to have good performance with the pay back. Pacific region, on the other hand, reveals the opposite situation, where fiscal sustainability is in good shape for all cities, but the ability to repay debts is weakening.

The last group of fiscal health measures is infrastructure (Table 14). This dimension considers asset consumption and how cities are preserving the value of their assets. This dimension is one with the smallest changes between 2011 and 2017. For example, five cities managed to maintain within the strong/very-strong quintile group: Cúcuta, Pereira, Cartagena, Riohacha and Sincelejo, the last three belonging to the lagged behind region of Caribbean. On the other hand, is the group of cities within the weakest infrastructure management, which have also been at the bottom of the ranking during the last several years: Tunja, Villavicencio, Medellín, Manizales, Valledupar, Montería and Santa Marta.

Within the cities that experienced significant changes in both infrastructure indicators, Bogotá and Florencia, one of the richest and one of the poorest cities in Colombia, did well in improving their infrastructure's fiscal health. Both of them moved through the lowest/middle ranking to the top. Opposite situation is that for Ibagué and Popayán, which

let the depreciation and amortization increase in such a way that increased the percentage of assets to be amortized and lowered the investments in capital assets.

Table 14. Infrastructure – Relative position 2011-2017

Region	Municipality	2011/2012		2017	
		Asset consumption ratio	Extent of investment in capital assets	Asset consumption ratio	Extent of investment in capital assets
Eastern	Bogotá	Yellow	Red	Green	Green
	Tunja	Red	Red	Red	Red
	Villavicencio	Red	Red	Red	Red
	Cúcuta	Green	Green	Green	Green
Central	Bucaramanga	Red	Red	Yellow	Yellow
	Medellín	Red	Red	Red	Red
	Manizales	Red	Red	Red	Red
	Florencia	Red	Red	Green	Green
	Neiva	Green	Yellow	Green	Green
	Armenia	Yellow	Yellow	Yellow	Yellow
	Pereira	Green	Green	Green	Green
	Ibagué	Yellow	Yellow	Red	Red
	Barranquilla	Green	Green	Green	Yellow
	Cartagena	Green	Green	Green	Green
Caribbean	Valledupar	Red	Red	Red	Red
	Montería	Red	Red	Red	Red
	Riohacha	Green	Green	Green	Green
	Santa Marta	Red	Red	Red	Red
	Sincelejo	Green	Green	Green	Green
	Popayán	Green	Green	Yellow	Red
Pacific	Quibdó	Red	Green	Red	Red
	Pasto	Green	Green	Red	Green
	Cali	Yellow	Yellow	Yellow	Yellow

(Weak/very weak)
 (Average)
 (Strong/very strong)

7.2. How persistent is fiscal health in Colombia?

After having computed and described fiscal health over several dimensions, the results revealed the complexity in approaching this concept, where a city could be in good shape according to one or several dimensions but fiscally unhealthy in some others. So far individual cities have been considered in the analysis allowing to have a detailed perspective of their particular fiscal circumstances over different profile and fiscal indicators which might help to understand cities' present and potential short and medium-term fiscal health.

In order to contribute to the objective of knowing where the main Colombian cities are heading to in terms of fiscal health, and making use of the panel data set available for each indicator, transition matrices for individual indicators are computed. These matrices will help

to understand whether or not, and to what extent, cities with a particular fiscal health in the past (weak, average or strong) will continue the same in the future. To do so, for each indicator, cities are grouped according to whether or not each of them falls within the weak/very-weak, average or strong/very-strong classifications.⁹ The elements of each matrix represent the probability that cities in each group move from one fiscal health condition in year t to another in year $t+1$. For example, if the element (1,1) in a transition matrix is 0.85, it means that the weak/very-weak group of cities in year t have an 85% probability to continue under the same fiscal health circumstance in the future ($t+1$), according to the particular indicator. Thus, high values over the main diagonal can be understood as high persistency on the current fiscal health condition, in other words that there is a high probability of remaining in the same circumstance in the years coming.

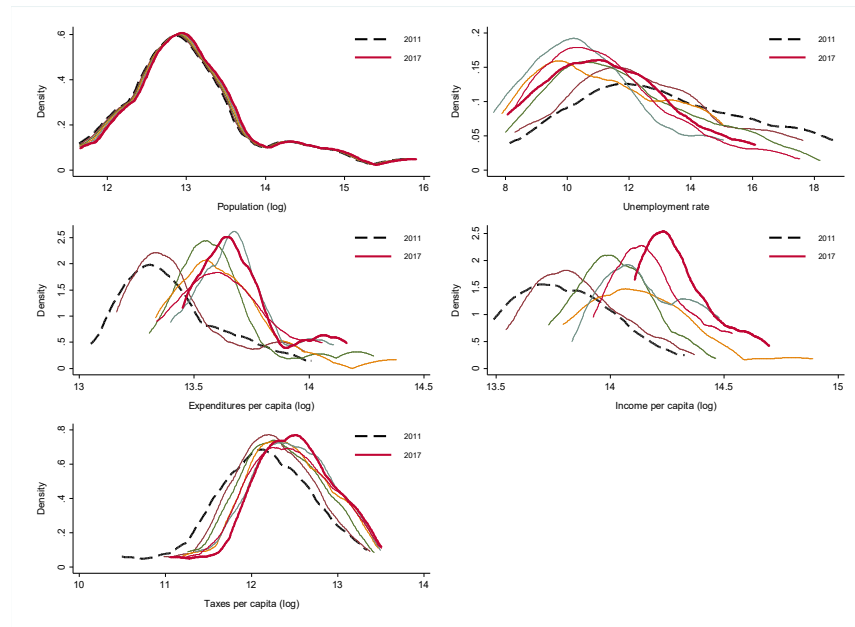
For a better interpretation of the results, they are presented in several panels according to the different dimensions of fiscal health they represent. Also, for the same set of indicators, yearly kernel density estimates as an additional way to observe distributional changes over the whole set of cities are presented. Profile variables show, as expected, that the highest persistency within this set of indicators is population, and increases with city sizes (Table 15 and Figure 19). For the rest of profile variables, it can be noticed that persistency is higher for the two extreme conditions, weak and strong, than for those cities with average profiles. In other words, it is difficult for weak/very-weak cities to improve up to the average group, as well as it is difficult for strong/very-strong cities to move down to the average group. A closer look at the weakest groups of cities, and for the particular case of income per capita and unemployment, they face the lowest probability of improving their situation and moving up to the average group (0.20 and 0.14, respectively). On the other hand, taxes per capita is clearly the one where good performance is rewarded with a high probability of continuing with good results (0.96). This make sense since building a robust tax system takes time and is compensated with a long-term gains.

⁹ This classification is the same used in the previous subsection, it is quintiles 1 and 2 were grouped as “weak/very weak”, quintile 3 as “average”, and quintiles 4 and 5 as “strong/very strong”.

Table 15. Markov transition matrices for profile indicators
(Relative position 2011-2017)

Population				Income per capita					
		Groups of municipalities [year t+1]					Groups of municipalities [year t+1]		
		Weak/ very weak	Average	Strong/ very strong			Weak/ very weak	Average	Strong/ very strong
Groups of municipalities [year t]	Weak/very weak	0.88	0.10	0.02	Groups of municipalities [year t]	Weak/very weak	0.78	0.20	0.02
	Average	0.05	0.91	0.04		Average	0.15	0.62	0.24
	Strong/very strong	0.05	0.00	0.95		Strong/very strong	0.05	0.21	0.73
Unemployment rate				Expenditures per capita					
		Groups of municipalities [year t+1]					Groups of municipalities [year t+1]		
		Weak/ very weak	Average	Strong/ very strong			Weak/ very weak	Average	Strong/ very strong
Groups of municipalities [year t]	Weak/very weak	0.82	0.14	0.04	Groups of municipalities [year t]	Weak/very weak	0.71	0.21	0.08
	Average	0.13	0.67	0.20		Average	0.20	0.59	0.21
	Strong/very strong	0.06	0.20	0.73		Strong/very strong	0.07	0.23	0.70
Taxes per capita									
		Groups of municipalities [year t+1]							
		Weak/ very weak	Average	Strong/ very strong					
Groups of municipalities [year t]	Weak/very weak	0.78	0.22	0.00					
	Average	0.20	0.77	0.04					
	Strong/very strong	0.00	0.04	0.96					

Figure 19. Kernel density functions for profile indicators, 2011 – 2017



The external group of variables is singular since, leaving aside population growth, both tax base growths show some of the lowest values in their main diagonals, meaning low persistency or low probability to keeping their current conditions steady in the future (Table 16). This is the result of significant variations over time, especially in the property tax base,

due to updates in cadaster appraisals which, in some cases, had significant increases (Figure 20). For example, for the groups of cities within the weak/very-weak and strong/very-strong in the property's tax base the probability of continuing in the same position is almost the same, 0.39 and 0.42 respectively. And also these probabilities are similar to those of strong/very-strong cities of moving down to weak/very-weak (0.38), or the opposite case the probability of the latter of moving up to the former (0.27). A similar situation faces GDP growth, but with higher probabilities, especially those of keeping up at the top or down at the bottom.

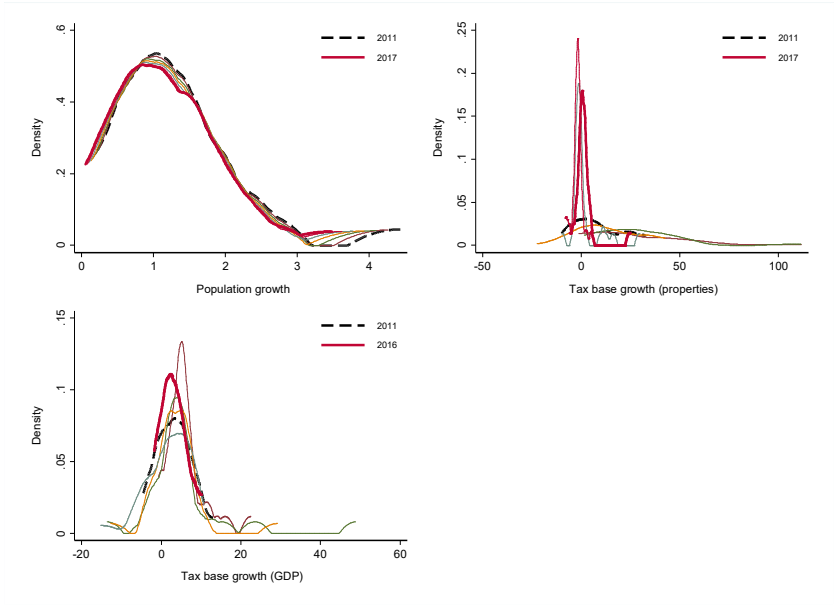
Table 16. Markov transition matrices for external indicators (Relative position 2011-2017)

Population growth					Tax base growth (property)				
		Groups of municipalities [year t+1]					Groups of municipalities [year t+1]		
		Weak/very weak	Average	Strong/very strong			Weak/very weak	Average	Strong/very strong
Groups of municipalities [year t]	Weak/very weak	0.92	0.02	0.06	Groups of municipalities [year t]	Weak/very weak	0.39	0.35	0.27
	Average	0.04	0.93	0.04		Average	0.16	0.48	0.36
	Strong/very strong	0.04	0.05	0.91		Strong/very strong	0.38	0.20	0.42

Tax base growth (GDP)				
		Groups of municipalities [year t+1]		
		Weak/very weak	Average	Strong/very strong
Groups of municipalities [year t]	Weak/very weak	0.52	0.29	0.19
	Average	0.23	0.45	0.32
	Strong/very strong	0.19	0.31	0.50

Source: Authors' calculations.

Figure 20. Kernel density functions for external indicators, 2011/12 – 2017



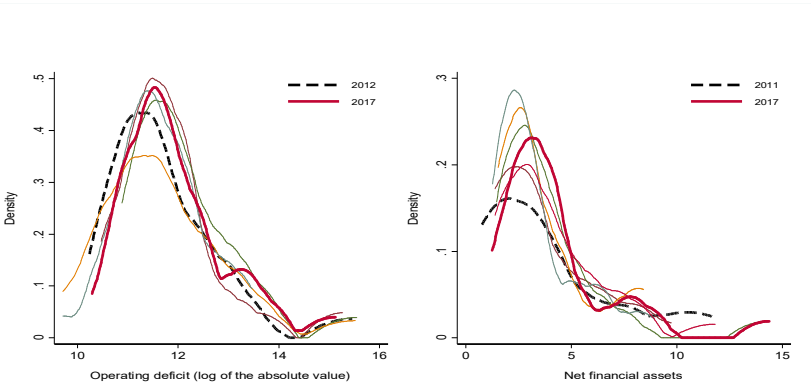
Operating deficit and net financial assets make up the financial set of indicators. Their transition probabilities are similar, except for the cities within the average group (Table 17). For example, while cities with an average performance in terms of their net financial assets are likely to move up with a probability of 0.16, they are prone to move to a weaker situation with low capability to pay their short term obligations with a probability of 0.21. Operating deficit shows higher persistency for both, those located up with higher revenue’s capacity to cover their operational expenses (0.81) as well as those less able to accomplish such commitments (0.73). These results find an explanation in the deeper yearly movement to the right of net financial assets’ distributions when compared with operating deficit’s (Figure 21).

Table 17. Markov transition matrices for financial indicators (Relative position 2011-2017)

Operating deficit				Net financial assets					
		Groups of municipalities [year t+1]					Groups of municipalities [year t+1]		
		Weak/ very weak	Average	Strong/ very strong			Weak/ very weak	Average	Strong/ very strong
Groups of municipalities [year t]	Weak/very weak	0.73	0.20	0.07	Groups of municipalities [year t]	Weak/very weak	0.69	0.24	0.06
	Average	0.19	0.71	0.10		Average	0.21	0.63	0.16
	Strong/very strong	0.11	0.08	0.81		Strong/very strong	0.05	0.16	0.78

Source: Authors’ calculations.

Figure 21. Kernel density functions for financial indicators, 2011/12 – 2017



Tax and revenue is the next dimension of fiscal health (Table 18). In this case there is a significant difference between the two indicators, where own-source revenues relative to total revenues shows higher persistence than taxes receivable relative to taxes levied. These results are consistent when compared with kernel density functions (Figure 22), since cities’ reliance on their own-source revenues shows more stability over time, in other words that dependence

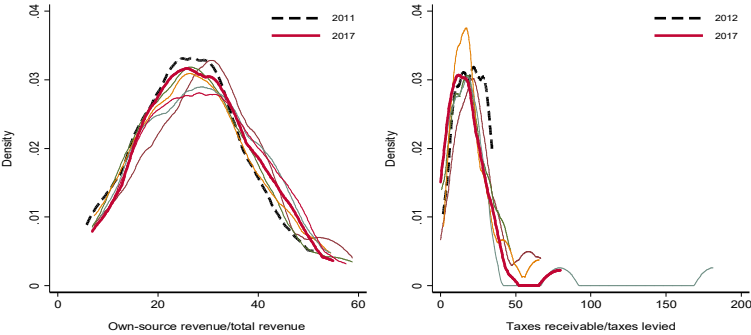
on transfers (high or low) might be related to cities’ structural characteristics. Cash flows movements instead, positive or negative, coming from different levels of tax arrears are more likely to change from one year another, translating into more weakness. This can be observed, for example, from probabilities of strong/very-strong groups of cities in both indicators where moving down one step to the average group is much higher in taxes receivable relative to taxes levied (0.26) than in own-source revenues relative to total revenues (0.09).

Table 18. Markov transition matrices for tax and revenue indicators (Relative position 2011-2017)

Own-source revenues relative to total revenues				Taxes receivable relative to taxes levied					
		Groups of municipalities [year t+1]					Groups of municipalities [year t+1]		
		Weak/very weak	Average	Strong/very strong			Weak/very weak	Average	Strong/very strong
Groups of municipalities [year t]	Weak/very weak	0.84	0.16	0.00	Groups of municipalities [year t]	Weak/very weak	0.74	0.17	0.09
	Average	0.13	0.77	0.11		Average	0.18	0.57	0.25
	Strong/very strong	0.02	0.09	0.89		Strong/very strong	0.13	0.26	0.61

Source: Authors’ calculations.

Figure 22. Kernel density functions for tax and revenue indicators, 2011/12 – 2017



If we analyze these results together with those of the tax base growth, it is evident once again that proper management of cities goes beyond stand-alone updates of cadastral appraisals. This since probabilities to move from weak to strong groups of tax base growth is around 20%, while the same improvement within the transition matrix of own-source revenues relative to total revenue has probability zero.

Together with the external indicators, debt is the other dimension with the lowest persistence within cities’ fiscal health indicators (Table 19). Transition matrices show low probabilities of continuing in the same debt positions, either on cities’ ability to pay back with tax revenues

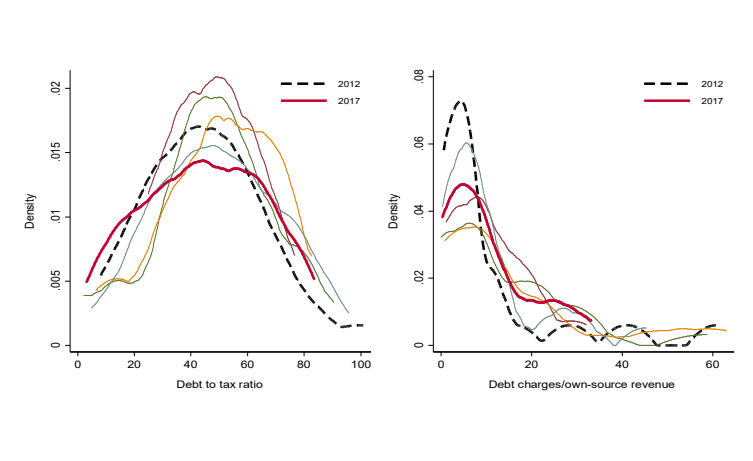
(fiscal sustainability) or on their capability to repay with tax and non-tax revenues. Good news from these results is that within out-of-main-diagonal probabilities the highest values for both indicators are for those weak/very-weak cities when moving one step ahead to the average and more positive debt position, 0.39 for debt to tax ratio and 0.29 for debt charges relative to own-source revenues. Density functions show two different dynamics (Figure 23). On the one hand, debt to tax ratio shows a symmetric distribution with and almost unchanged average of about 50%, and no evident particular cases with too good or too bad fiscal sustainability. An opposite situation is that of debt charges relative to own-source revenues, with a truncated and positive asymmetry, caused by several cities with significant relative problems to repay their debts. In 2011 it was the case of Tunja, Florencia, Pereira, Villavicencio, Medellín and Manizales. Nevertheless, as can also be noticed, the situation was changing as time passed and the distribution became more uniform with fewer cities with high debt charge ratios.

Table 19. Markov transition matrices for debt indicators
(Relative position 2011-2017)

Debt to tax ratio				Debt charges relative to own-source revenues					
		Groups of municipalities [year t+1]					Groups of municipalities [year t+1]		
		Weak/very weak	Average	Strong/very strong			Weak/very weak	Average	Strong/very strong
Groups of municipalities [year t]	Weak/very weak	0.67	0.29	0.04	Groups of municipalities [year t]	Weak/very weak	0.52	0.39	0.09
	Average	0.27	0.46	0.27		Average	0.34	0.37	0.29
	Strong/very strong	0.11	0.23	0.66		Strong/very strong	0.20	0.23	0.57

Source: Authors' calculations.

Figure 23. Kernel density functions for debt indicators, 2012 – 2017



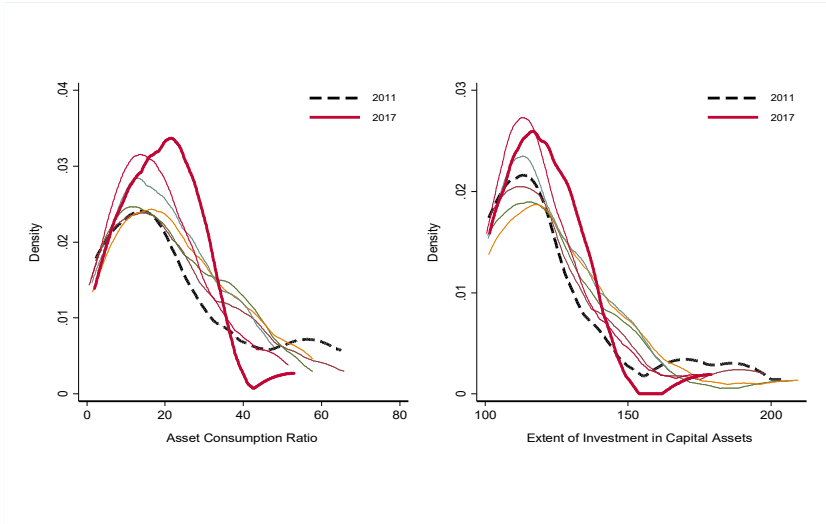
The last dimension of fiscal health is infrastructure, which involves how cities are doing in repairing or replacing their physical assets (asset consumption ratio) and in preserving their full value (extent of investment in capital assets). Transition probabilities (Table 20) as well as density functions (Figure 24) do not seem to show significant differences among the two infrastructure indicators. In both cases probabilities of staying within the same groups (weak/very-weak or strong/very-strong) in the future are around 0.80. On the other hand, probabilities of moving one step up or down are also similar for both infrastructure indicators, between 0.13 and 0.20, irrespective of their initial positions. An additional characteristic can be seen from density functions. Apart from the increase in the concentration as the years passed, it is also evident the presence of cities with high relative ratios. This is the case for Manizales, Villavicencio, Valledupar, and Santa Marta for which is coincident a weak/very-weak fiscal health in terms of infrastructure.

Table 20. Markov transition matrices for debt indicators (Relative position 2011-2017)

Asset consumption ratio				Extent of investment in capital assets					
		Groups of municipalities [year t+1]					Groups of municipalities [year t+1]		
		Weak/very weak	Average	Strong/very strong			Weak/very weak	Average	Strong/very strong
Groups of municipalities [year t]	Weak/very weak	0.80	0.16	0.04	Groups of municipalities [year t]	Weak/very weak	0.82	0.14	0.04
	Average	0.16	0.67	0.16		Average	0.13	0.71	0.16
	Strong/very strong	0.02	0.20	0.78		Strong/very strong	0.04	0.18	0.78

Source: Authors' calculations.

Figure 24. Kernel density functions for infrastructure indicators, 2012 – 2017



8. Conclusions

Fiscal health revealed to be a useful instrument to understand to what extent subnational governments are capable of providing basic services to their residents and to improve their quality of life. However, being fiscally healthy is a necessary but not sufficient condition to promote welfare, since policy makers still have to make it happen through adequate management and public policy decisions. Perhaps one of the main advantages of identifying and dealing with fiscal and financial problems in advance is that, when crisis get out of hand, subnational governments are able to better face them compared to the situation when they try to do it in full crisis.

The first and most evident result from this study is that each subnational government is unique and so is its fiscal health diagnosis. They all have different problems and means of enforcing authority, as well as is different their local culture, which makes it necessary to take custom-made public policy decisions. This is one of the reasons regional analysis is essential, since local governments' decisions and preferences might depend on their particular locations, whether or not they share national or international borders or if they are coastal or inner jurisdictions. Despite of not being a generalized pattern for all fiscal health indicators, in Colombia there are some regional/spatial regularities on how cities are doing on their public finance management.

If we consider the two lagged behind regions, Caribbean and Pacific, the results allow us to identify the generalized weaknesses of the cities that conform these regions. The first and weakest is tax and revenue dimension, in both indicators, own-source revenues relative to total revenues and taxes receivable relative to taxes levied. This might be revealing some low capability of peripheral coastal local governments in enforcing law, mainly due to low administrative capacity, poor or null systematization of fiscal and financial management processes, especially billing and collection of tax and non-tax revenues. All this combined with small and insufficient legal teams make it difficult for local governments to keep up in making the most of their revenue's potential. The second weakness, that seems prevalent in most of Caribbean and Pacific cities, is tax base growth and debt to tax ratio, which is consistent with previous results and reinforces issues on unexploited revenues' potential in

some local governments. On the other hand debts, in particular cities' capability to pay them back with taxes, seem to show low fiscal sustainability too.

For the other two regions, Eastern and Central, there are also common diagnoses. The major fiscal health vulnerabilities are population growth, financial issues (both operating deficit and net financial assets) and debt (in this case debt charges relative to own-source). The first one is consistent with the degree of development of the cities, since the more capable the cities the lowest the population growth. The other two dimensions (financial and debt) are revealing cash-flow tightness and the low capability to pay short-term obligations. In sum, results indicate all together that cities belonging to lagged behind regions deal more with structural and long-term fiscal health issues while, on the other hand, more capable cities face short term liquidity obstacles.

It is important to make clear that previous diagnosis does not mean that particular regions face exclusive fiscal health issues but that there are behavioral patterns depending on cities' locations and their socioeconomic development. Despite the particular fiscal and financial relative drawbacks faced by local governments, results do not show serious problems that can affect long-term fiscal sustainability. It has been argued that the main reason was the implementation of measures intended to impose boundaries to indebtedness capacity, the regulation of credits and the rationalization of spending. What remains to be done is to improve the quality of spending and increase transparency indicators.

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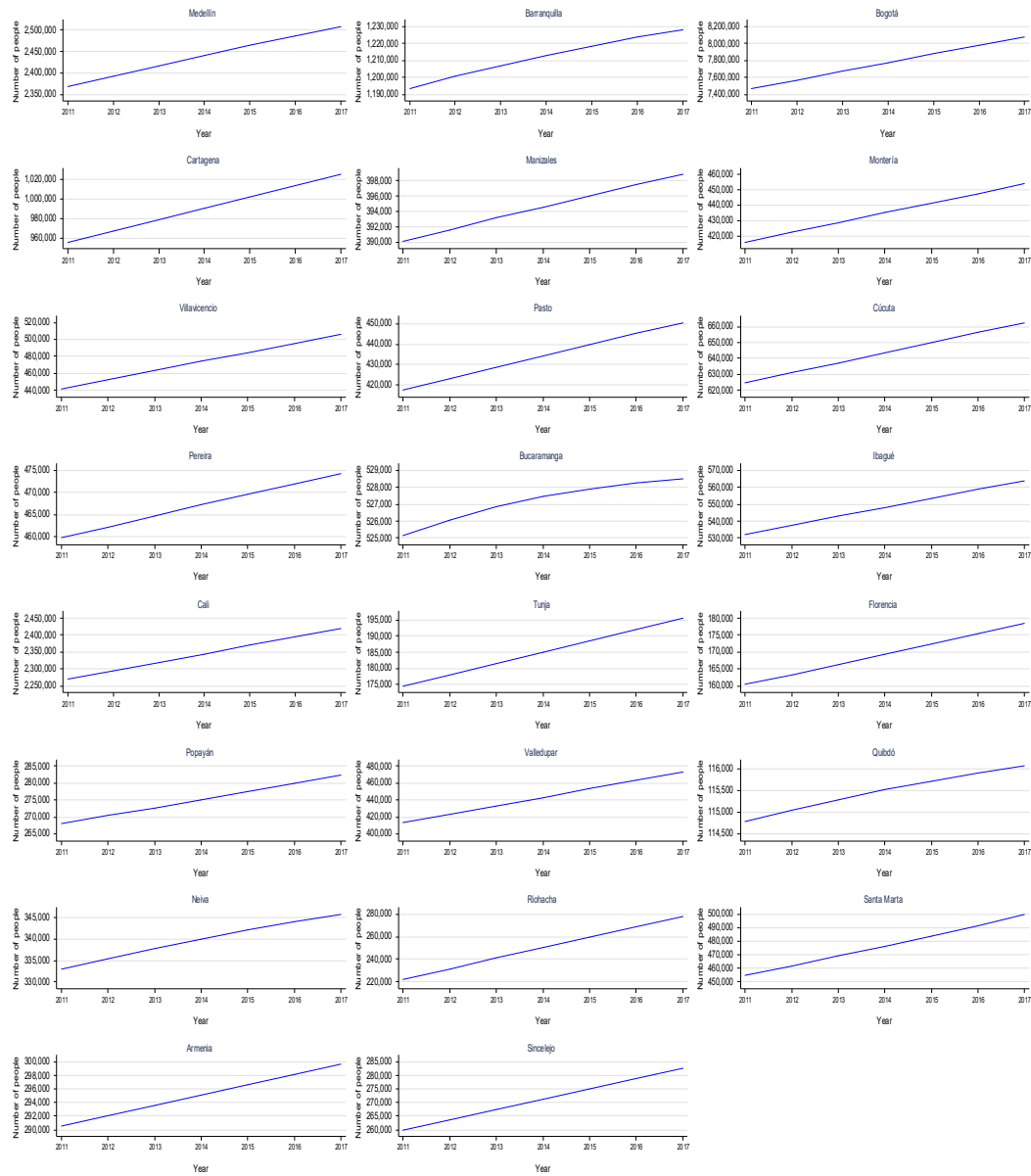
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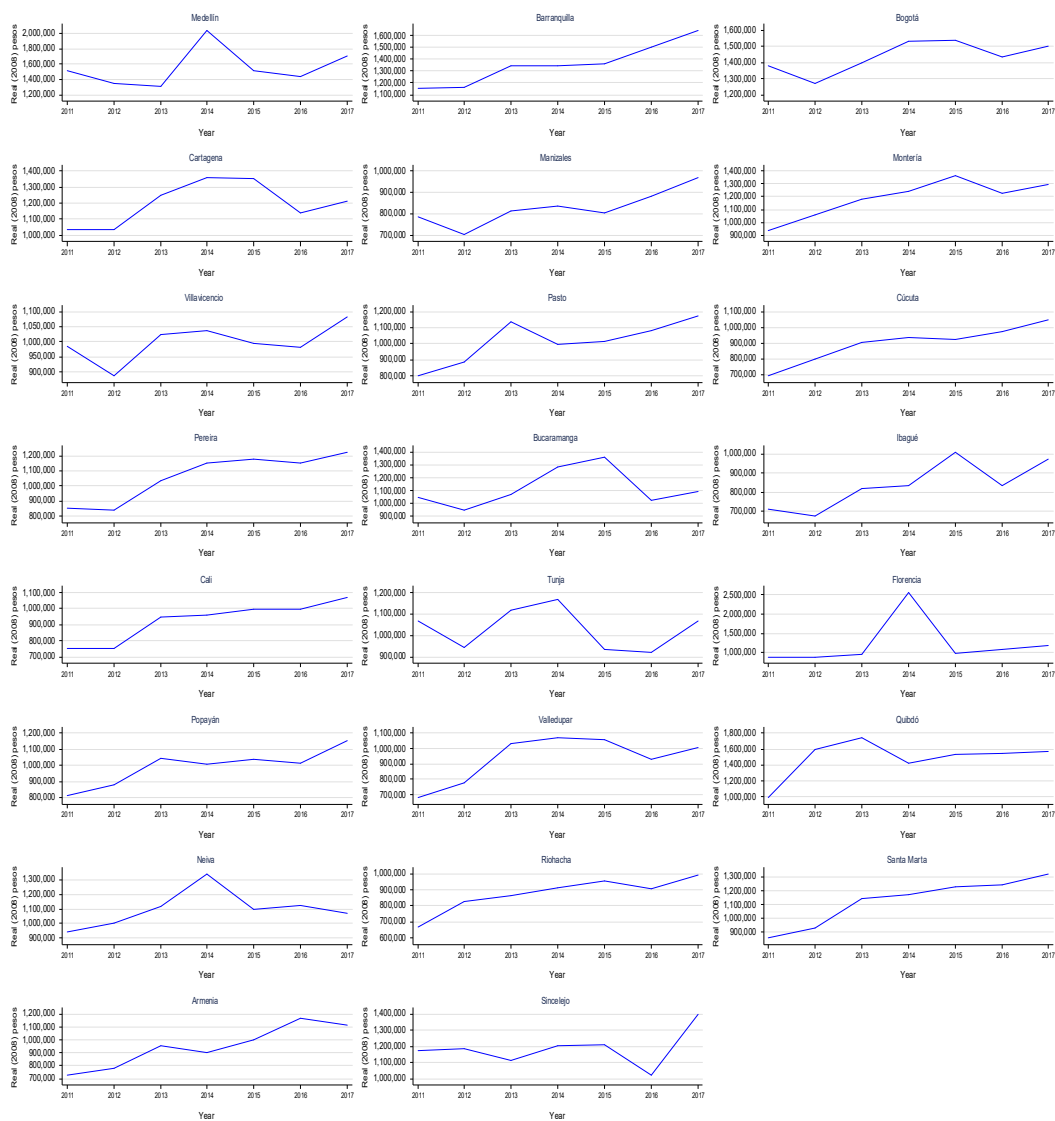
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Annex 1A. Population, 2011 - 2017



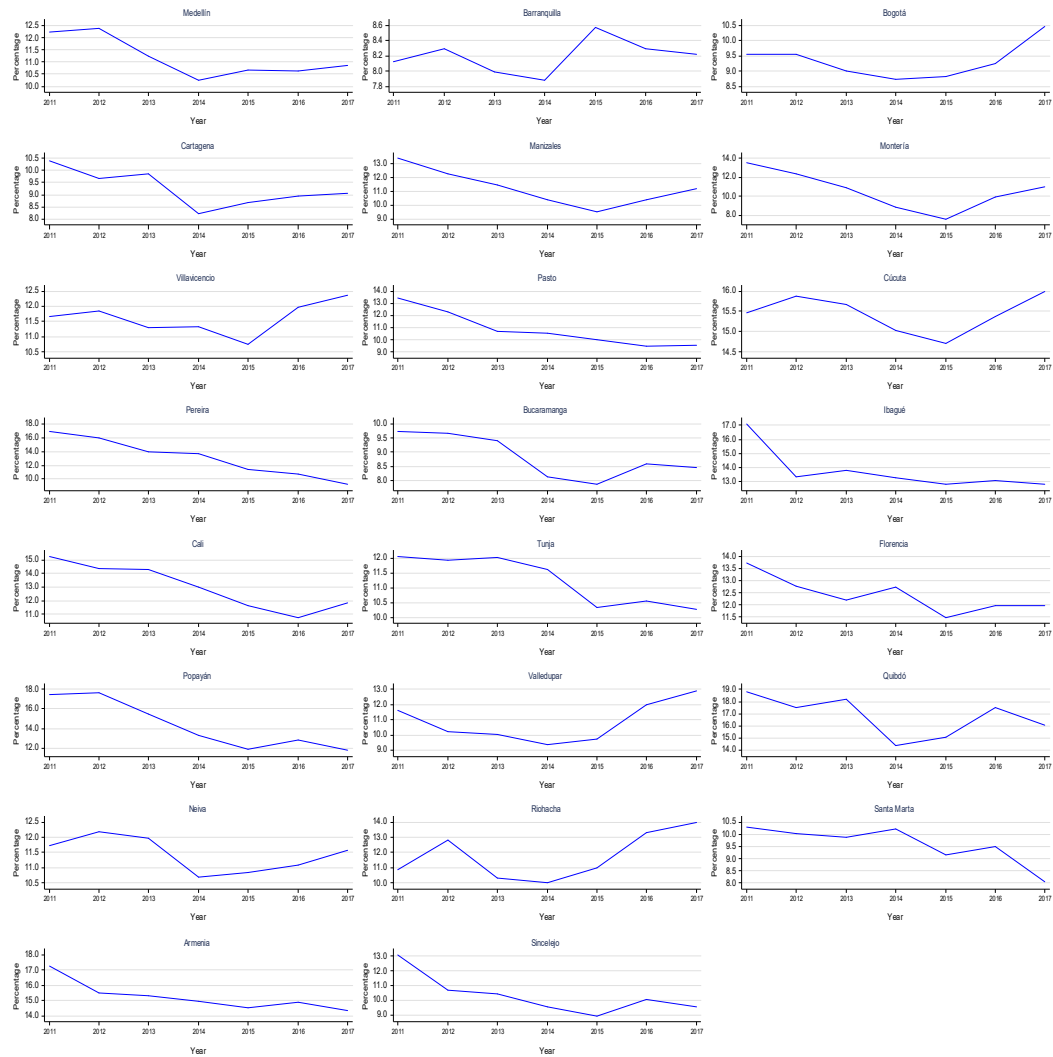
Source: DANE. Authors' calculations.

Annex 1B. Income per capita, 2011 - 2017



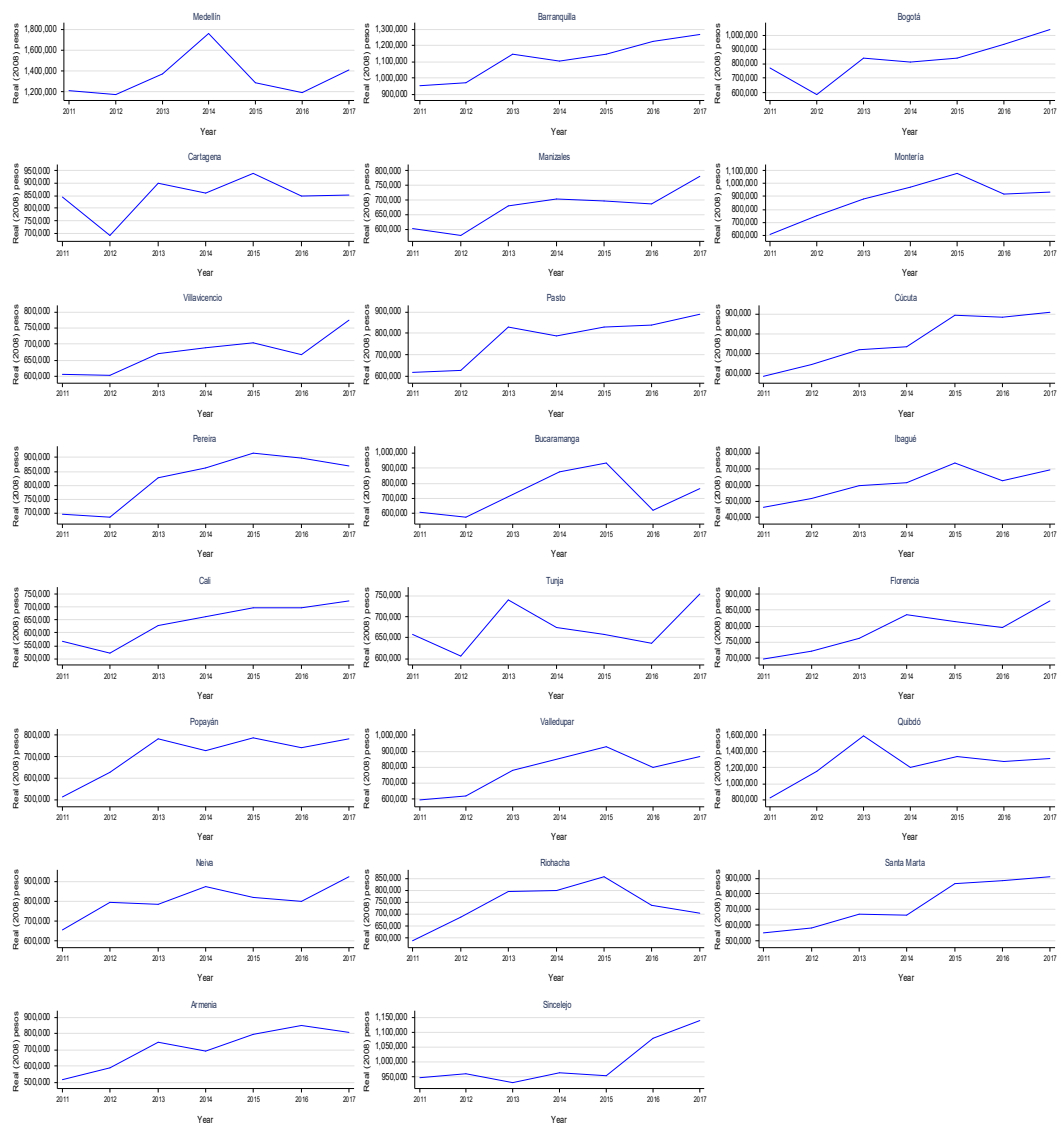
Source: DANE. Authors' calculations.

Annex 1C. Unemployment rate, 2011 – 2017



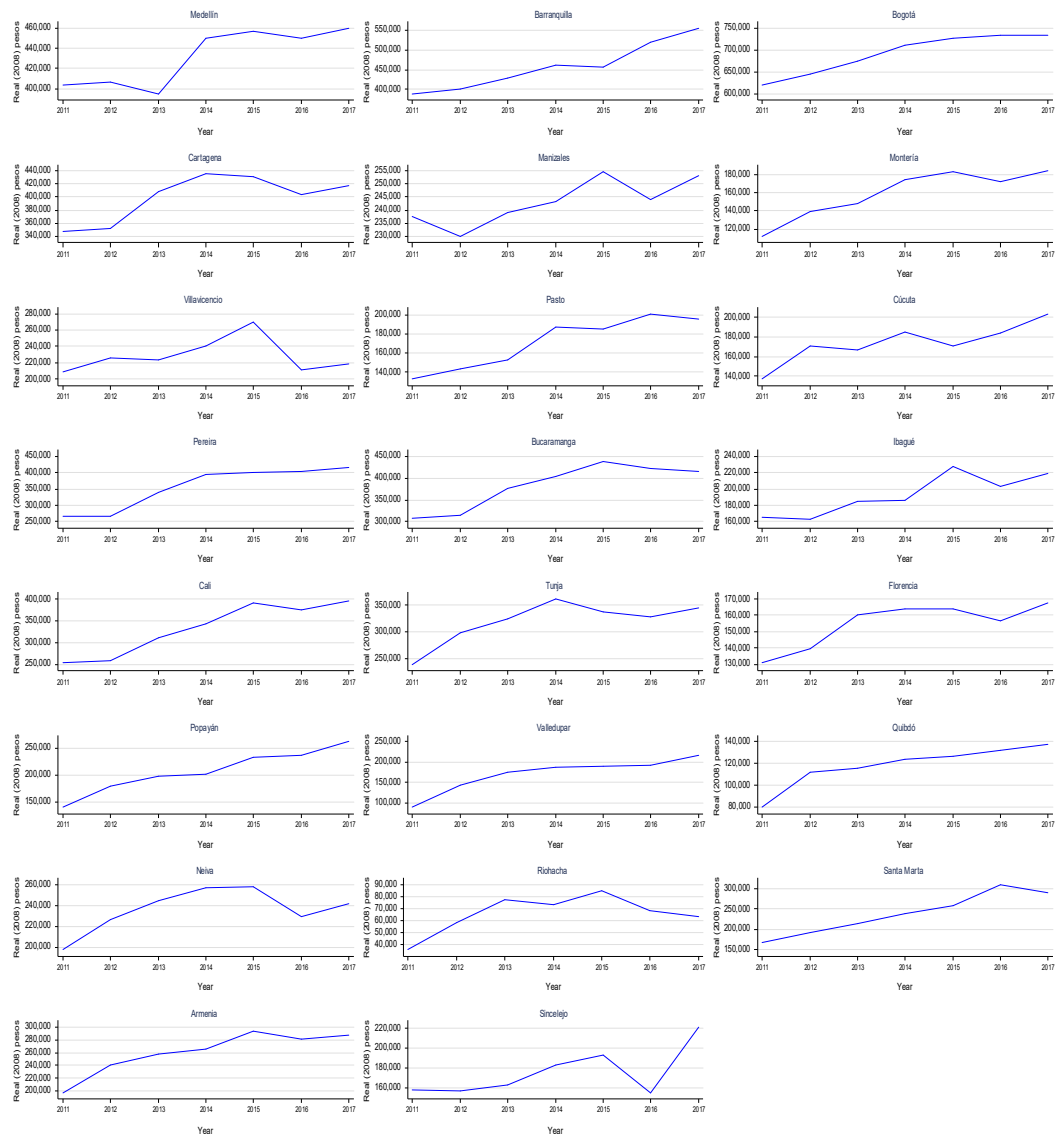
Source: DANE. Authors' calculations.

Annex 1D. Expenditures per capita, 2011 – 2017



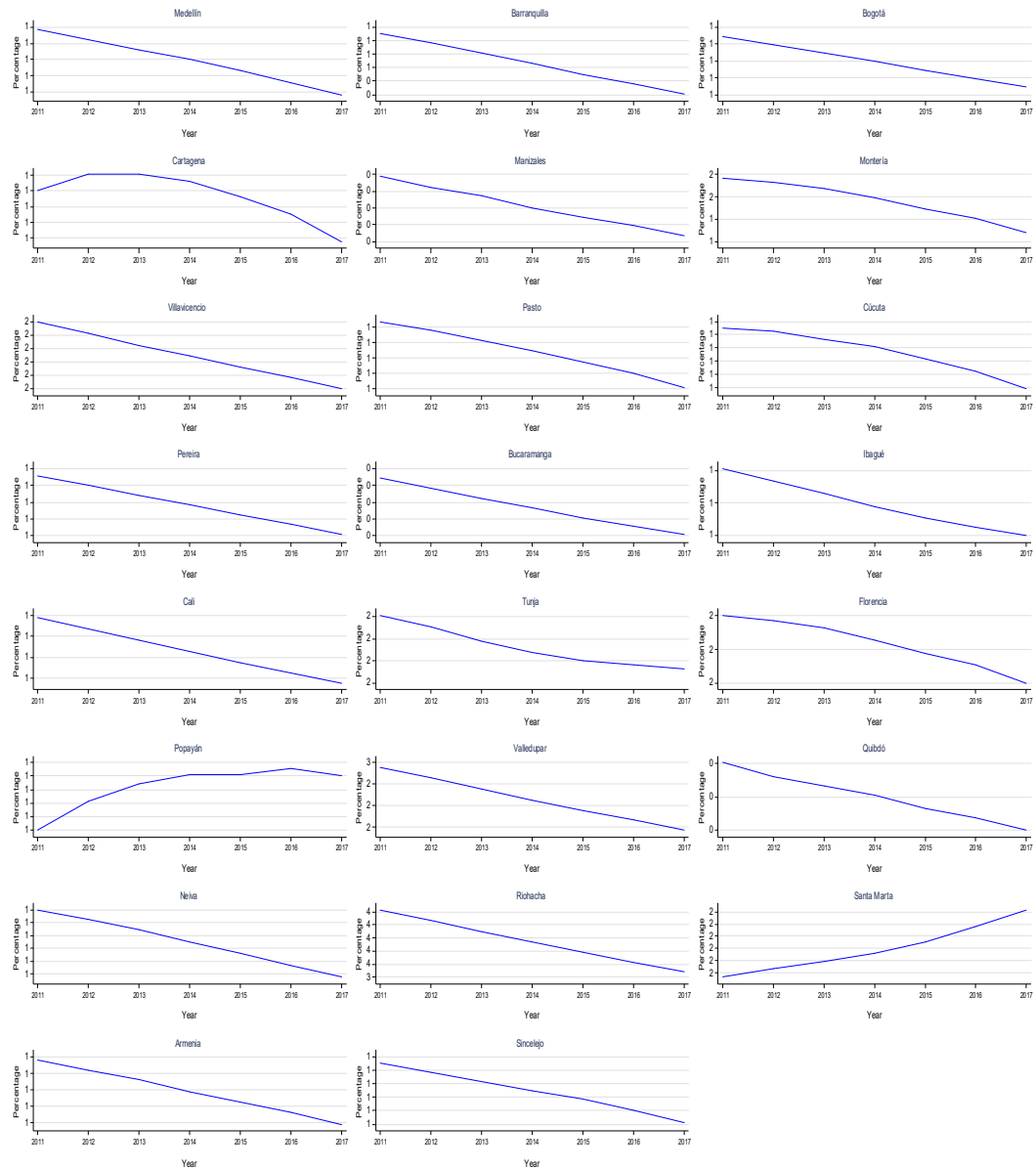
Source: DANE. Authors' calculations.

Annex 1E. Taxes per capita, 2011 – 2017



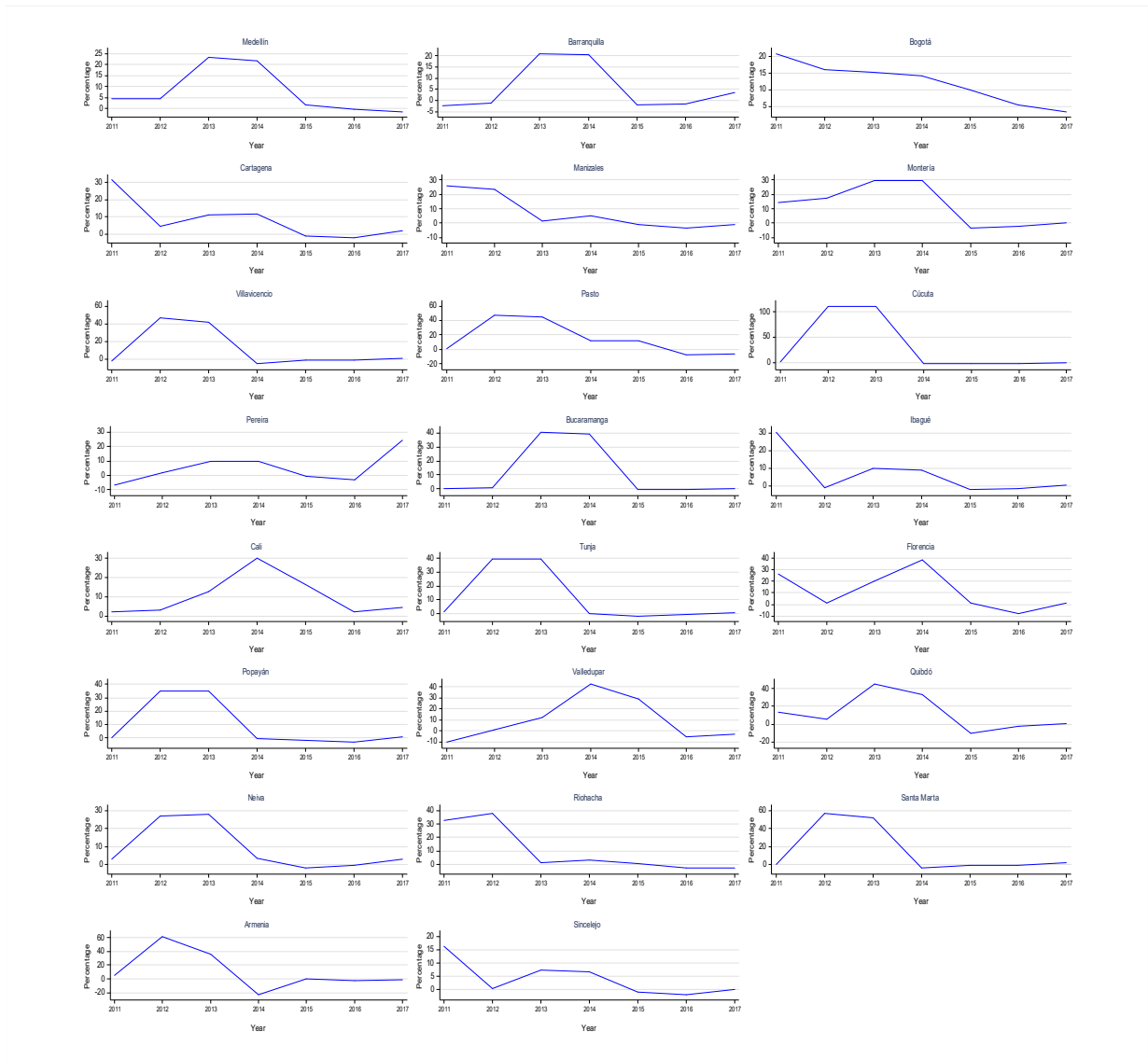
Source: DANE. Authors' own calculations.

Annex 2A. Population growth, 2011 – 2017



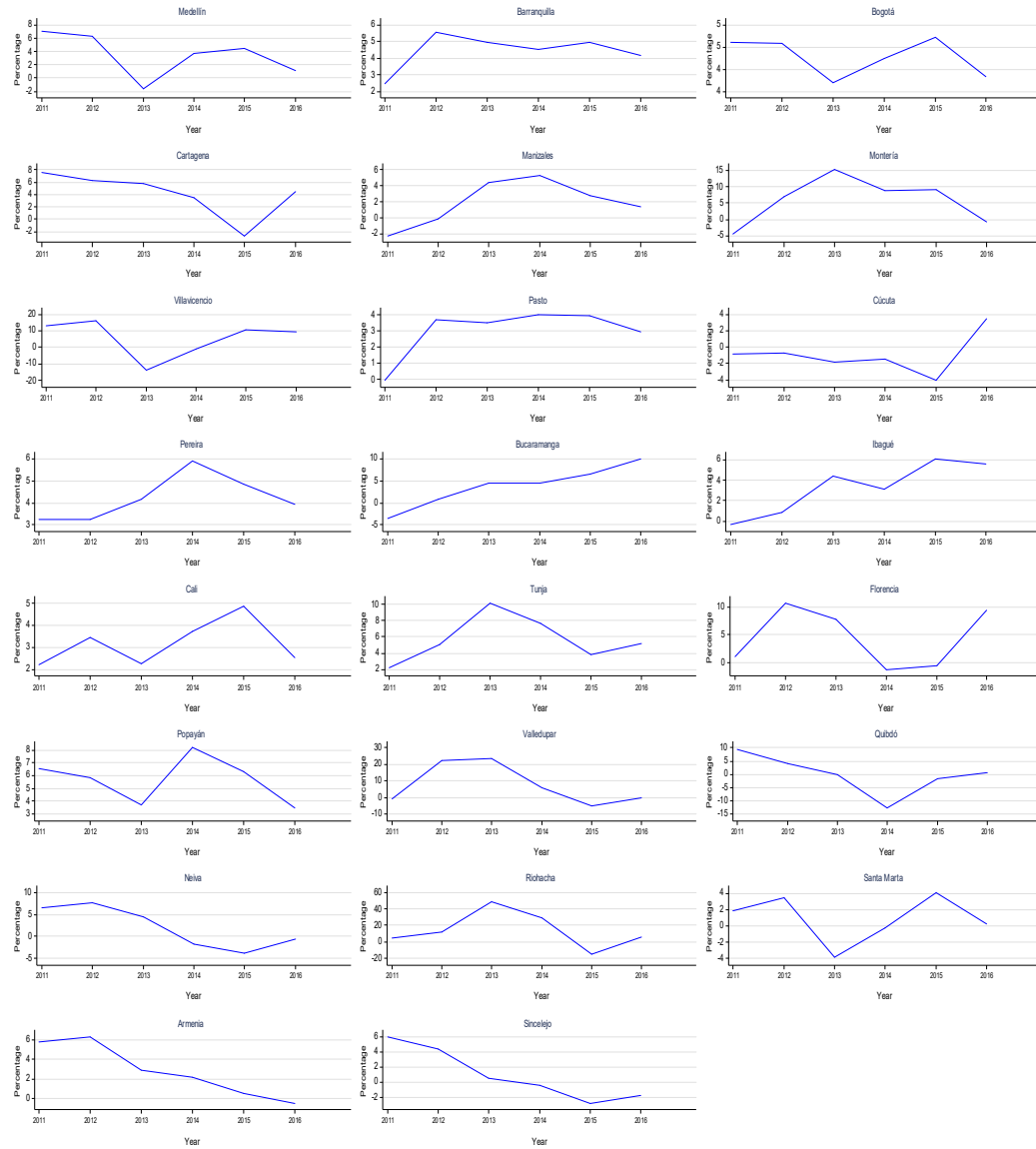
Source: DANE. Authors' own calculations.

Annex 2B. Tax base biannual-growth (property tax), 2011 – 2017



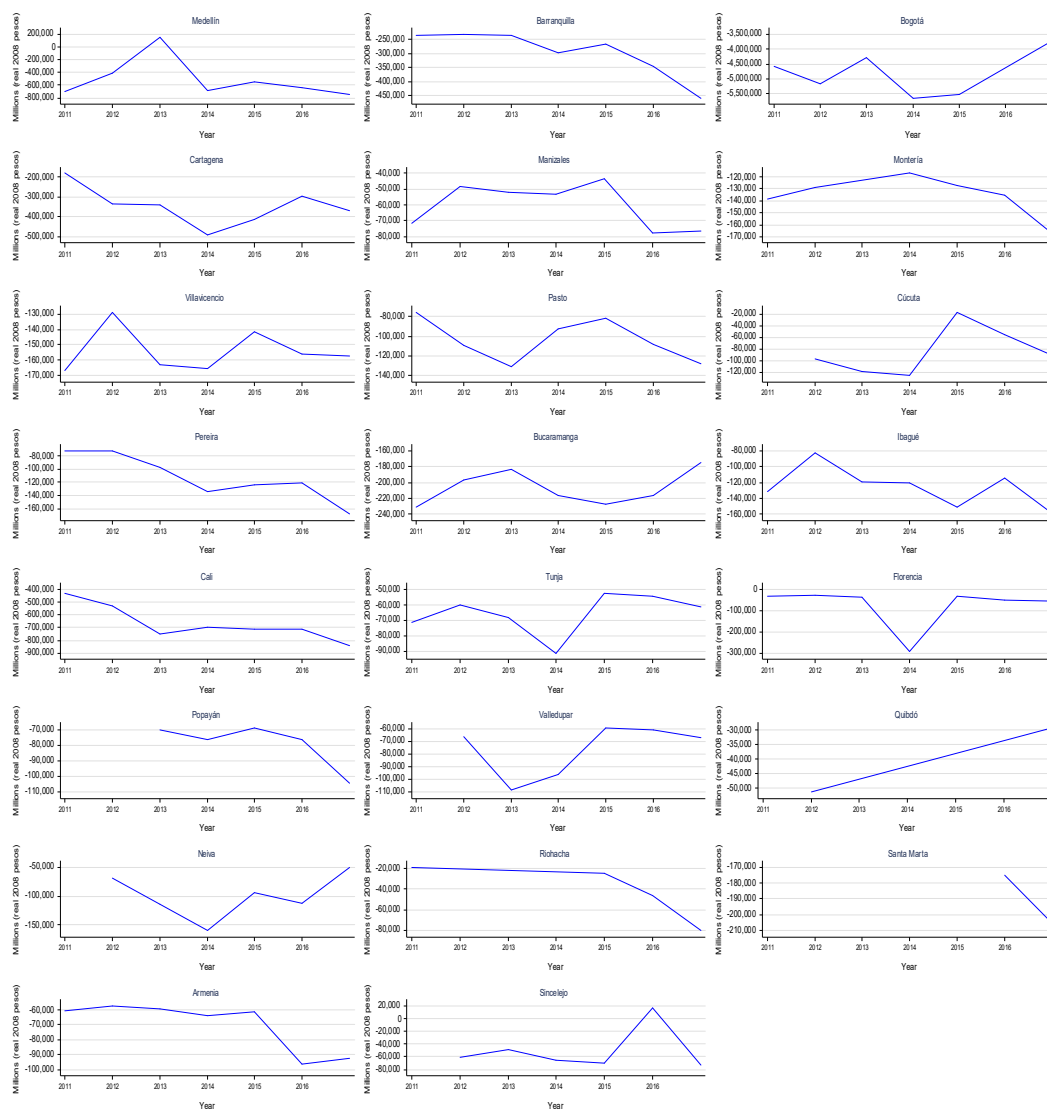
Source: DANE. Authors' own calculations.

Annex 2C. Tax base biannual-growth (GDP), 2011 – 2017



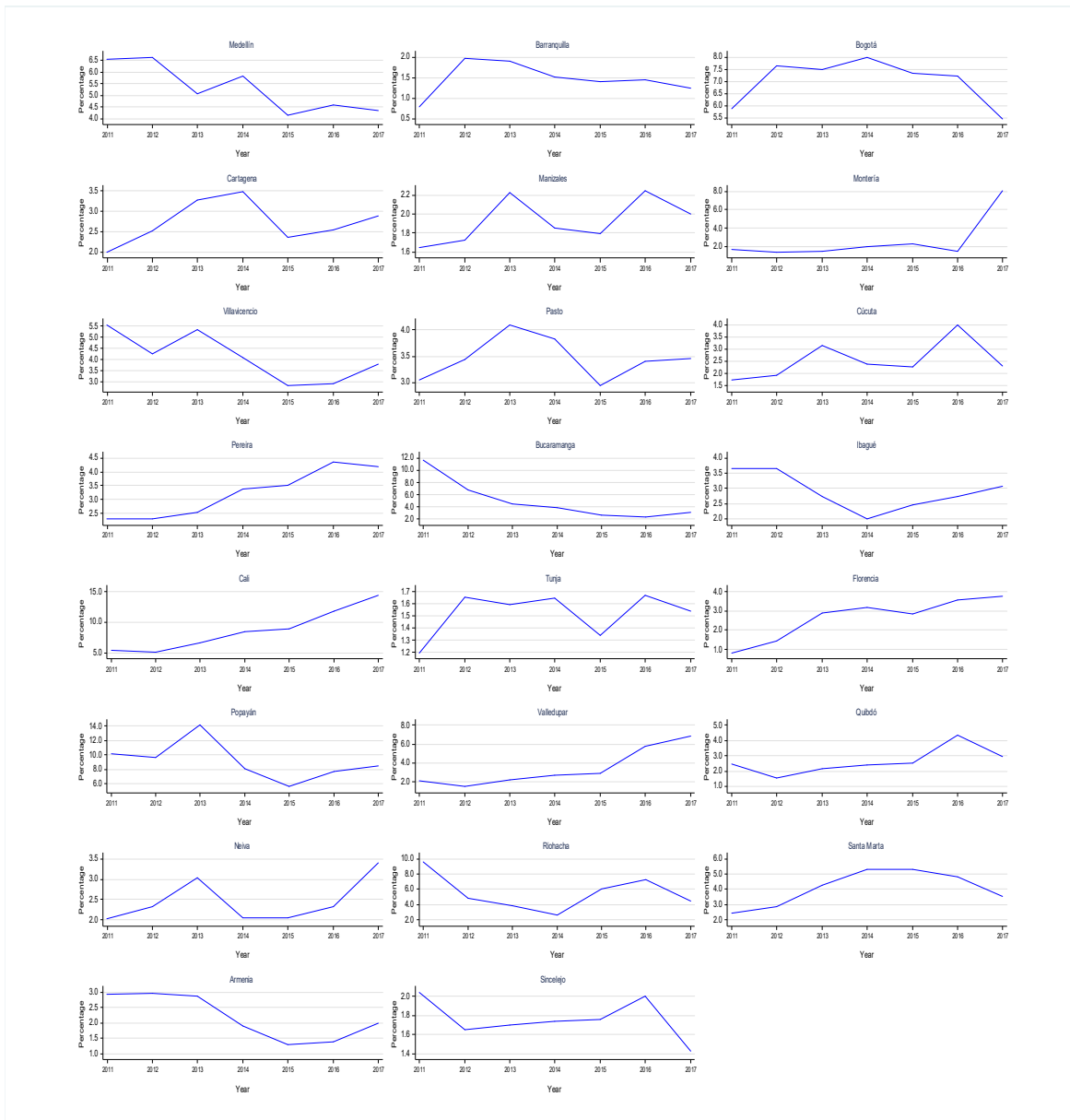
Source: DANE. Authors' own calculations.

Annex 2D. Operating deficit, 2011 – 2017



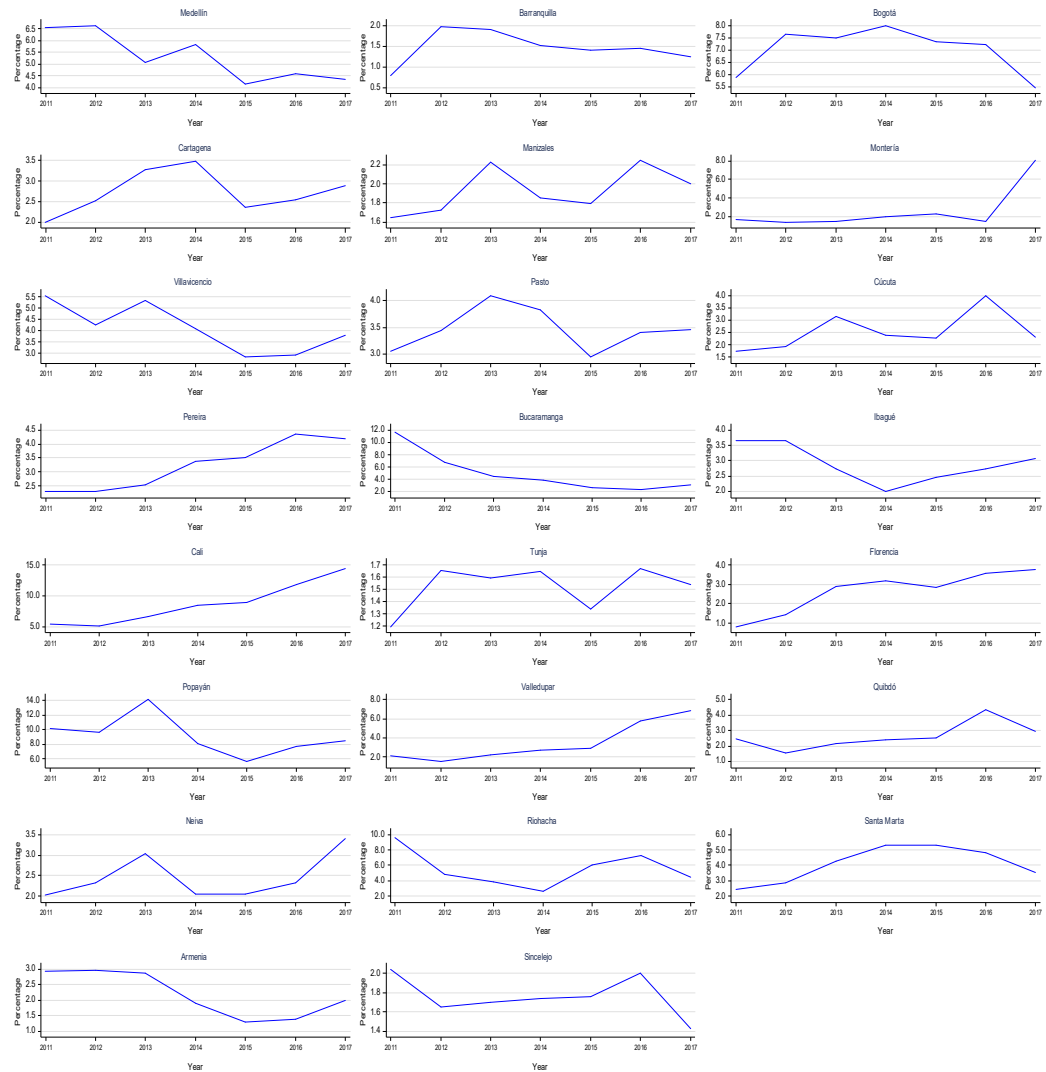
Source: DANE. Authors' own calculations.

Annex 2E. Net financial assets, 2011 – 2017



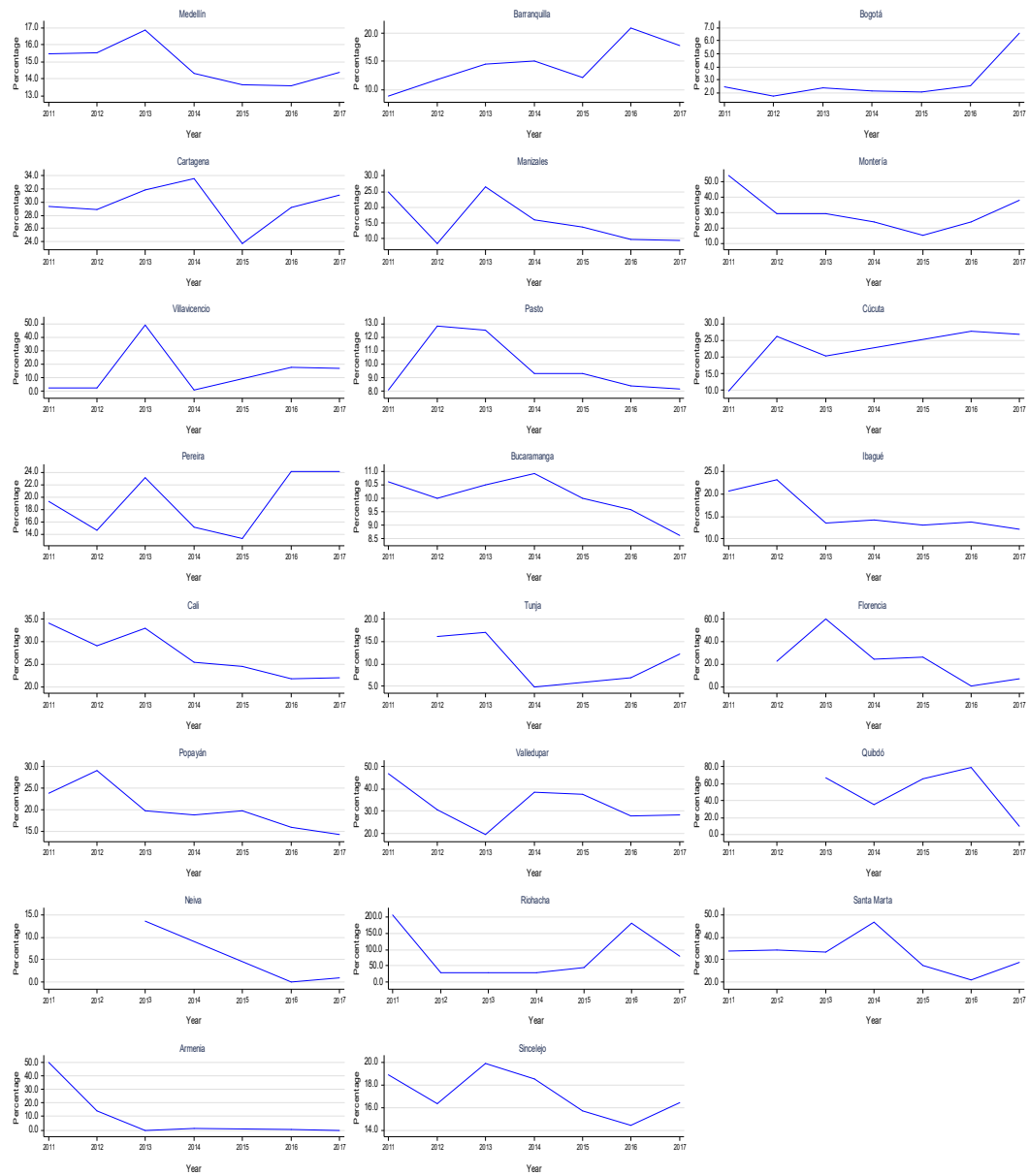
Source: DANE. Authors' own calculations.

Annex 2F. Own source revenues relative to total revenues, 2011 – 2017



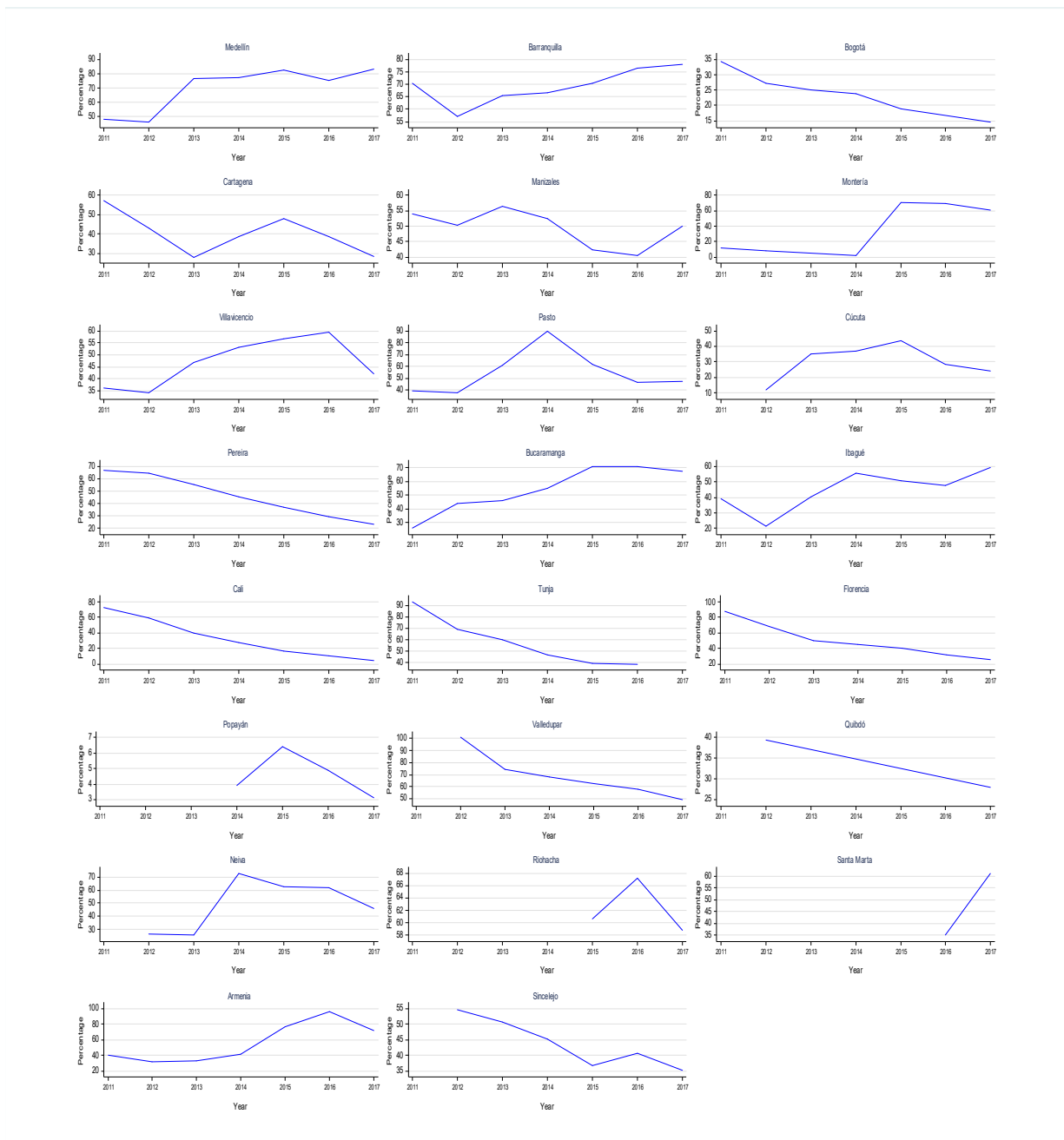
Source: DANE. Authors' own calculations.

Annex 2G. Taxes receivable relative to taxes levied, 2011 – 2017



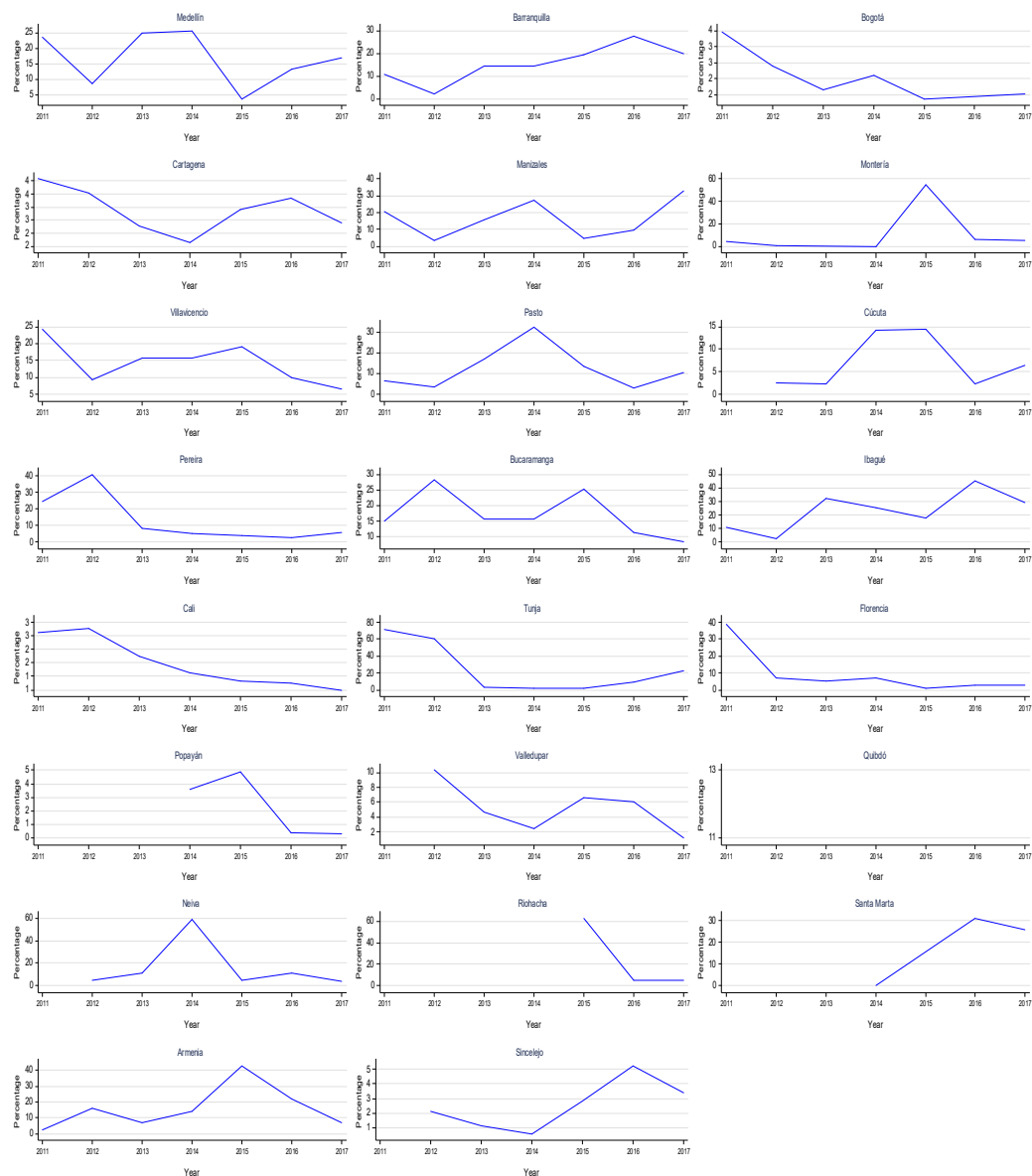
Source: DANE. Authors' own calculations.

Annex 2H. Debt to tax ratio, 2011 – 2017



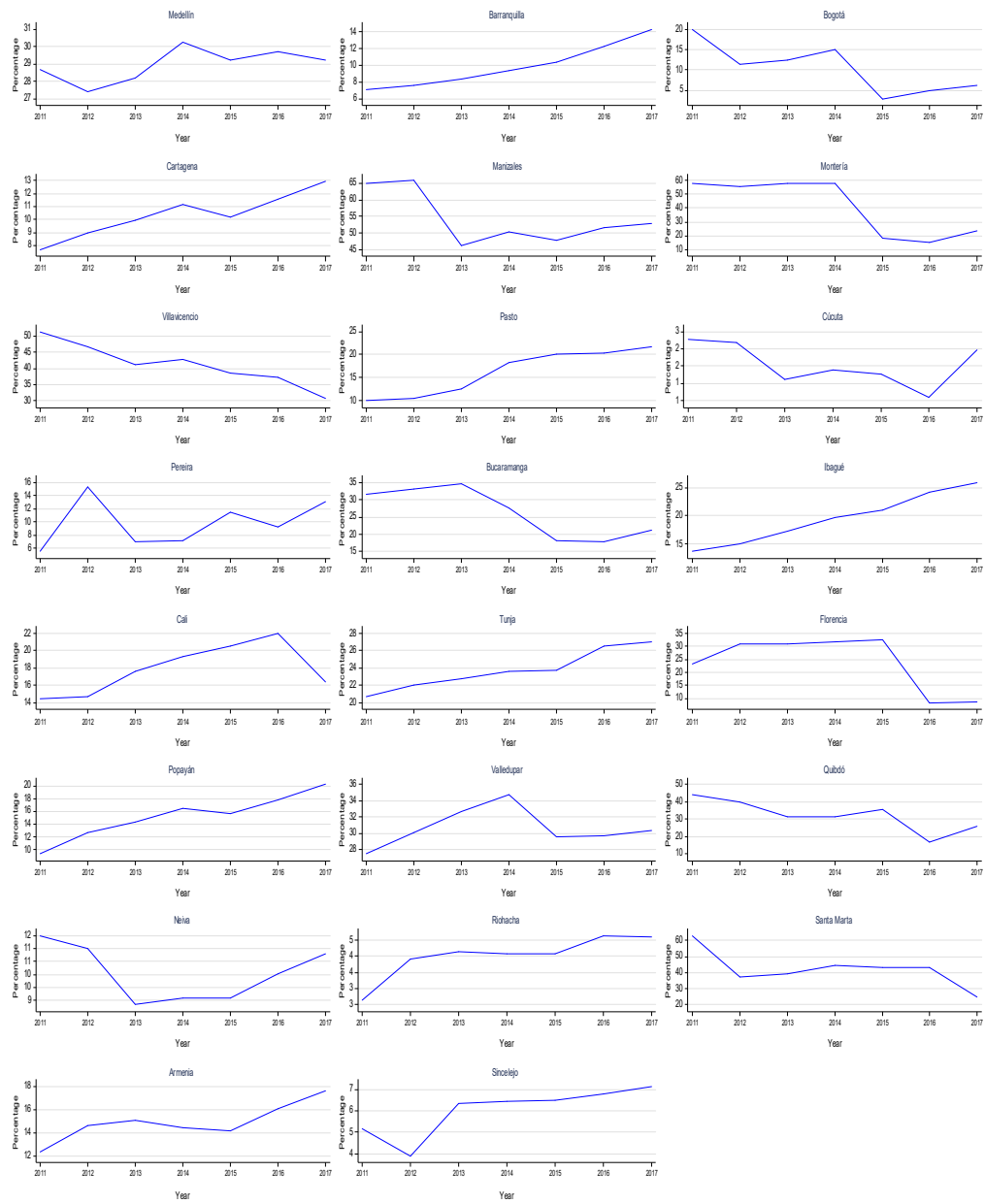
Source: DANE. Authors' own calculations.

Annex 2I. Debt charges relative to own-source revenues, 2011 – 2017



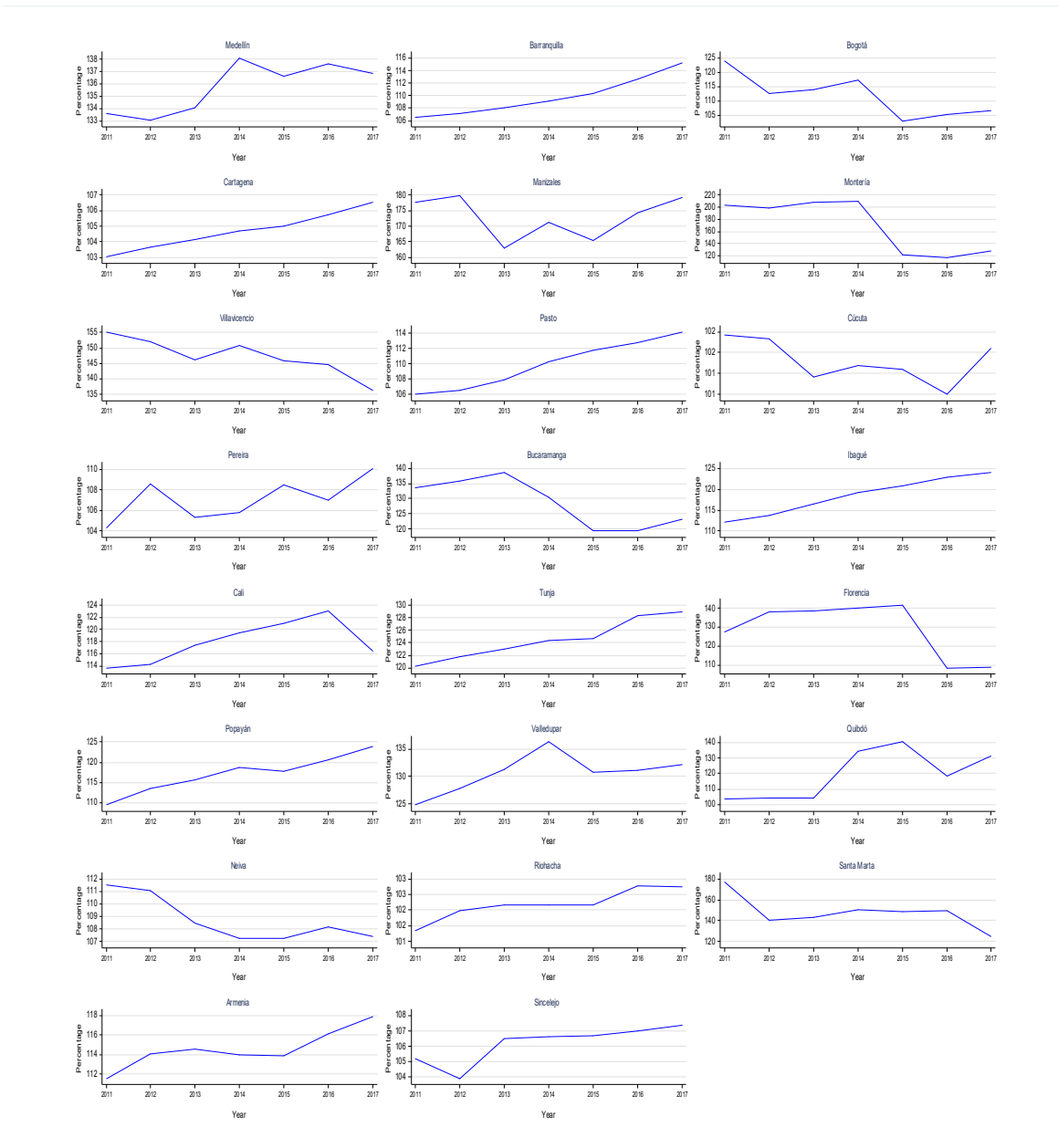
Source: DANE. Authors' own calculations.

Annex 2J. Asset consumption ratio, 2011 – 2017



Source: DANE. Authors' own calculations.

Annex 2K. Extent of investment in capita assets, 2011 – 2017



Source: DANE. Authors' own calculations.