

Spatial Heterogeneity Patterns in the Local Business Tax Rate Across Colombian Municipalities

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Abstract

This paper examines the spatial heterogeneity patterns of the local business tax rate (Impuesto de Industria y Comercio, ICA) across Colombian municipalities, focusing on their distribution, revenue contributions, and spatial autocorrelation patterns. Using data from the year 2022, we analyze the share of ICA in total municipal tax revenues, revealing significant disparities: while ICA accounts for approximately 40% of municipal tax revenues on average, its contribution varies widely, with "Big municipalities" (4% of total municipalities) generating 84% of ICA revenues. We employ various spatial analysis techniques, including Moran's I, Geary's C, and Join-count tests to uncover the underlying spatial dependencies. Our findings reveal significant spatial autocorrelation and clustering of ICA rates with high-tax municipalities clustering in economically developed regions (e.g., Bogotá, Antioquia) and low-tax municipalities in peripheral areas. Local Gi and Hi statistics further highlight regional disparities, suggesting that economic and administrative factors drive these patterns. The findings underscore the need for targeted fiscal policies to address spatial inequalities and enhance tax efficiency in Colombia.

Keywords: Colombia, Spatial heterogeneity, Business tax rates, Spatial autocorrelation

JEL classification: H71, H77, R12, C21

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1. Introduction

Fiscal decentralization was implemented in Colombia in the early 1990s, after 30 years of trying. According to several studies, 63 of the 75 countries with a population over 5 million have undergone major decentralization since 1980 (Lee and Roy, 1999; Manor, 1999; Oxhorn et al., 2004). Existing Colombian literature has explored how fiscal decentralization influences the delivery of education and healthcare (Melo, 2005; Faguet and Sánchez, 2008, 2009), other public services (Sánchez, 2006) as well as on the so called “fiscal fatigue” (Bousquet et al. 2015) and on the impact of local tax revenue and royalties from the extraction of natural resources on governance in Colombian municipalities (Martínez, 2023).

Understanding local tax structures in Colombia is especially relevant given the country's pronounced regional disparities, historical fiscal centralization, and recent efforts to modernize its fiscal framework. Colombia is a compelling case study for analyzing spatial patterns in local taxation due to its complex geography, economic heterogeneity, and the pivotal role municipalities play in public service delivery. The local business tax (ICA) is the main source of municipal revenue from the business sector, yet its distribution and effectiveness vary drastically across regions. Studying the spatial dynamics of this tax not only helps to assess fiscal equity and efficiency within Colombia but also offers insights applicable to other developing countries undergoing decentralization reforms.

Colombia's fiscal decentralization has led to significant variations in local tax structures, particularly in the business tax (ICA), which is a critical revenue source for municipalities. The ICA, regulated under Laws 14/1983 and 49/1990, contributes approximately 1% of GDP, with revenues highly concentrated in urban centers like Bogotá and Antioquia (Ortiz-Muñoz, 2022). Despite its importance, spatial disparities in ICA rates and revenues remain understudied. Existing literature highlights the role of spatial autocorrelation in fiscal policies, yet few studies apply these methods to Colombian local taxation.

This paper contributes to the literature in three key ways. First, it provides a comprehensive spatial analysis of the Colombian business tax rate (ICA), an underexplored yet essential component of municipal finance. Second, it quantifies and maps spatial autocorrelation patterns in ICA rates using robust global and local spatial statistics. Third, it identifies regional clusters and spatial dependencies that inform more equitable and efficient tax policy designs. These contributions are particularly relevant in the context of fiscal decentralization and ongoing efforts to strengthen local public finance systems. Our findings reveal that ICA rates exhibit strong spatial dependence, with high-tax clusters in economically dynamic regions and low-tax clusters in less developed areas. These results align with theories of fiscal competition (Tiebout, 1956) and underscore the need for spatially informed tax policies.

The remaining of the paper is structured as follows: Section 2 briefly introduces the Colombian business tax rate and its main statistics in terms of shares over total municipal tax rates and total revenues collected from this tax across municipalities. Section 3 deals with the spatial analysis of the ICA using global spatial autocorrelation methods. Section 4 turns to the analysis of local spatial autocorrelation patterns in the ICA by computing local measures of similarity and diversification to better understand the existence of clusters and the potential variance across them. Finally, section 5 presents the main results and policy implications.

2. The Colombian business tax rate (ICA)

The size of Colombian municipal governments is moderate, with municipal budgets representing in terms of tax revenues around 11% of total Colombian tax collection¹. The Colombian municipalities and regions depend to a great extent on the central government transfers and grants (Catañeda-Rodríguez, 2023). Inter-governmental transfers and grants represent around 68-69% of total municipal budgets and local taxes represent around 31%. In the case of the regions, inter-governmental transfers and grants represent around 74-76% of total regions budgets, and region taxes represent around 24%. The business sector is charged a number of municipal taxes and fees. The main components of this list are the local business tax (Impuesto de Industria y Comercio (ICA)), the property tax (Impuesto Predial), and the petrol tax (Sobretasa a la gasolina). The Colombian local business tax rate (ICA) is the main local tax burden borne by the business sector (industrial, commercial or service activities are subject to this tax). The revenues from this tax represents around 40% of municipal tax revenues², which implies a percentage of almost 1% of the Colombian GDP. The ICA is, therefore, the largest source of financing that Colombian municipalities currently have from taxes. This tax is regulated under the Law 14 of 1983 and Law 49 of 1990 which create the conditions and general parameters that municipal councils must follow when defining the tax bases and tax rates. In essence, ICA taxes individuals and companies that carry out commercial, industrial and service activities in a given municipality, and is settled based on the taxpayer's net income.

2.1. ICA and its share of total municipal tax revenues

Table 1 provides a first approach to the key statistics describing the proportion that ICA represents as a share of total municipal tax revenues for the year 2022. The results show that municipal average share of ICA over the total municipal tax revenues is quite stable for the whole period (between 18% and 21%). On the other hand, half of the Colombian municipalities have a share of ICA over total municipal tax revenues in the range of 14%-17%. These shares are below the average values indicating that the distribution of these values is positively skewed. In other words, there are some municipalities with very high proportions of revenues from ICA over the total municipal tax revenues, which raises the average (mean).

Figure 1 shows in a graded red color the spatial distribution of the share of ICA over total municipal tax revenues for the year 2022. In this figure we break down the spatial distribution of Colombian municipalities in three groups. The first group (light-red) takes in those municipalities for which the ratios of ICA to total tax revenues is below the average (21%). The second group (red) includes those municipalities for which the ratios of ICA to total tax revenues are between the average of the sample and the percentile 75. Finally, the last group (dark-red) takes in the remaining municipalities, those for which the ratios of ICA to total tax revenues are above the percentile 75. A visual inspection of the map indicates that by far the vast majority of Colombian municipalities are included in the first group (below the average ICA ratios, light-red). These municipalities are basically (with a few exceptions) located both in the Eastern-South Eastern and South Western regions of the country (Chocó, Nariño, Cauca, Putumayo, Caqueta), Central regions (Boyacá, Casanare, Cundinamarca, Meta) and in the Amazonian region (Vaupes,

¹ Colombian tax collection at national level represents around 85% of total tax revenues and the remaining 4% corresponds to taxes collected at the region (departamento) level.

² The property tax and the petrol tax represent around 32% and 7% of municipal tax revenues respectively. Other municipal taxes such those charge for street lighting, gambling and entertainment represent the remaining 20% of municipal tax revenues.

Guaviare). By and large these regions are surrounding the growth poles of Colombia made by the axis Barranquilla-Cartagena (Atlántico region)-Medellín (Antioquia region)- the so-called coffee axis, Manizales, Pereira and Armenia (Caldas, Risaralda and Quindío regions) and Bogotá and towards the south Cali (Valle del Cauca region). The second most important group in terms of number of municipalites is the third group (above percentile 75, dark-red). A small number of municipalities are between the average and the percentile 75 as regards to ICA ratio to total tax revenues. Therefore, the distribution of municipalities according to ICA ratios is very skewed to the left. Figure 2 shows the number of municipalities that fall within the ICA ratio brackets we have defined in Figure 1. 659 municipalities (around 61%) fall within the first bracket, 152 (14%) in the second bracket and 273 (25%) in the last bracket.

Table 1 - Business Tax Rate (ICA) as a Share of Total Tax Revenues for Colombian Municipalities (2000–2022)

Year	Min	Q1	Median	Mean	Q3	Max
2022	0.006	0.11	0.17	0.21	0.28	0.87

Source: Own elaboration.

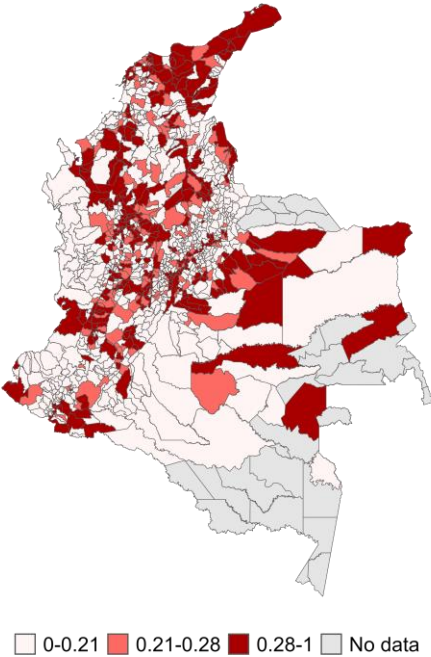


Figure 1 - Ratio of ICA over total tax revenues (2022)

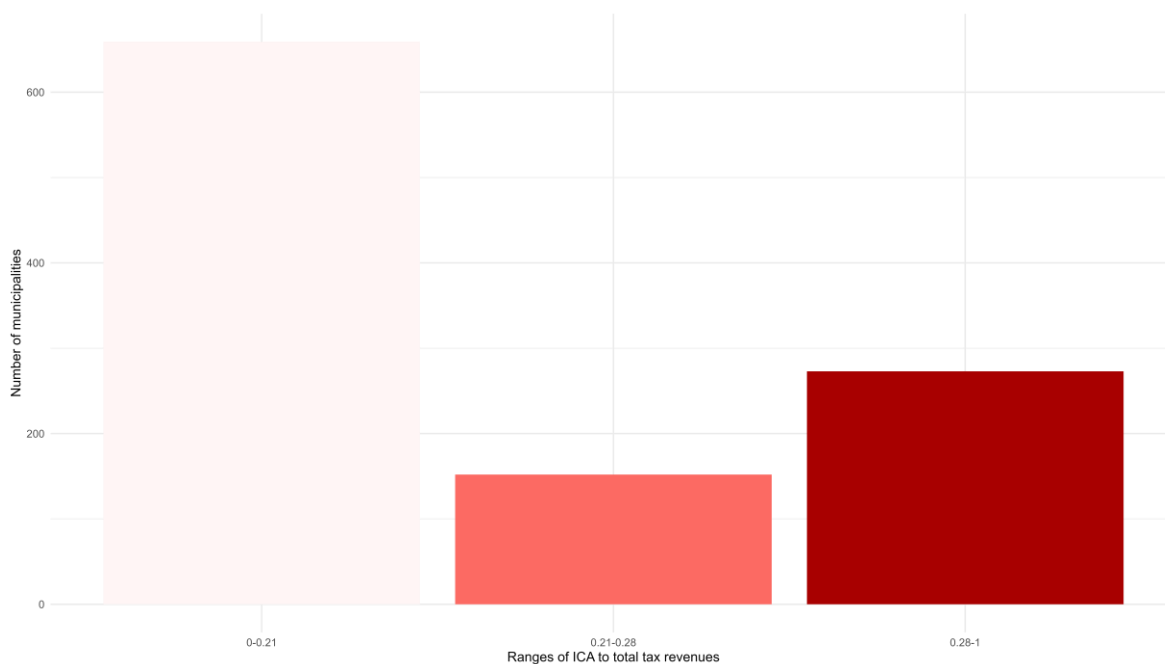


Figure 2 - Number of municipalities according to ICA ratio over total tax revenues (2022)

2.2. Total ICA revenues across Colombian municipalities

In this section we analyze ICA revenues for the year 2022. Table 2 shows the distribution of total revenues from ICA from the different categories of municipalities defined for Colombia. A better insight of what these numbers reveal is get by classifying total ICA revenues according to the typology of municipalities defined according to the Colombian Law 1551 of 2012. This law defines three groups of municipalities³: the first group which is referred to as “Big municipalities” which takes in municipalities with the categories "1" and the letter "E" in Table 2. The second group is referred to as "Intermediate municipalities" and takes in municipalities with the categories "2", "3" and "4". Lastly, the third group is referred to as "Basic municipalities" and takes in municipalities with the categories "5" and "6". Table 3 shows the data on total ICA revenues and the percentage they represent over total ICA collection for the three groups in the year 2022. It can be seen that the Big municipalities account for the biggest share of total ICA revenues collection with a remarkable share of 83.89% despite the fact that the number of

³Grandes municipios in Colombia are referred to those municipalities that belong to the so called "E" category (categoría especial) and first category (categoría 1). The "E" category takes in municipalities with more than 500.001 inhabitants and current annual revenues above 400.000 monthly minimum legal wages. The first category takes in municipalities in the range of (100.001, 500.000] and current annual revenues above 100.000 monthly minimum legal wages and up to 400.000 monthly minimum legal wages. The second category takes in municipalities in the range of (50.001, 100.000] and current annual revenues above 50.000 monthly minimum legal wages and up to 100.000 monthly minimum legal wages. The third category takes in municipalities in the range of (30.001, 50.000] and current annual revenues above 30.000 monthly minimum legal wages and up to 50.000 monthly minimum legal wages. The fourth category takes in municipalities in the range of (20.001, 30.000] and current annual revenues above 25.000 monthly minimum legal wages and up to 30.000 monthly minimum legal wages. The fifth category takes in municipalities in the range of (10.001, 20.000] and current annual revenues above 15.000 monthly minimum legal wages and up to 25.000 monthly minimum legal wages. Finally, the sixth category takes in municipalities with less than 10.001 inhabitants and current annual revenues below 15.000 monthly minimum legal wages.

municipalities belonging to this group is 45 representing less than 4% of municipalities in Colombia. The groups of Intermediate municipalities and Basic municipalities collect a more balanced amount of revenues with shares of 8.81% and 7.3% of total ICA revenues collection but this reading changes quite substantially when we pair these numbers with the municipalities belonging to each of these groups. Intermediate municipalities amount 82 whereas Basic municipalities amount 957 which leads to the striking result of an average ICA municipality revenue for the Intermediate municipalities of around 14823.4 millions of current COP whereas this number falls to 1052,28 millions of current COP for the (a fourteen times factor decrease!!) for the basic municipalities. The average ICA municipality revenue for the big municipalities is of around 257229.1 millions of current COP for the year 2022, a seventeen times fold with regards to average ICA municipality revenue for the Intermediate municipalities and a 244.4 times fold with regards to average ICA municipality revenue for the basic municipalities.

Table 2 - ICA revenues across categories of municipalities (2022)

Category	Total ICA revenues (millions of current COP)
1	2697118
2	689615
3	383519
4	142387
5	405137
6	601903
E	8878193

Source: Own elaboration.

Table 3 - ICA revenues across groups of municipalities (2022)

Group	Total ICA revenues (millions of current COP)	%
Big municipalities	11575311	83.89
Intermediate municipalities	1215521	8.81
Basic municipalities	1007040	7.30

Source: Own elaboration.

Finally, Table 4 breaks down the shares of ICA revenues that big municipalities, intermediate municipalities and basic municipalities account for in the top 6 regions in Colombia. By far the largest shares correspond to the big municipalities with percentages (excluding the region capital, Bogotá, DC) ranging between 67.42% (Cundinamarca) and 90.81% (Santander). Intermediate municipalities are the second most important contributors to ICA revenues with the exception of the Santander region where these municipalities represent only a 2% of total ICA revenues for the region.

Table 4 - ICA revenues across groups of municipalities in top 6 regions (2022)

Departamento	Group	Total ICA (million COP)	ICA Cat. (% Total ICA)
Antioquia	Big municipalities	1935861	73.43
	Inter. municipalities		16.58
	Basic municipalities		9.99
Atlántico	Big municipalities	767679	89.92
	Inter. municipalities		6.98
	Basic municipalities		3.09
Bogotá,Dc	Big Municipalities	5628593	100.0
Cundinamarca	Big municipalities	921469	67.42
	Inter. municipalities		21.93
	Basic municipalities		10.65
Santander	Big municipalities	652617	90.81
	Inter. municipalities		2.01
	Basic municipalities		7.18
Valle Del Cauca	Big municipalities	1103360	84.54
	Inter. municipalities		11.14
	Basic municipalities		4.32

Source: Own elaboration.

3. Spatial analysis of the Colombian business tax rate

In this section we carry out a series of analysis to check both for potential spatial autocorrelation as well as spatial heterogeneity patterns in the business tax rates across Colombian municipalities. Figure 3 depicts in a graded yellow color a gradient of ICA ratios⁴. A quick look to the map suffices to see that municipalities with high ICA tax rates are clustered together. The same occurs for municipalities with low ICA tax rates. A more formal approach to the type(s) of spatial dependence(s) that are reflected in the data comes next.

⁴ Grey color in the map captures municipalities for which there is no data.

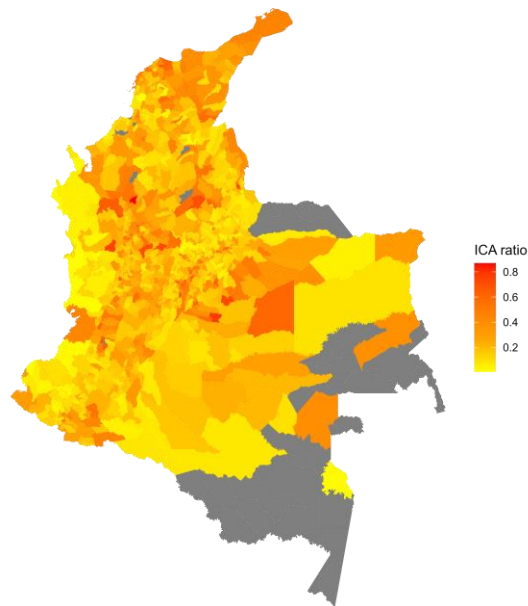


Figure 3 - Spatial distribution of ICA ratios by municipalities (2022)

3.1. Global spatial autocorrelation

Table 5 shows the results of four different global spatial dependence statistics (Moran' I, Geary' C, Global G and Moran monte carlo) using four neighbourhood criteria, queen-contiguity, 5-nearest neighbours, 10-nearest neighbours and a weights matrix with a combined neighbourhood criteria. The combined neighbourhood weights matrix has been built by considering two different radius of distances in order to assign neighbors to each and every Colombian municipality taking into account their very different sizes. For the so-called “Amazonian” municipalities (municipalities belonging to the departamentos of Vaupes, Guaviare, Guainía, Putumayo, Meta, Caquetá, Vichada) and also for La Guajira we have considered that municipalities are neighbours within a radius of 675 km. For the rest of Colombian municipalities, since they are smaller in sizes, the radius within which we defined the neighbours is 65km.

The results show that regardless which neighborhood criteria⁵ or statistic is used the null of spatial independence is rejected.

⁵ The only case where we cannot reject the null is for the case of the Global G test using the combined neighbourhood criteria.

Table 5 - Spatial Autocorrelation Global Tests: ICA (2022)

Neighbourhood criteria	Moran's I	Geary's C	Global G	Moran MC
Queen contiguity	17.43**	14.60**	14.83**	0.32**
5-nearest neighbours	17.60**	16.96**	16.31**	0.30**
10-nearest neighbours	20.45**	19.59**	19.43**	0.25**
Combined neighbourhood	3.67**	1.63**	-0.03	0.02**

Source: Own elaboration. *p<0.1; **p<0.05; ***p<0.01.

For robustness purposes, we have also checked the results of increasing the number of neighbours and their impact in terms of Moran's I coefficient. This result is shown in Figure 4 which depicts Moran's I values for neighborhoods that go from 5 to 100 neighbors in increments of 5. It can be seen that the decline is more pronounced at the beginning, particularly for smaller neighborhood sizes (5, 10, 15, and 20 neighbors). Beyond this point, the decrease in Moran's I becomes less steep, indicating a stabilization of spatial autocorrelation as the neighborhood size increases. This pattern suggests that spatial dependency is stronger within smaller, localized neighborhoods and diminishes progressively as the spatial scale expands. The observed pattern can be attributed to the following reasons:

- a) **Localized Spatial Autocorrelation:** Smaller neighborhood sizes (e.g., 5, 10, 15 neighbors) capture local interactions and dependencies more effectively. In these cases, Moran's I is higher because nearby units are more likely to share similar characteristics, reflecting stronger localized spatial autocorrelation.
- b) **Dilution of Spatial Relationships:** As the neighborhood size increases, the analysis includes more distant units. This expansion reduces the influence of strong local similarities and incorporates areas with potentially weaker or no spatial dependency, leading to a decline in Moran's I.
- c) **Heterogeneity of Spatial Processes:** The spatial process driving ICA tax rates may operate more strongly at a local scale. Including larger neighborhoods could dilute the signal of the process by incorporating more heterogeneous or unrelated spatial units.
- d) **Spatial Homogenization:** With increasing neighborhood size, the spatial structure becomes less distinct as it averages out the variability across larger areas, contributing to the less pronounced decline in Moran's I beyond a certain scale.

This phenomenon highlights the importance of selecting an appropriate spatial scale when analyzing spatial autocorrelation to ensure that the analysis aligns with the scale at which the process of interest operates.

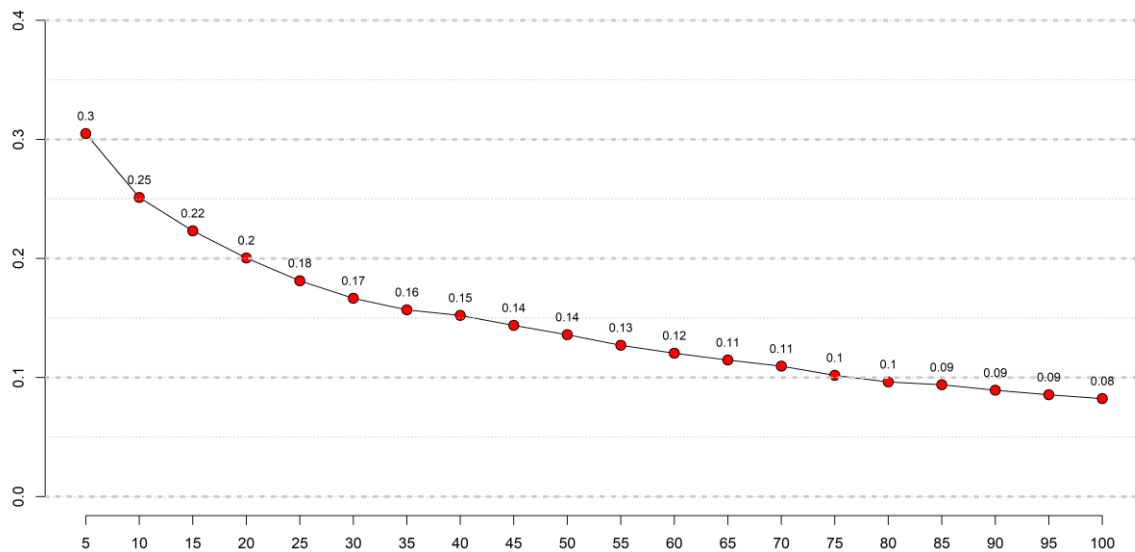


Figure 4 - Moran's I over different Knn (2022)

A more illustrative way to examine spatial dependence is through the representation of Moran's scatterplots, proposed by Anselin (1996). In these graphs, the value of the business tax rate (ICA) of each municipality, standardized with respect to the mean, is shown on the x-axis, while the standardized value of the other municipalities business tax rates (or the spatial lag) are represented on the y-axis. The spatial lag represents the weighted average of the municipalities business tax rates of the other municipalities. The spatial weights matrices we have used for building our Moran's scatterplots are the queen contiguity, 5 and 10 nearest neighbours, the combined neighborhood and also the inverse of the distance to all municipalities.

Figure 5 shows the Moran's scatterplots for the year 2022 using the Queen contiguity matrix. The results shows that the areas of positive autocorrelation (Quadrant I and Quadrant II) where high ICA taxes are surrounded by high ICA taxes (Quadrant I) and low ICA taxes are surrounded by local ICA taxes (Quadrant III) are where the vast majority of municipalities are clustered. However, there are municipalities that set low ICA taxes surrounded by municipalities that set high ICA tax rates (Quadrant II), as well as municipalities that set high ICA tax rates whose closest municipalities set low ICA tax rates (Quadrant IV).

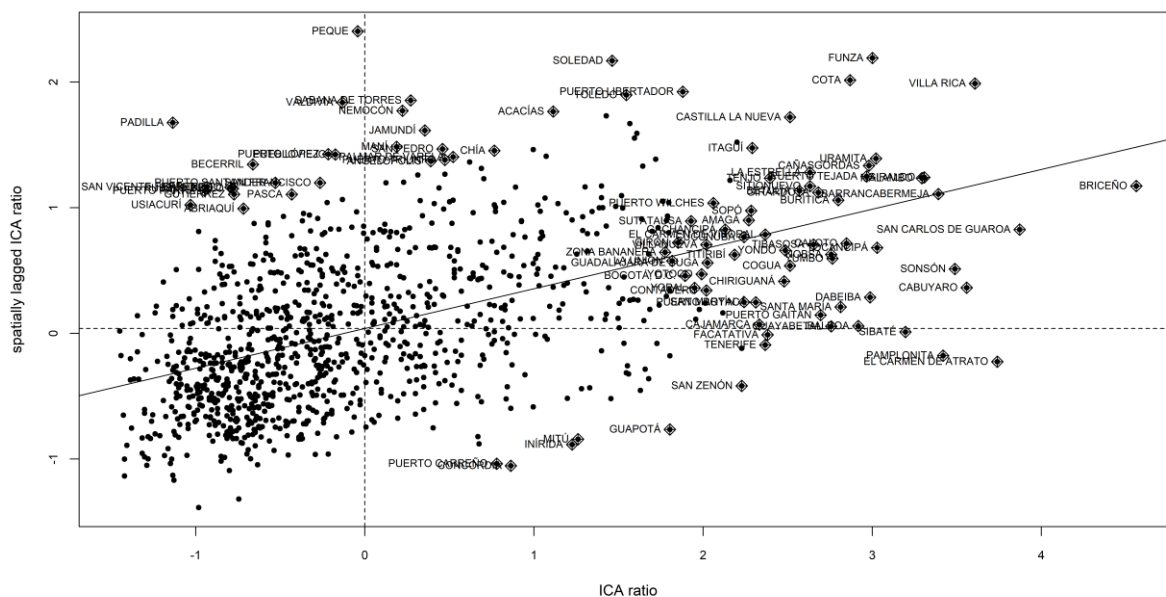


Figure 5 - Global Moran's I scatterplot (2022) (Queen contiguity)

A similar perspective to the previous one, but much more useful when identifying the clusters or groups of municipalities, consists of mapping Moran's scatterplots quadrants which are usually referred to as representing the Moran's I scattermaps. In this way, the municipalities that are located in each one of the quadrants of the previous figures can be identified. Figure 6, shows the Moran's I scattermap using the spatial weights matrix based on the queen contiguity. We have depicted in red and green colors the clusters of municipalities where positive spatial autocorrelation is detected. Particularly, the red color shows the clusters where municipalities with high ICA rates are surrounded by municipalities with also high ICA rates and the green color shows the clusters where municipalities with low ICA rates are surrounded by municipalities with also low ICA rates. Grey color shows clusters of municipalities with a center-periphery type of behaviour, either they set high tax rates and are surrounded by municipalities which set low tax rates or vice-versa. Finally, the yellow color in the map shows municipalities for which we do not have data. By and large, the Moran's I scattermap show a remarkable clustering pattern across Colombian municipalities. The red clusters (HH) take in in the North of the country municipalities belonging to the departamentos of La Guajira, Atlantico Magdalena and Cesar, in central-eastern part of the country municipalities belonging to the growth poles of Colombia, Antioquia, Caldas, Risaralda, Quindío and Valle del Cauca departamentos, in the eastern municipalities belonging to the Casanare, Meta, Cundinamarca and Boyacá departamentos and also in Norte de Santander and Bolivar. Finally there is another red cluster in the border between Nariño and Putumayo. The green clusters (LL) are mainly surrounding the growth poles of Colombia. In the west and south-eastern of Colombia they take in municipalities belonging to the Chocó, Cauca, Nariño, Putumayo, Caquetá, Guaviare and Meta departamentos. Up North another green cluster takes in municipalities in the departamentos of Santander, Norte de Santander (in the east) and in Córdoba and Sucre departamentos (in west).

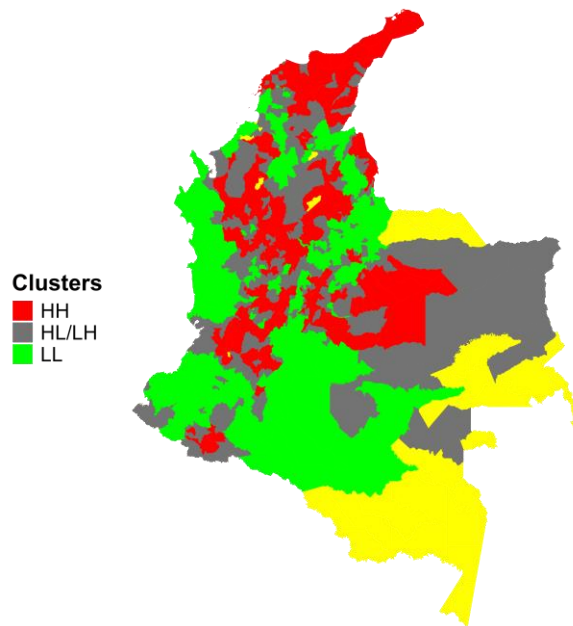


Figure 6 - Global Moran's I map (2022) (Queen contiguity)

4. Local spatial autocorrelation

In this section, we try to detect local clusters and potential variance within them by computing local measures of similarity (Local Gi test) and diversification (Hi). Figure 7 visualizes the local Gi statistics for the ICA rate across municipalities in Colombia, categorized into five levels: Very low, Low, Medium, High, and Very high. The map captures an important geographic clustering. Municipalities with very low and low Gi statistics (in blue shades) are concentrated in regions with low levels of development, suggesting areas with relatively low contributions to local spatial autocorrelation for the ICA rate. Conversely, municipalities with high and very high Gi statistics (in orange and red) appear clustered across the most developed departamentos of Colombia, indicating regions where high ICA rates strongly contribute to positive local spatial autocorrelation. Therefore, in terms of regional patterns, there is a clear spatial division where areas with high and very high Gi statistics (central and economically significant regions) are distinct from areas with low or very low Gi statistics. These results are potentially reflecting economic disparities or differences in tax collection efficiencies across regions. On the other hand, municipalities with medium Gi statistics (in green) are dispersed across various regions, reflecting a transitional category with moderate contributions to local autocorrelation. In sum, Figure 7 underscores significant spatial heterogeneity in the ICA rate across Colombian municipalities. The clustering patterns suggest economic and administrative factors influencing tax contributions at local levels. These insights could guide policymakers in identifying areas requiring targeted interventions to enhance tax collection efficiency or address regional disparities⁶.

⁶ Municipalities shaded in grey color are excluded from the analysis.

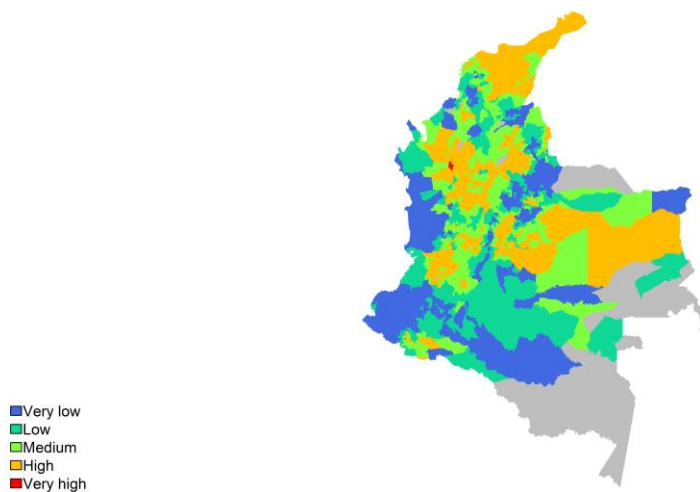


Figure 7 - Local Gi (2022)

Figure 8 depicts the spatial distribution of the H_i statistic, which measures local variance within spatial clusters. The values are again categorized into different levels of variance: "Very Low," "Low," "Medium," "High," and "Very High". Areas with very low or low H_i values (blue and dark green) are indicative of clusters with relatively uniform ICA rates, showing little variation within these local neighborhoods. Medium H_i values (light green) suggest moderate heterogeneity within clusters. High and very high H_i values (orange and red) highlight regions with significant local variance, indicating that neighboring municipalities within these clusters exhibit greater differences in ICA rates. It can be observed that different spatial patterns arise across the country. Some regions (e.g., the eastern and western parts of the country) show predominantly high or very high H_i values, signifying localized heterogeneity in these areas. These regions may require closer examination to identify potential economic, administrative, or geographic factors influencing this variability but it is beyond the scope of this chapter. The very far north-east, central and southern regions exhibit a mixture of very low to medium H_i values, reflecting relatively homogeneous clusters in these areas. This indicates more stable and consistent ICA rates among neighboring municipalities. These results can also have important implications for policy and planning. The high local variance in some regions may point to underlying disparities in the tax base, economic activity, or compliance across municipalities, potentially signaling the need for targeted interventions. Conversely, the presence of homogeneous clusters in certain areas suggests that these regions may not require significant adjustments, as ICA rates are more stable within these clusters.

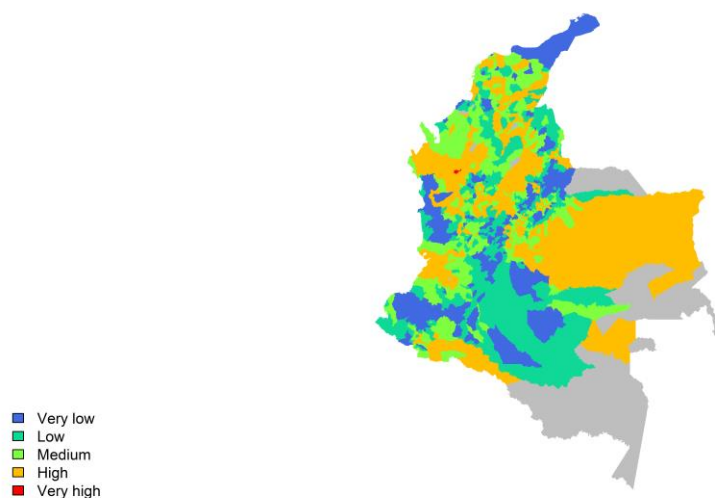


Figure 8 - Local ICA (2022)

5. Final remarks and policy implications

This study reveals pronounced heterogeneities in Colombia's ICA rates, driven by economic disparities and administrative capacities. ICA revenues are concentrated in a small number of "Big municipalities" exacerbating regional inequalities. The spatial analysis reveals significant spatial clustering and strong spatial autocorrelation suggesting that neighboring municipalities influence each other's tax policies, potentially through competition or tax-mimicking processes. The spatial clustering shows that high-tax municipalities cluster in economically developed areas (e.g., Bogotá, Antioquia), while low-tax municipalities are concentrated in peripheral regions.

These findings highlight the need for targeted interventions tailored to local economic and administrative capacities to enhance tax collection efficiency and address regional disparities. High-revenue municipalities clustered in economically developed regions may benefit from greater fiscal autonomy, while lower-revenue municipalities require targeted support, capacity building, and possibly revenue-sharing mechanisms. Policymakers should consider spatial dependencies when designing tax reforms, as neighboring jurisdictions influence each other's tax-setting behavior. A spatially informed policy approach can help reduce regional inequalities and improve the efficiency and fairness of local tax systems.

This study is cross-sectional and focuses only on ICA for the year 2022, which limits the ability to observe temporal dynamics or long-term trends. Additionally, the analysis does not control for other municipal characteristics such as political factors, tax enforcement capacity, or economic informality, which may influence ICA variability. Further research could adopt a longitudinal perspective to examine the evolution of spatial patterns in ICA and other local taxes over time. Incorporating qualitative dimensions, such as governance quality or administrative capacity, would enrich the spatial analysis. Moreover, future studies could explore the impact of tax rates

on firm location decisions, economic growth, and public service delivery, providing a more holistic understanding of local fiscal policy effectiveness.

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