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The Territorial Fiscal Gap in Colombia*

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Abstract

This paper presents an estimation of expenditure needs and fiscal capacity of Colombia's municipalities and departments in 2014. We use standard per capita norms to estimate the spending needs and data envelopment analysis for the local fiscal capacity. The results show that: (i) there are high horizontal fiscal disparities in Colombia, with greater incidence in municipalities than in departments; (ii) these disparities favor more developed territories; and (iii) there is evidence of a center-periphery pattern in the horizontal fiscal disparities, causing central regions of the country to have a lower imbalance between expenditure needs and fiscal capacity. An equalization transfers system is an option for public policy to eliminate these disparities.

Keywords: horizontal fiscal disparities, fiscal capacity, fiscal needs, data envelopment analysis.

JEL Classification: H71, H73, H77, R12.

1. Introduction

One of the issues addressed by the theory of fiscal federalism is that of inequalities between different levels of government and between territories located at the same level (Musgrave, 1990). The former are known as *vertical inequalities* and focus on how the responsibilities of revenue and expenses are allocated between the central government and subnational governments; the latter is called *horizontal inequalities* and it refers to the gaps that arise in the differences between expenditure needs and fiscal capacity in the jurisdictions (Martinez-Vazquez and Searle, 2007).

Regarding Colombia, there is literature on inequality from an individual approach (Gomez and Rossignolo, 2015; Bonilla, 2011), on the disparities of regional income (Galvis and Meisel, 2011; Bonet and Meisel, 1999), and on vertical inequalities (Bonet, 2006a). However, there are few studies about the inequalities between revenue and expenditure of municipalities and departments¹. Some authors have addressed the analysis of the two variables independently, without considering the real expenditure needs and potential revenue. For example, Bonet (2006b) finds territorial inequalities in public spending in Colombia, and GAFDT (2005) identified disparities in the ability of municipalities and departments to collect resources in order to provide their inhabitants with public goods and services, either due to differences in economic structures or levels of development, or to other reasons.

Bonet and Ayala (2015) analyzed these disparities considering public spending and per capita revenue independently, and the equalizing effect of fiscal transfers from the central government. This study found that there are high horizontal fiscal disparities in Colombia in terms of expenditure and revenue, although the relatively less-developed territories have a higher public per capita expenditure due

¹ Colombia has three levels of government: National Central Government, departments and municipalities.

to transfers from the General Participation System (SGP, by its acronym in Spanish) and the General Royalties System (SGR, by its acronym in Spanish).

A new phase in the analysis of horizontal fiscal disparities in Colombia should jointly involve territorial expenditure and revenue, incorporating not only the observed expenses and tax collection, but also the expenditure needs and potential revenue.

There are two reasons why it is important to measure and design strategies to eliminate horizontal fiscal inequalities (Auld and Eden, 1987; Dahlby and Wilson, 1994; Boadway et al., 1983; Norrie et al., 1982). The first is economic efficiency: municipalities or departments with more resources can attract immigrants from other jurisdictions given their ability to provide more and better public goods and services, generating fiscally-induced migration (Dahlby and Wilson, 1994). The second has to do with a criterion of equity, which states that individuals from all sub-national governments should receive the same quality and quantity of public goods and services. This, however, is not achieved when the jurisdictions' tax bases are different. In this scenario, municipalities or departments with smaller tax bases would need to levy higher tax rates to their taxpayers than those with a higher tax base, which translates into fiscal inequality.

Horizontal fiscal disparities are solved with equalization transfers (Shah, 2007). In other words, resources will be transferred to the poorest entities so that they can provide the same amount and quality of public goods than the richest ones. In Colombia, there is no such instrument of fiscal equalization. The current system consists of transfers that, for the most part, are conditioned and have specific destinations, either for expenses in health, education, drinking water and basic sanitation, or for general purposes, without considering the potential revenue of

sub-national governments (*Dirección General de Apoyo Fiscal*, 2009; Bonet et al, 2014.; Villa et al., 2014).

The main purpose of this paper is to measure horizontal fiscal disparities in Colombia, taking into account expenditure needs and fiscal capacity jointly both for municipalities and departments. This study contributes to the discussion of fiscal disparities and transfer systems. Based on the results, there will be an estimate of the territorial fiscal gap, understood as the difference between expenditure needs and local potential revenue in each territory. This estimate will provide ground for discussion about the need to implement a transfer system with fiscal equalization in Colombia.

This document consists of six sections. The second one presents a review of existing literature on the estimation of horizontal fiscal disparities, explaining the advantages and disadvantages of each method. The third section presents the methodology we followed to calculate expenditure needs and fiscal capacity. The fourth part presents and analyzes the results, while the fifth discusses a possible reform of the country's current fiscal transfers system. Finally, the sixth presents the conclusions and recommendations.

2. The Theory and Practice of Horizontal Fiscal Disparities

Horizontal fiscal disparities are the difference between the expenditure needs and the fiscal capacity of a sub-national government (Norrie et al., 1982; Le Grand, 1975; Porto and Rosales, 2008). If expenditure needs exceed fiscal capacity, the local government requires transfers to cover such needs. On the contrary, if a territory has a higher fiscal capacity than needs, it is able to transfer resources to other jurisdictions to reduce the fiscal gap.

In practice, the estimation of horizontal fiscal disparities is performed in order to determine the amount of resources that should be transferred from one territorial entity to another to achieve horizontal equity (Boex and Martinez-Vazquez, 2007; Galbiati and Vertova, 2008). With these transfers, known as equalization transfers (Martinez-Vazquez and Boex, 2001; Shah, 2007), greater inter-regional equity can be achieved and poverty can be reduced (Hofman and Guerra, 2007).

Following Boex and Martinez-Vazquez (2007), there are many ways to calculate expenditure needs and fiscal capacity depending on the amount and quality of the information available. The expenditure need can be calculated by using six methods, each one with its own advantages and disadvantages: i) lagged expenditure values, ii) equal per capita expenditure norms, iii) weighted indices of expenditure needs, iv) per client expenditure norms, v) traditional expenditure norms, and vi) regression-based representative expenditure system. On the other hand, the fiscal capacity can be estimated as i) lagged revenue values, ii) basic approaches of the ability to pay, and iii) regression-based representative revenue system. Other authors have proposed additional methodologies such as measures based on production frontiers (Jha et al., 1999; Alm and Duncan, 2014).

The lagged expenditure values methodology takes the per capita fiscal spending of a base year and uses it as an indicator of the need for spending in the corresponding jurisdiction. Its disadvantage is that it perpetuates possible initial disparities in the reference year. However, Boex and Martinez-Vazquez (2007) argue that this is a quick and justifiable method to estimate expenditure needs in the absence of information. Similarly, the equal per capita expenditure norm has a simple application: it assumes that all jurisdictions have the same resource needs regardless of their size and composition of their population. However, it has the disadvantage of encouraging territorial fragmentation. Additionally, it does not consider differences in poverty in sub-national governments.

Meanwhile, the weighted indices of expenditure needs seek to correct the problem regarding the rule of equal spending, which contains differentiating cost factors such as population, territory size, poverty, and cost of living, among others. This method assigns more resources to areas where it would be more expensive to provide public goods and services. According to Boex and Martinez-Vazquez (2007), this is the most commonly-used approach in developing countries because the necessary information is generally available. The problem with this methodology, as stated by the authors, is that inclusion or exclusion of differential cost factors does not follow any technical criteria. The results depend on political decisions and the weights assigned to each factor.

The per client expenditure norm assumes that expenditure needs should be the same for all potential clients in an expending sector. For example, expenditure on education must be the same for every student throughout the territory; expenditure on roads should be equal per square kilometer; and subsidies for people living in poverty must be the same. Thus, for each item, expenditure per customer is calculated first at the national level and then each territorial entity receives resources depending on the number of clients located in such territory. This methodology differs from the traditional expenditure norm in that the latter is based on a detailed estimate of the costs of providing public goods and services in a territory according to quality standards and the amount of public goods.

Finally, the regression-based representative expenditure system uses econometric techniques to obtain weights for different groups of spending. However, it demands a high quantity and quality of information on all expenditure groups and each of their determinants, as well as for each level of government.

Regarding fiscal capacity, Boex and Martinez-Vazquez (2007) state that the simplest method is the measure of per capita tax revenue for prior periods. Its disadvantage

is precisely that it ignores differences in effort or collection efficiency of sub-national governments. To solve this limitation, an approximation of the taxpayers' ability to pay, for instance, per capita income, regional GDP, or regional GDP without receiving transfers from the central government can be used. Finally, another more sophisticated technique to estimate potential revenue is the regression-based representative revenue system (Boex and Martínez-Vazquez, 2007). This advanced technique demands detailed information on taxes and charges levied at each jurisdiction, sectors, and population groups, and uses methodologies based on production functions (Jha et al., 1999; Alm and Duncan, 2014). In addition, it assumes that the collection is the result of the combination of inputs such as per capita income, labor force, and tax collection effort, among others.

At the time of writing this paper, there were no studies for Colombia in which the horizontal fiscal disparities were estimated considering the two sides (revenue and expenditure) simultaneously. However, studies had been made in which the spending needs and tax capacity of local authorities were evaluated independently (GAFDT, 2005; Bonet, 2006b; Gutiérrez, 2011; Clavijo and Vera, 2010; Bonet and Ayala, 2015). These studies reflected the disparities of per capita fiscal revenue and expenditures in municipalities and departments, as well as the need for a reform of the transfer system aiming to reduce such inequalities.

3. Methodology

The calculation of horizontal fiscal disparities in Colombia requires estimating expenditure needs and fiscal capacity. As for the first, this work uses the per client expenditure norms explained above. On the other hand, fiscal capacity is estimated by non-parametric production frontiers with data envelopment analysis (DEA). This methodology allows to calculate a production frontier where tax revenue depends on observable characteristics of municipalities or departments (per capita GDP, the

workforce and the size of the state), without assuming any specific functional form of relationships (Cooper et al., 2011; Ji and Lee, 2010; Ray, 2004). Furthermore, among the production frontier methods of estimation, DEA is one of the best predictors and has no disadvantage when compared with other methods, such as the stochastic frontiers analysis (Krüger, 2012).

3.1. Estimation of Expenditure Needs

Expenditure needs in Colombia are calculated based on the use of per client expenditure norms. This methodology acknowledges the expenditure need to be located within the boundary of fiscal constraints, given the budget restriction that Colombian territories face. Thus, there are no incentives to increase public spending outside this border.

This approach has several advantages (Boex and Martinez-Vazquez, 2007). First, the calculation is not complex because the information is available, unlike other methodologies such as the representative revenue system, which demands highly detailed information. It is also better than other methods such as spending of previous periods because it does not perpetuate existing inequities from the base period. Second, it evades perverse incentives because it recognizes budgetary constraints and does not allow for gaps in spending decisions. Third, it ensures that the amount of resources needed to meet the estimated expenditure needs is available. In this way, the problem of traditional expenditure norms (which ignore the fact that resources are finite) can be avoided. Its disadvantage is that the sectorial distribution of resources in the base year may not reflect the country's real spending needs. As a result, its accuracy will depend on assuming that this period represents an appropriate prioritization in spending and investment needs.

3.1.1. Per client Expenditure Needs

As explained above, this method estimates average spending per client in each of the areas of expenditure, then multiplying the norm for that sector by the number of customers in each territorial jurisdiction. Formally:

$$TEN_{is} = EN_s * C_{is}$$

Where TEN_{is} represents the total expenditure need of the jurisdiction i in sector s , EN_s is the per client expenditure norm in s , and C_{is} is the number of i customers in s . Thus, if POP_i is the total population at i , the per capita expenditure need in a municipality or department (EN) is given by:

$$EN_i = \frac{\sum_{s=1}^S TEN_{is}}{POP_i}$$

The per capita expenditure need was estimated considering public spending by sub-national governments in nine sectors, as described in Table 1. The customers were selected according to the destination of the resources in each row. The total expenditure in each category across the country was divided by the number of customers. Then, the total number of customers multiplied this norm in each municipality or department to determine the expenditure need for each territorial entity.

Table 1. Groups Spending and Customers

Sectors	Customers
Agricultural	Rural population
Drinking water and basic sanitation	Total housing in the country
Attention to vulnerable groups- social promotion	Poor population
Education	Enrollment public schools
Operating expenses	Total population
Health	Subsidized and uninsured poor population
Transport	Local area in Km ²
Housing	Homes in quantitative and qualitative deficit
Other sectors	Total population

Source: Created by the authors.

Once the total expenditure norm for each municipality or department is known, the next step is to estimate the per capita value considering that there are territorial entities with a greater number of customers, which are expected to have greater expenditure needs than those with less population to serve.

3.2. Estimation of Fiscal Capacity

The fiscal capacity of a territorial entity is the per capita revenue it can obtain given its tax base. Hence, differences at each of the municipality's and department's levels of economic activity and income have different potential revenue. If the tax base of a territory is known, different tax rates can be applied. Moreover, the revenue under the collection efficiency scenario can be determined.

A major limitation of the Colombian tax system is the absence of information on the tax bases of sub-national governments. Due to this, the municipal or departmental fiscal capacity is unknown. Nonetheless, it is possible to use quantitative methodologies to estimate the fiscal capacity of a territorial entity considering aspects such as their level of economic activity and population size (Alm and Duncan, 2014).

Tax revenue depends on economic activity. Therefore, the collection potential associated with the size of the economy can be estimated. This potential revenue depends on the efficiency of those responsible for setting the tax base, invoicing, and collecting taxes in their jurisdictions. Through tax collection efficiency, it is possible to determine whether a municipality or department is gathering its potential or if it has inefficient levels of revenues, given some observable tax-collection determinants such as per capita GDP and population size. This document uses the DEA method to estimate this efficiency.

3.2.1. Data Envelopment Analysis - DEA

The aim of this method is to measure the efficiency of decision-making units (DMU) to transform inputs into outputs (Charnes et al., 1978; Ray, 2004; Cooper et al., 2011; Cooper et al., 2007). DEA is a non-parametric method that does not assume any production, cost, benefit or utility function for any DMU. Additionally, it does not make any assumption on the probable distribution of the data (Ji and Lee, 2010). Furthermore, it has been widely used to evaluate the performance of entities such as hospitals, universities, cities, companies, and regions (Cooper et al., 2011).

Depending on the type of accessible information, the method can be input or output oriented (Ji and Lee, 2010). In the first case, the goal is to minimize the amount of inputs used to achieve a defined amount of product. In the second, it seeks to maximize the amount of product obtained with a certain amount of inputs.

Furthermore, this methodology allows to make assumptions about the returns to scale observed between the analyzed input-output ratios (Cooper et al., 2011). It is possible to have constant, variable, and not increasing returns to scale (Ji and Lee, 2010). In order to calculate the efficiency of tax collection in Colombian territorial entities, variable returns to scale are assumed, which allow separating the technical efficiency and scale efficiency of the DMU (Krüger, 2012). It has been shown that, under variable returns to scale, better technical efficiency can be expected (Banker et al., 1996).

In the case of this document, the purpose is to evaluate which municipalities or departments manage to collect more fiscal resources considering several variables: first, the size of the working-age population as a measure of the labor force; second, per capita GDP as a measure of their economic development; third, participation of government spending on the GDP as a measure of the size of the state. Therefore, efficiency is calculated based on an output-oriented method under the assumption

of variable returns to scale. Formally, the method known is used as a model BCC (Banker et al., 1984) which consists of:

$$\max_{v, u_0} \frac{y_i - u_0}{vX_i}$$

Subject to the restrictions:

$$\frac{y_j - u_0}{vX_j} \leq 1 \quad (j = 1, 2, \dots, n)$$

$$v > 0$$

$$v > 0$$

Where y_i is the per capita local tax revenue for i (i is a municipality or department in set $j = 1, 2, \dots, n$), u_0 is a parameter ensuring a personal convexity of a production border with variable returns to scale. The vector v contains the parameters that assign weights to different inputs of the matrix X (per capita GDP, size of the state and working-age population). The condition $\frac{y_j - u_0}{vX_j} \leq 1$ ensures that the maximum efficiency can be 1 for jurisdictions i or j considering the level of the "virtual" product and the "virtual" profit of vX_j .

3.3. Data

In order to estimate fiscal capacity and expenditure needs, information about fiscal revenues and expenditures was taken from the municipal and departmental budgetary executions of the National Planning Department (DNP, by its acronym in Spanish) for 2014, reported in the Unique Territorial Form (FUT, by its acronym in Spanish). We used the total expense for each territorial entity as a measure of spending, while tax and non-tax collection (excluding capital transfers and Central Government transfers) were used as local revenue.

Specifically for expenditure needs, data on the overall population was considered, including rural and working-age population, obtained from the population figure

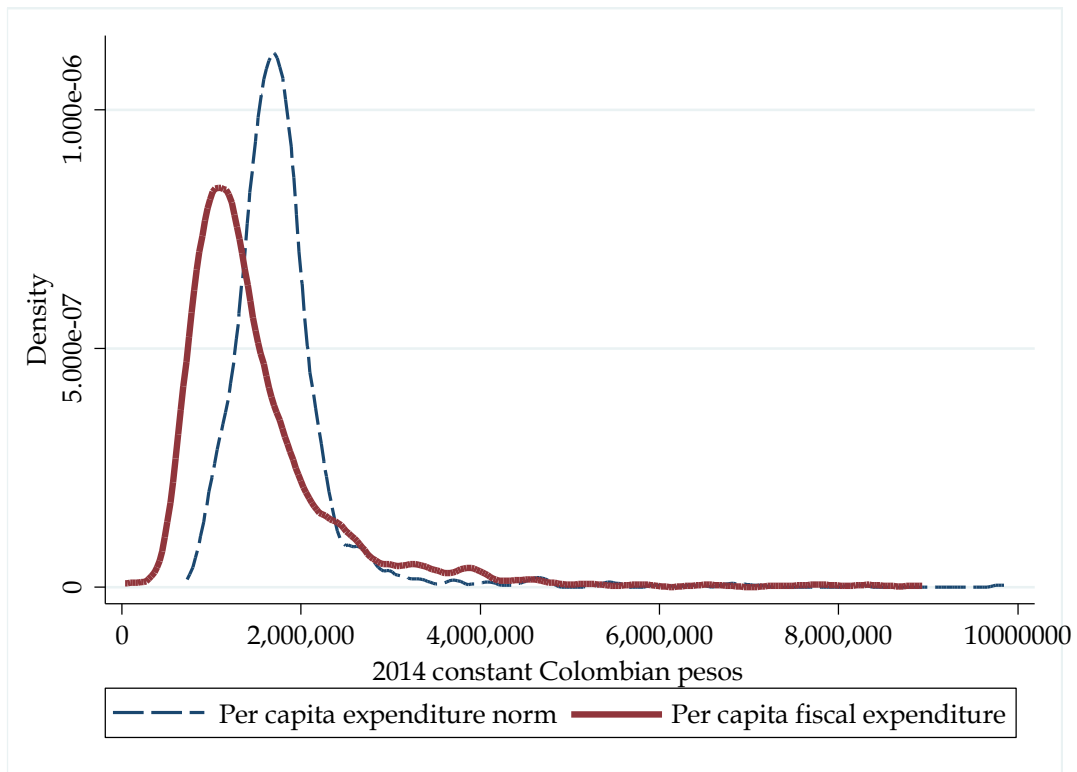
projected by the National Administrative Department of Statistics (DANE, by its acronym in Spanish) for 2014. The households in the country, the population living in poverty, and the qualitative and quantitative housing deficit come from the General 2005 Census by DANE. On the other hand, enrollment in public schools comes from the National Ministry of Education for 2014, while the population under both branches of the health system, the subsidized and the uninsured poor people, from the Ministry of Health and Social Protection for 2013. Departmental per capita GDP was obtained from DANE, while the municipal GDP was estimated based on the economic importance indicator from DANE for 2012. Annex 1 summarizes the main descriptive statistics of the data used.

4. Horizontal Fiscal Disparities

4.1. Municipalities

The average municipal per capita expenditure in Colombia was COP \$1,542,623 (Colombian pesos) for 2014 with a high dispersion because some municipalities had a COP \$31,960 expense per inhabitant, while others registered more than COP \$9,000,000. However, it is possible that this difference does not necessarily reflect inequality in spending, because maybe those with a higher per capita expenditure actually have greater needs.

Figure 1. Expenditure Norm, Municipalities



Source: Calculations by the authors with data from DANE & DNP

In order to determine if the actual expense is enough to provide for the public goods and services needed in each territory, the expenditure need for Colombian municipalities was estimated based on the methodology described above. Figure 1 shows the distribution of executed spending and the fiscal need in per capita terms for Colombian municipalities in 2014².

As may be seen, there is a disparity with a high concentration of municipalities in the lower part of the distribution of per capita expenditure and a low concentration in higher values. However, the estimations of needs are above what was executed in most municipalities. The average per capita fiscal need estimated for Colombian municipalities was COP \$2,294,114, a value greater than the average per capita

² For a better visualization, 1,086 municipalities with lower per capita spending stand for COP\$ 10 million.

expense. The same figure shows that this estimated need concentrates a greater amount of municipalities in higher average values than currently registered with the executed per capita fiscal expenditure.

The estimated Gini for the per capita expenditure need was 0.34, while per capita spending has an inequality indicator of 0.29. If resources managed by municipalities had been distributed under the criterion of equity, the Gini would have been 0.05 higher than it actually was. This reflects that there is a greater dispersion in the expenditure need than in the observed territorial spending in Colombia. To show the importance of this aspect, 787 municipalities registered a per capita expenditure lower than their need, while only 308 had expenses above their needs. This means that the excess resources in 308 municipalities could have balanced out the needs for spending in 787 municipalities.

Given the methodology used to estimate the expenditure needs, the total spending and the total requirement must be equal. Differences can be observed from a per capita perspective because there are territories that receive resources over their estimated needs. The total expenditure of the 1,095 municipalities from the sample in 2014 was COP \$65 trillion pesos. In those municipalities where the need for spending was higher than the actual execution, COP \$14.4 trillion more were needed to meet their expenditure needs. This corresponds to 787 municipalities that spent less than their estimated needs, while the same amount remained at 308 territorial entities as surplus spending. In other words, about 800 jurisdictions, which make up 48% of the Colombian population in 2014, would have covered their fiscal needs if resources had been distributed equitably. In per capita terms, 308 municipalities spent an average of COP \$587,411 more than their expenditure needs, while 787 municipalities executed COP \$628,285 less than their fiscal needs. Should this situation continue, the regional spending disparities in Colombia are expected to increase.

Table 2. Expenditure Needs by Municipal Category, 2014 Colombian pesos

Categories	Per capita expenditure	Expenditure norm	Frequency	Percent
Special	1,673,666	939,035	6	0.5
1	1,327,664	1,107,290	24	2.2
2	1,224,786	1,169,410	19	1.7
3	1,286,306	1,258,262	16	1.5
4	1,239,608	1,548,967	26	2.4
5	1,193,965	1,499,364	39	3.6
6	1,167,262	1,857,124	965	88.1
Total	1,178,959	1,794,916	1,095	100

Source: Calculations by the authors with data from DANE & DNP

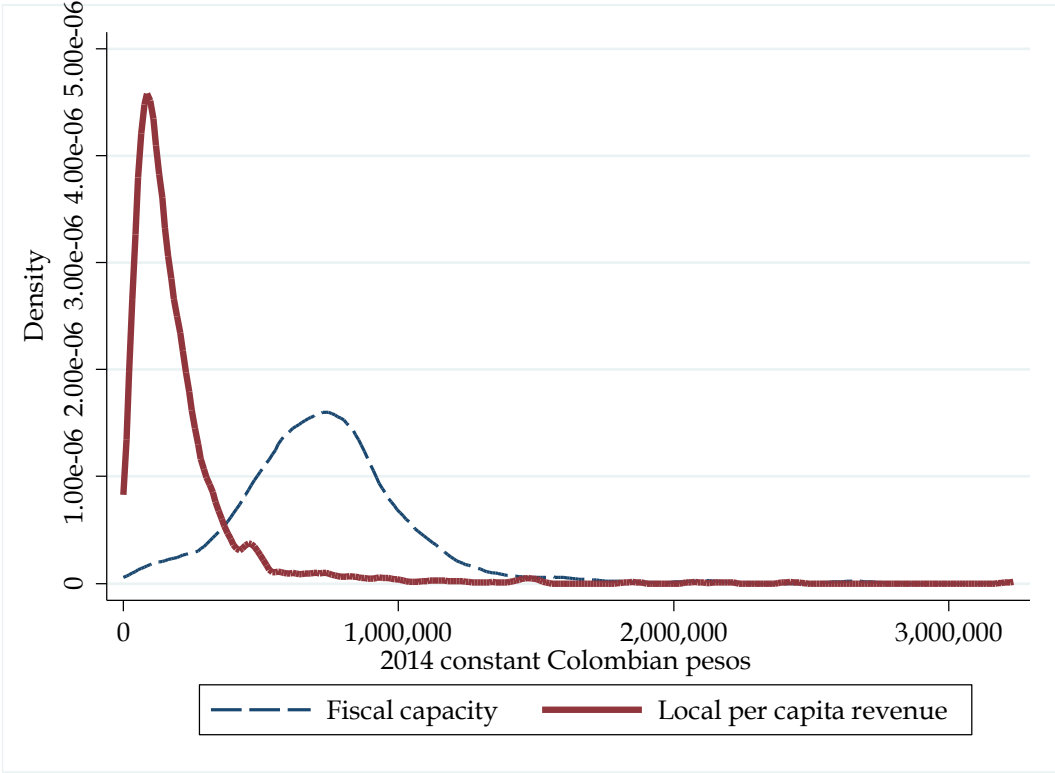
The results by categories of municipalities (Table 2) show that there clearly is a greater need in the laggards than in those with better economic conditions.³ Municipalities from the special category (the most advanced), representing less than 1% of the total entities and 32% of the total population, required COP \$939,035 per capita in 2014 to meet their basic needs in conditions of equity, while those in category six (the less developed ones) were close to doubling the number for this need, with COP \$1,857,124 per capita. An important detail to point out is that the municipalities from the special category as well as 1, 2, and 3 spent more per capita than the estimated need, on average, while those from Category 4, 5, and 6 executed a mean per capita expenditure lower than the estimated need.

The question that arises is whether these municipalities are able to generate their own resources to meet their own needs. In order to answer this question, the fiscal capacity was estimated, which measures the amount of fiscal per capita resources that municipalities can collect given their levels of economic activity, population size, and size of the government.

³ These categories move from *most developed* (Special) to *less developed* (6). Act 617 of 2000 defines the categories considering current fiscal revenue of municipalities and the size of their population.

Figure 2 shows the distribution of the estimated fiscal capacity in Colombian municipalities by 2014. On average, Colombian municipalities collect COP \$278,171 per capita, while the estimated average fiscal capacity reaches COP \$803,795. That is, municipalities collect 34.6% of their estimated per capita potential, on average.⁴

Figure 2. Fiscal Capacity, Municipalities



Source: Calculations by the authors with data from DANE & DNP

In other words, the tax revenue of the municipalities from the sample⁵ reached COP \$9.5 trillion, while their collection capacity was close to COP \$27.4 trillion. Therefore, local authorities collected 34.6% of their total potential. The 65.4% inefficiency accounted for about COP \$18 trillion less in collection, with which these

⁴ Observations with values above or below the mean plus five standard deviations were removed in the variables: tax revenue per capita, per capita GDP, workforce, size of state, tax revenue per capita/per capita GDP, tax revenue per capita / workforce, tax revenue per capita / size of the state. This is because the estimation of border collection efficiency is sensitive to outliers.

⁵ Out of 1122, 1076 municipalities resulted after removing outliers.

municipalities could have more than doubled the expense per inhabitant, financed with their own resources from 2014.

Table 3. Fiscal Capacity by Municipal Category, 2014 Colombian pesos

Categories	Fiscal capacity	Per capita revenue	Efficiency	Frequency	Percent
Special	1,094,973	630,526	57.6	3	0.3
1	921,509	426,436	46.3	23	2.1
2	861,133	314,122	36.5	19	1.8
3	837,917	357,745	42.7	16	1.5
4	709,309	211,337	29.8	24	2.2
5	816,177	295,382	36.2	38	3.5
6	691,589	137,719	19.9	953	88.6
Total	803,795	278,171	34.6	1,076	100

Source: Calculations by the authors with data from DANE & DNP

By category of municipalities, some differences can be observed in the per capita potential collection and the percentage of collection efficiency (Table 3). The relatively more developed municipalities have higher per capita potential revenue. In addition, they collect a higher percentage of their per capita potential revenue than the less developed (57.6% vs. 19.9%, respectively), which represents a greater availability of resources for the first group and generates inequalities in spending capacity.

An additional way to measure the horizontal tax disparity is by analyzing the difference between the need for spending and fiscal capacity (Le Grand, 1975; Martinez-Vazquez and Boex, 2001). In this way, it is possible to determine the amount of per capita resources required by various local governments in addition to their fiscal capacity or their surplus resources, given their need for spending in equal conditions. This difference is known as the “fiscal gap”, which can be positive or negative depending on the differences in tax capacity and expenditure needs.

In general, the municipal fiscal gap is equal to COP \$ 23.8 trillion. Seventy point eight percent of the municipalities in the sample (where 32.2% of the population

resides) recorded a fiscal gap below the national average, while in the remaining 29.2% of local authorities the gap was above the mean. Only 33 of the 1,076 municipalities registered a negative fiscal gap equal to COP \$1.04 trillion. The remaining 1,043 had a positive fiscal gap of COP \$24.9 trillion. In other words, the remainder from tax resources in surplus municipalities is not enough to cover the shortfall of resources in deficit entities, considering the fiscal needs and capacity estimated.

Table 4. Per capita Fiscal Gap and Municipal Category, 2014 Colombian pesos.

Categories	Gap	Relative gap (%)	Frequency	Percent
Especial	50,730	4.7	3	0.3
1	167,445	15.4	23	2.1
2	308,277	28.4	19	1.8
3	420,346	38.7	16	1.5
4	794,516	73.1	24	2.2
5	681,620	62.7	38	3.5
6	1,161,996	107.0	953	88.6
Total	1,086,374	100.0	1.076	100

Source: Calculations by the authors with data from DANE & DNP

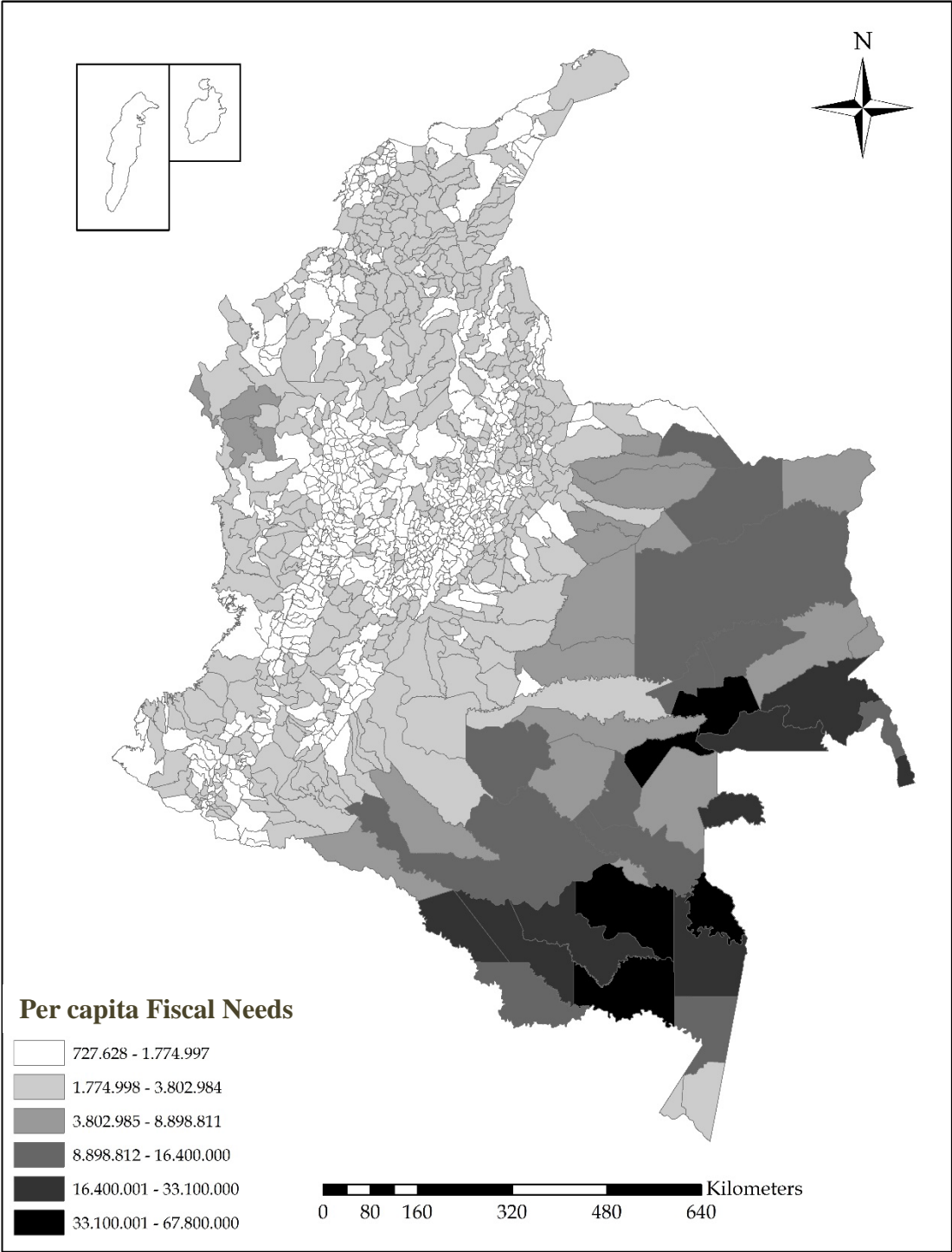
Table 4 shows that, on average, the fiscal gap was positive in the different categories. This indicates that the average fiscal capacity of each category was not enough to meet the per capita expenditure needs. Furthermore, it can be seen that the gap increases as it passes from one category to another. This evidence states two obvious facts: (i) municipalities with greater relative development had less spending needs not covered under equal conditions when controlled by the estimated fiscal capacity, and (ii) less developed municipalities had a fiscal gap more than 20 times the one recorded in the special category.

If a transfer system were to be designed to reduce the maximum planned horizontal fiscal disparities, it should take into account the territorial needs for spending and fiscal capacity. For example, municipalities of category six should receive transfers per inhabitant close to COP \$1,161,996, on average, while for those of special

category per capita resources around COP \$50,730, on average, would suffice. Overall, there is a need to redistribute approximately COP \$24.9 trillion to meet spending needs in the 1,076 municipalities of the sample. This is not an excessive amount considering that, according to the information reported in the FUT, transfers from the Central National Government (CNG) to local authorities in Colombia for 2014 were COP \$55.1 trillion, from which COP \$25 trillion were related to the SGP and COP \$12.2 trillion to the SGR.

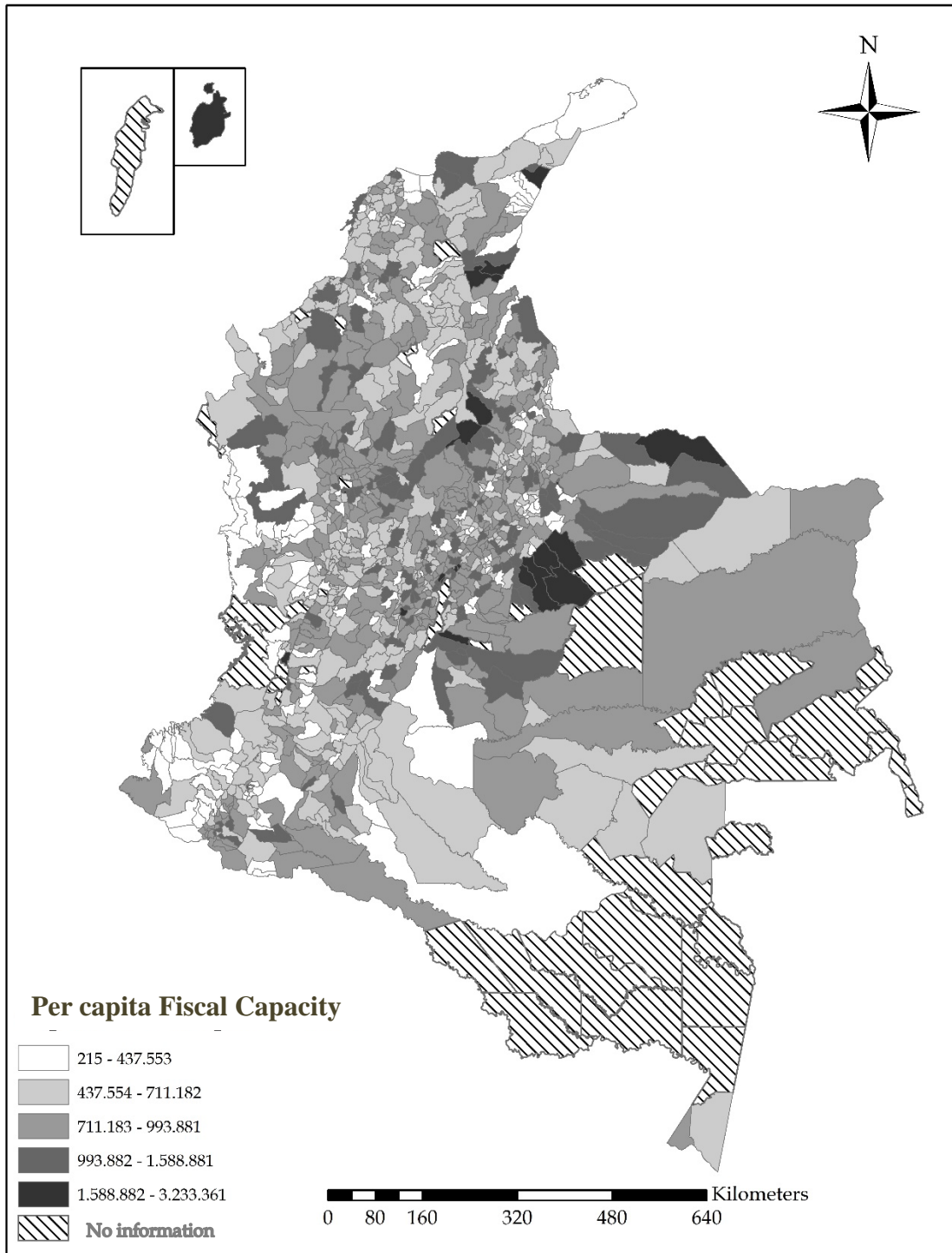
Map 1 shows the need for spending, which is clearly higher in the municipalities located in the Colombian periphery, especially in dispersed regions in the Amazon, the Orinoco, and northern Choco. Meanwhile, the fiscal capacity does not reflect a clear spatial pattern (Map 2). It further notes that peripheral municipalities tend to have a greater disparity than central municipalities (Map 3), providing evidence of a central-periphery pattern for the country's fiscal gap.

Map 1. Expenditure Needs per Municipalities (2014 Colombian pesos).



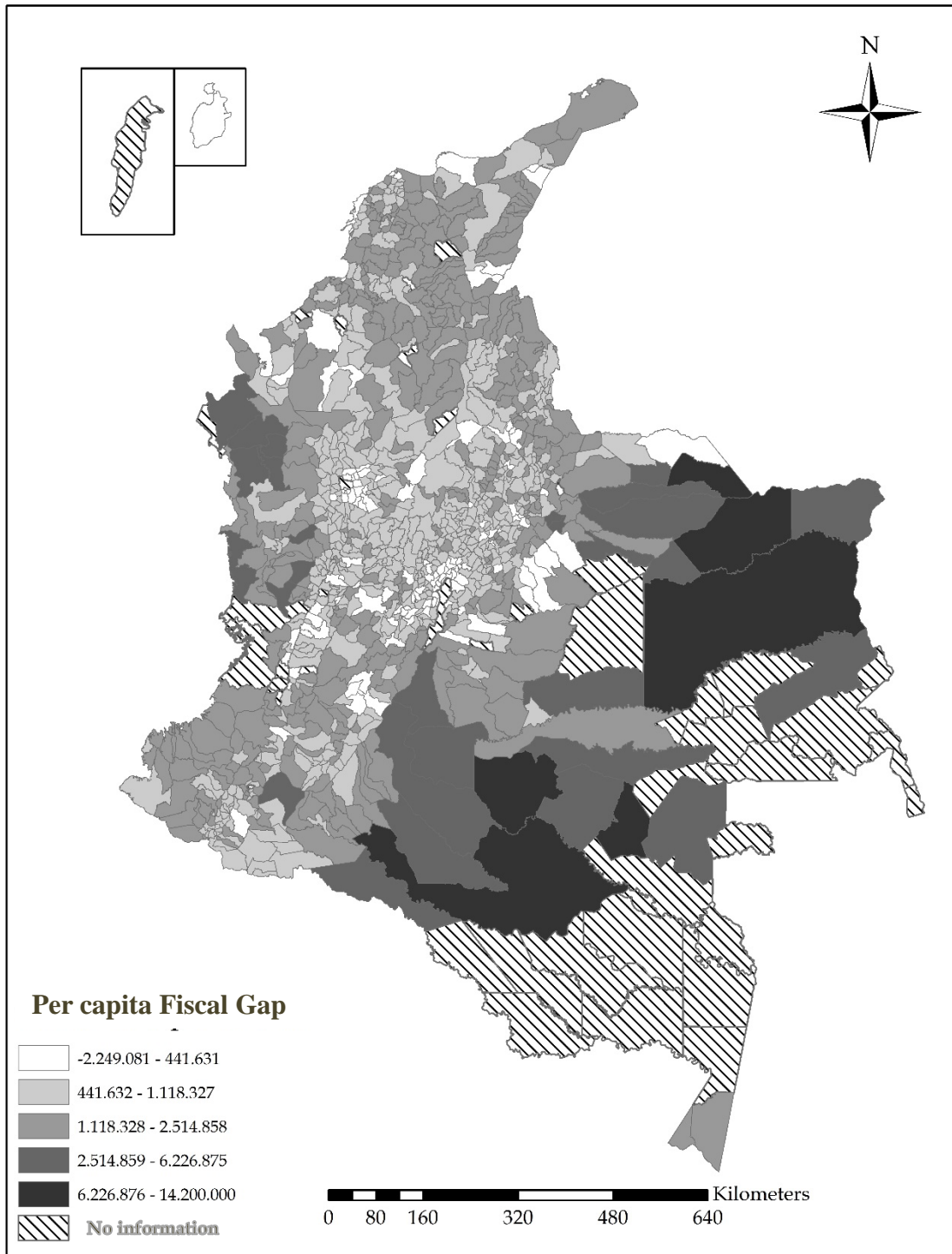
Source: Calculations by the authors with data from DANE & DNP

Map 2. Fiscal Capacity, Municipalities (2014 Colombian pesos).



Source: Calculations by the authors with data from DANE & DNP.

Map 3. Horizontal Fiscal Gap, Municipalities (2014 Colombian pesos).

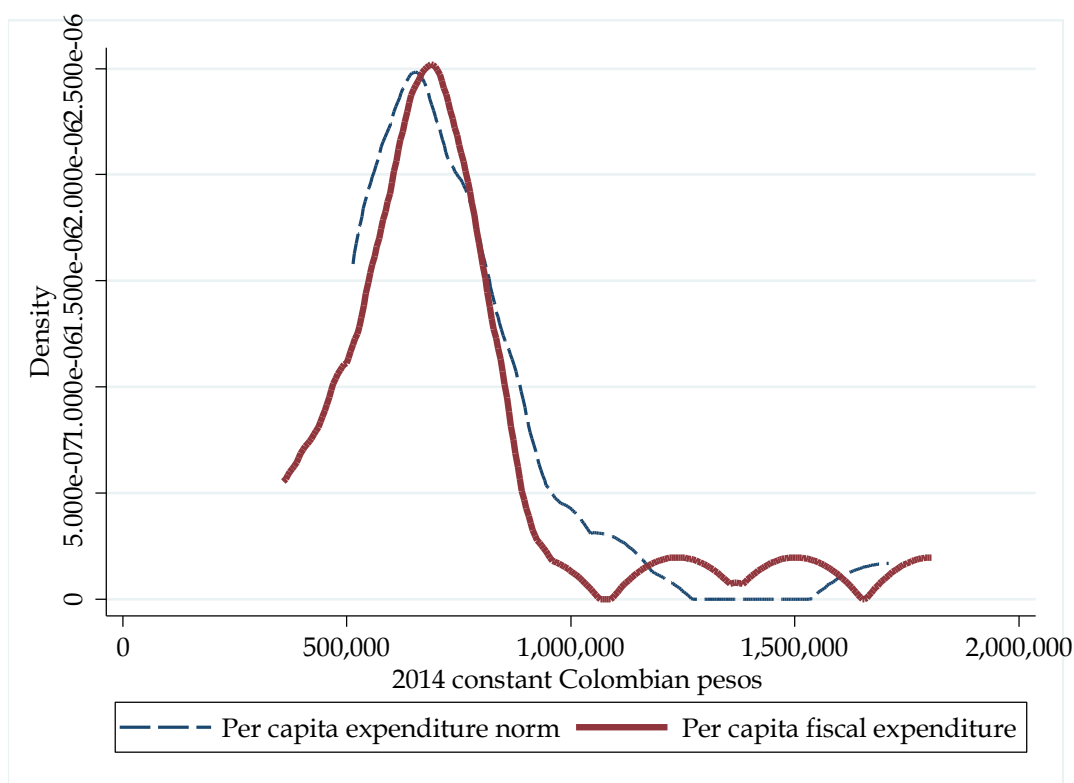


Source: Calculations by the authors with data from DANE & DNP.

4.2. Departments

In the departments, the average per capita expenditure in Colombia was COP \$1,128,078 for 2014. They also recorded a high dispersion, since there are departments with a per capita expense of COP \$358,497 and others with COP \$3,932,215. However, as well as with municipal spending, this does not necessarily imply inequality, because it may be the case that those with the highest per capita expense actually have greater needs. For this, Figure 3 shows the distribution of spending and the expenditure needs in per capita terms for Colombian departments in 2014.⁶

Figure 3. Expenditure Norm, Departments



Source: Calculations by the authors with data from DANE & DNP

⁶ For display purposes, the departments of Amazonas, Guainía and Vichada, which have per capita expenses exceeding COP \$2,000,000, were omitted.

It is important to note that, for departments, the differences between observed spending and estimated needs are not as marked as in the case of municipalities. In fact, the Gini coefficient for departmental per capita expenditure was 0.38, while the same indicator for the fiscal need is 0.40. This means that there is high disparity in the departmental expenditure needs, but not with a negative connotation, as the expenditure needs depend on potential customers within each territorial entity. In this case, if there is more disparity because departments with the greatest needs spend more, it is then understood that there is more equity in budgetary executions.

Taken together, 21 out of the 33 departments recorded a per capita expense lower than their need for spending. The resource gap reached COP \$2.9 trillion, which, speaking in per capita terms, caused these 21 local authorities to receive, on average, COP \$2,157,420 less, while the remaining 12 departments had a expense COP \$2,701,024 higher than their needs, thus expanding fiscal gaps in Colombia.

By category, the expenditure need is higher in less-developed departments. The special category registered an estimated per capita expenditure need of COP \$543,846, while for category four, which makes up 31.3% of the departments, it was COP \$1,181,799 (Table 5). Expenditure needs are higher when the departmental category moves from the advanced ones (Special) to the lagged ones (Category 4).

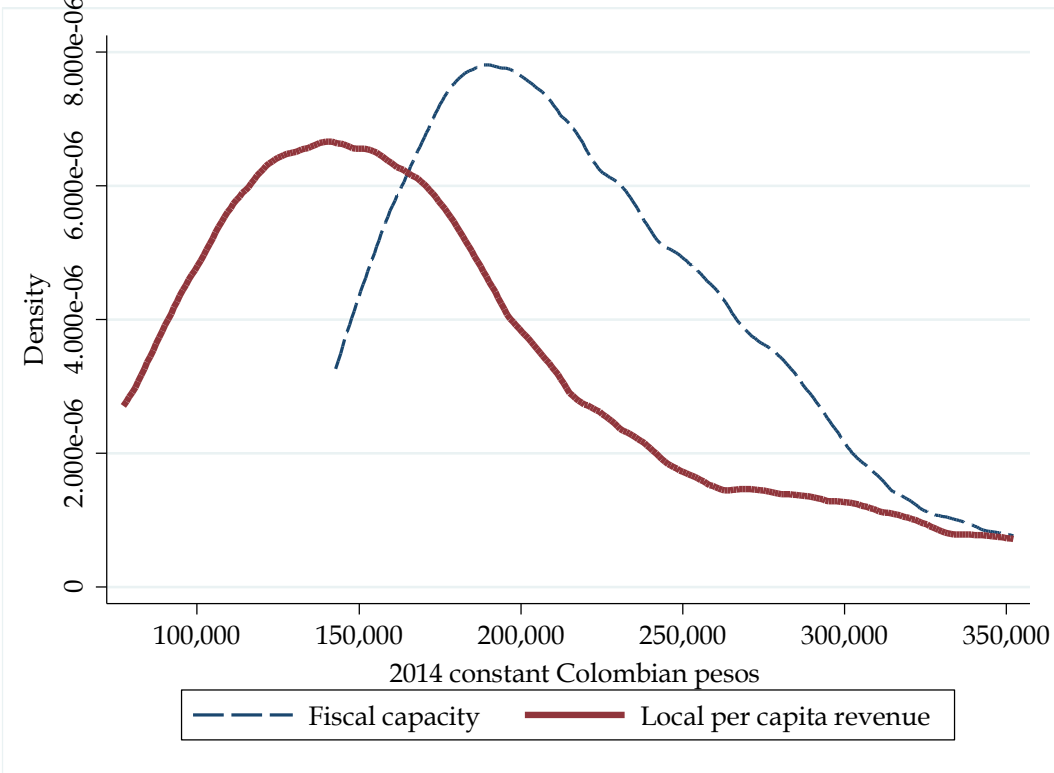
Table 5. Expenditure Needs by Departmental Category, 2014 Colombian pesos.

Categories	Per capita expenditure	Expenditure norm	Frequency	Percent
Special	549,381	543,846	3	9.4
1	637,552	609,342	4	12.5
2	660,827	674,853	11	34.4
3	878,547	745,832	4	12.5
4	1,010,102	1,181,799	10	31.3
Total	783,833	821,675	32	100

Source: Calculations by the authors with data from DANE & DNP

Similarly, fiscal capacity differs from per capita collection (Figure 4)⁷. While the average per capita collection was COP \$187,984 in 2014, the capacity of per capita revenues reached COP \$236,754. This means that, on average, the departments of Colombia collected nearly 79.4% of the estimated per capita potential, a more efficient scenario than the one observed for municipalities.

Figure 4. Fiscal Capacity, Departments



Source: Calculations by the authors with data from DANE & DNP

In the national aggregate, the departmental tax revenue for 2014 was COP\$ 7.5 trillion, while the collecting capacity was COP \$9.4 trillion. That is, 20.6% of tax collection inefficiency accounted for about COP \$2 trillion fewer resources available

⁷ The same rule for removing outliers used in municipalities was applied; San Andrés and Providencia was the only department removed.

for departments, which meant a per capita revenue lower by approximately COP \$48.700.

Regarding departmental categories, the collection efficiency of those located both in the special category and category 1 exceeds those in categories 2, 3, and 4. The former collected 92.9% and 93.8% of their per capita potential, respectively, while the latter collected sequentially 61.1%, 68.1%, and 62.5% of the estimated fiscal capacity (Table 6). It is important to highlight that efficiency is higher in the relatively more developed departments, as mentioned before regarding municipalities, although the differences are lower. This could explain why per capita spending is more equitable between departmental categories, unlike municipal ones.

Table 6. Fiscal Capacity by Departmental Category, 2014 Colombian pesos.

Categories	Fiscal capacity	Per capita revenue	Efficiency (%)	Frequency	Percent
Special	268,743	249,651	92.9	3	9.7
1	231,896	217,618	93.8	4	12.9
2	223,647	136,676	61.1	10	32.3
3	216,967	147,816	68.1	4	12.9
4	179,497	112,251	62.5	10	32.3
Total	213,972	151,612	70.9	31	100

Source: Calculations by the authors with data from DANE & DNP

Table 7. Per capita fiscal gap and departmental category, 2014 Colombian pesos.

Categories	Gap	Relative gap (%)	Frequency	Percent
Special	275,103	45	3	9.7
1	377,446	62	4	12.9
2	452,413	74	10	32.3
3	528,865	86	4	12.9
4	1,002,302	164	10	32.3
Total	612,829	100	31	100

Source: Calculations by the authors with data from DANE & DNP

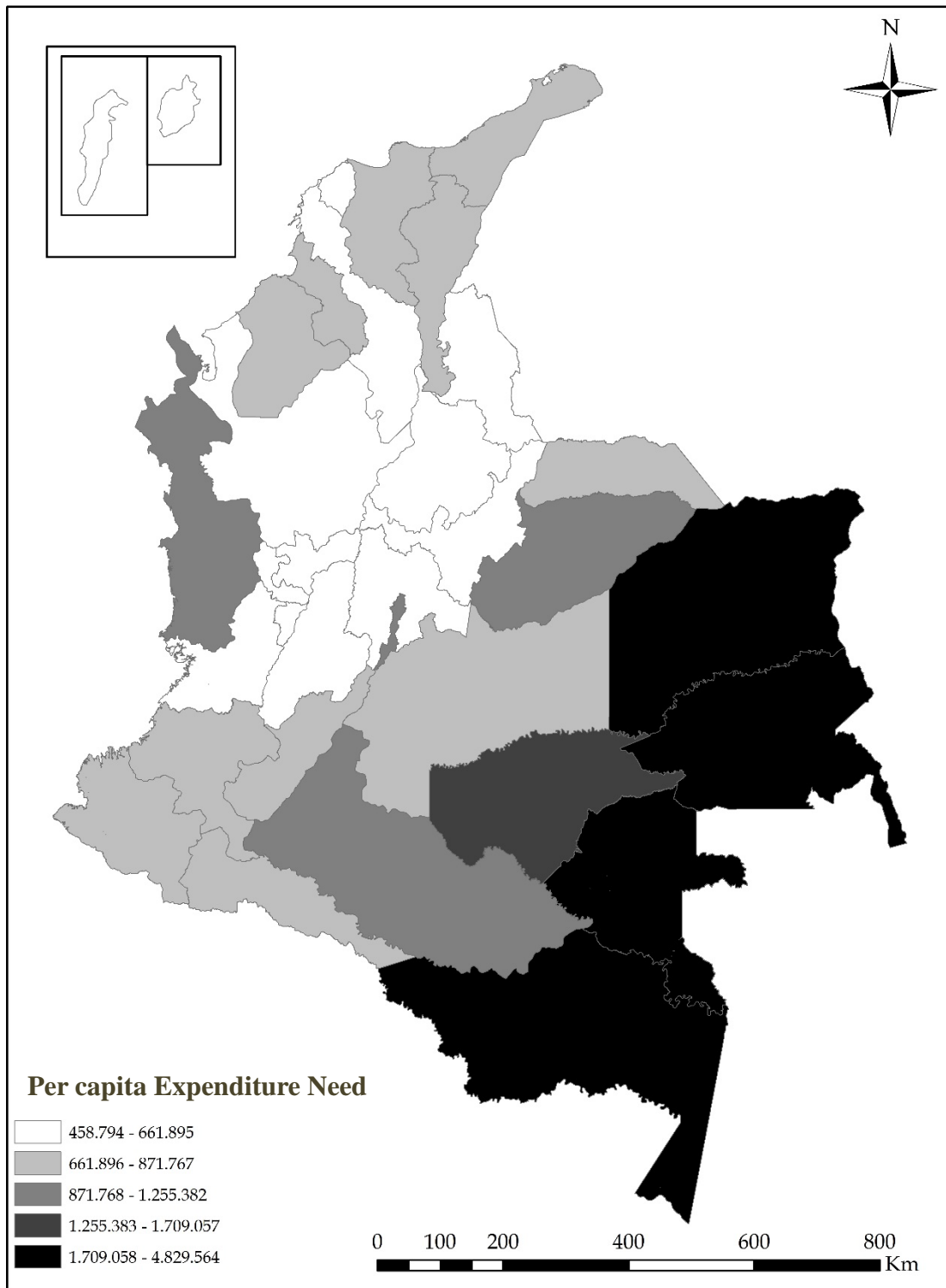
Based on the estimated fiscal capacity and expenditure needs, it is possible to calculate the fiscal gap for the departments in Colombia (Table 7). As can be observed, the mean per capita fiscal gap is positive for all categories, and it increases

as it moves towards the categories of the less-developed departments. This suggests that laggard departments are less able to meet their spending needs than the more developed ones.

The departments would need COP \$16.9 trillion to match their fiscal capacity and their expenditure needs. Per category, the relatively more developed ones (Special) required on average COP \$275,103 per capita, while the fourth category needed more than three times that amount, COP \$1,002,302, on average, per capita. The resources spent in 2014 would have been enough to achieve full equality of spending because the total need, by construction, is equal to the total budget executions from the same year.

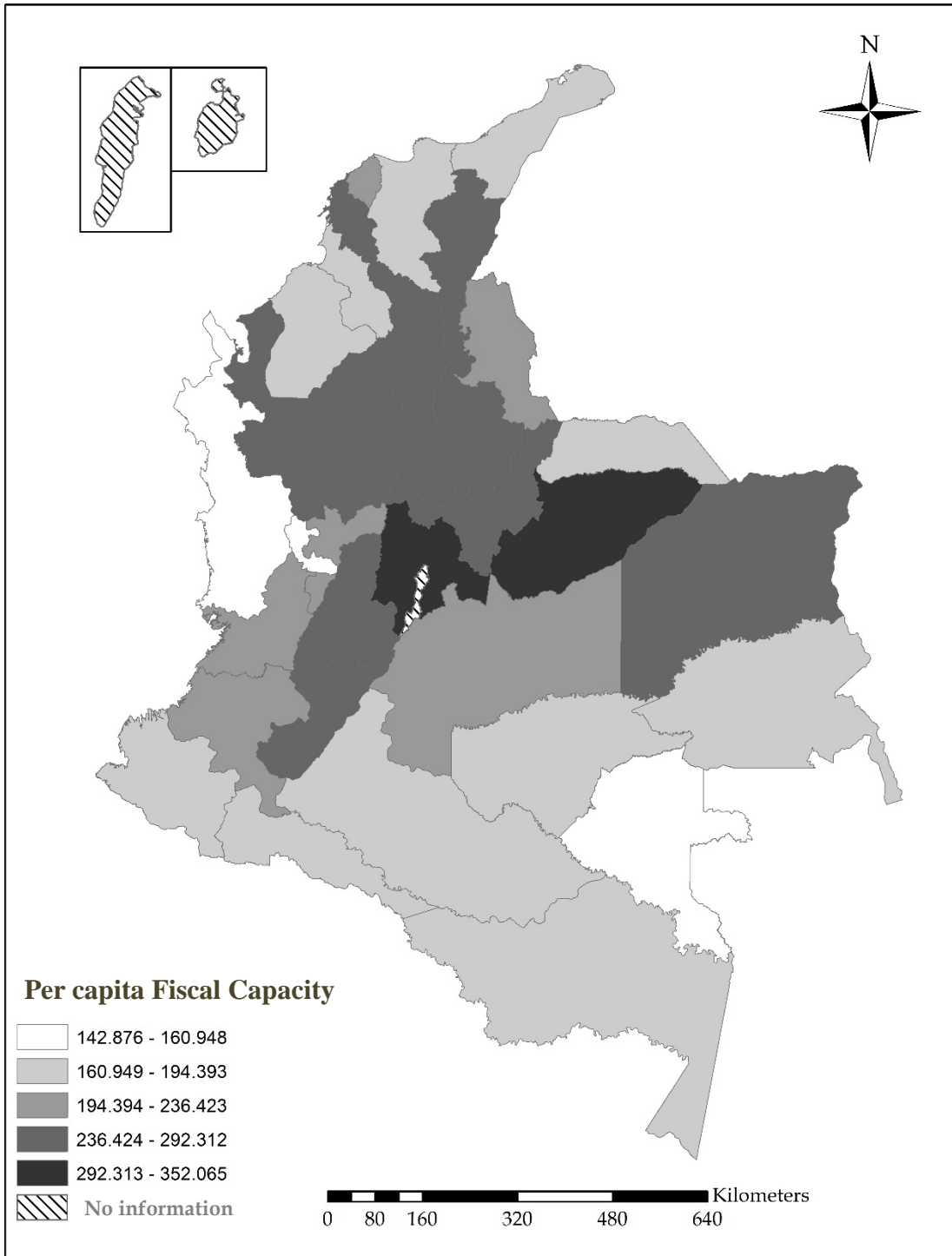
A spatial analysis of the results shows that there is a greater expenditure need both in the departments of the Amazon and Orinoco regions (Map 4). Additionally, poor fiscal capacity worsens the situation for these regions (Map 5). They cannot cover their needs as do the departments located in the center of the country such as Cundinamarca, Boyacá, Antioquia, and Santander. Therefore, the fiscal gap was higher in the regions of Amazon, Orinoco, the Caribbean (except Bolívar and Atlántico) and in the Pacific, than in the departments of Cundinamarca, Tolima, Caldas, Quindío, Risaralda, Santander, and Boyacá (Map 6).

Map 4. Expenditure Needs, Departments (2014 Colombian pesos).



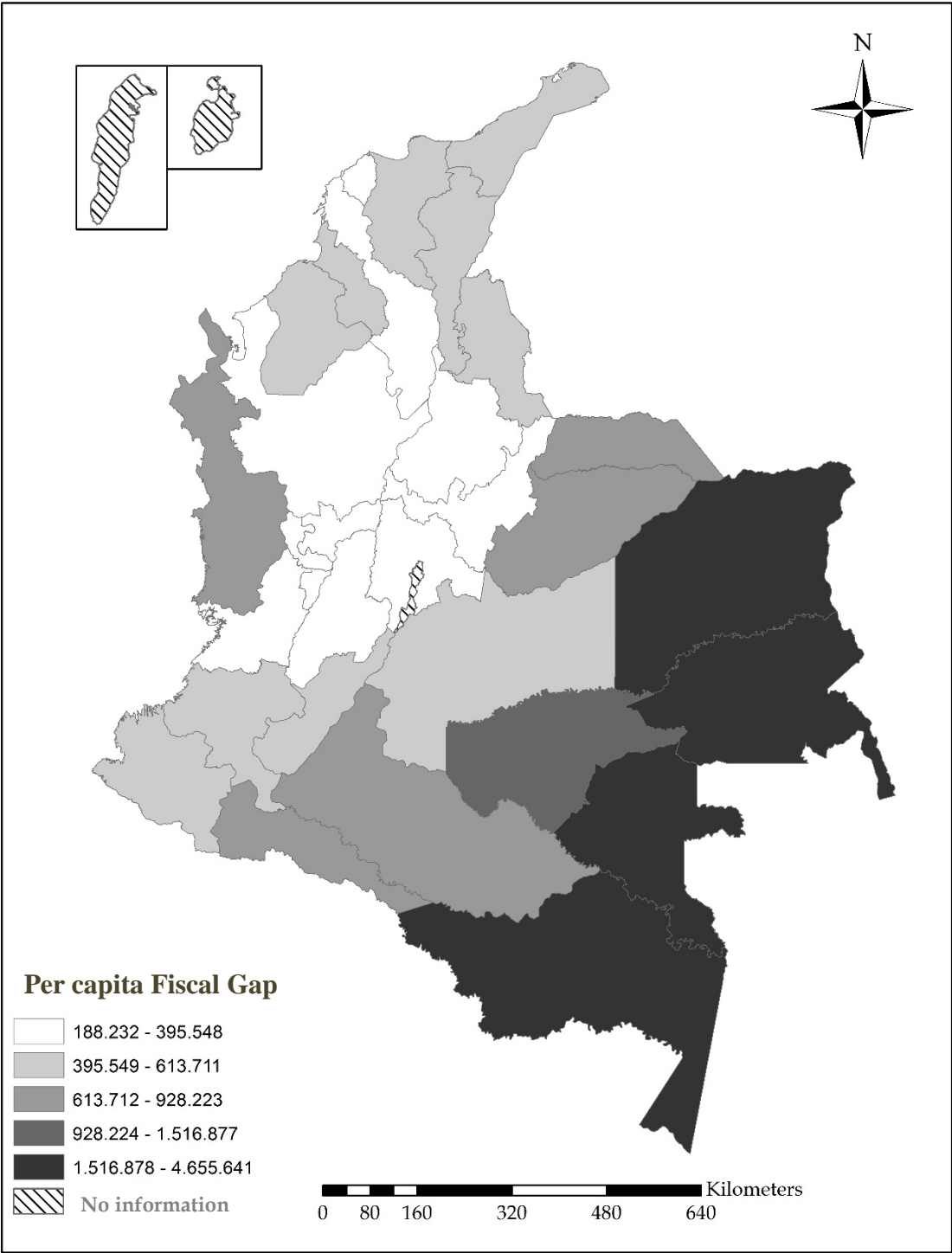
Source: Calculations by the authors with data from DANE & DNP

Map 5. Fiscal Capacity, Departments (2014 Colombian pesos).



Source: Calculations by the authors with data from DANE & DNP

Map 5. Horizontal Fiscal Gap, Departments (2014 Colombian pesos).



Source: Calculations by the authors with data from DANE & DNP

To sum up, the results show that the territorial fiscal gap follows a center-periphery pattern, by which municipalities and departments in the center of the country have a smaller gap than those located on the periphery. Taken together, it would be possible to establish a system of equalization transfers because the resources required for this purpose are fewer than the current transfers to sub-national governments, as long as territorial entities collect their potential. The analysis of how such reform should take place and its political viability are dealt with in the next section.

5. Comments on a Reform Agenda

Colombia is characterized by horizontal fiscal disparities, and existing mechanisms have little impact on reducing these imbalances. For example, by 2014, the spending executed by territorial governments in Colombia was COP \$91.5 trillion in investment and operating expenditures. Since the potential collection is estimated to be COP \$36.8 trillion (COP \$27.4 trillion in municipalities and COP \$9.4 in departments), the total fiscal gap would be COP \$40.7 trillion (COP \$23.8 trillion for municipalities and COP \$16.9 trillion for departments). In other words, this is the amount of resources that were needed by municipalities and departments to achieve equitable levels of public goods and services, under the assumption that sub-national governments reach their fiscal capacity. Therefore, there were territorial entities in which the per capita expenditure was below requirements in conditions of equity, which increasingly expands the spending gaps.

About COP \$41 trillion⁸ needs to be redistributed in order to meet the need for territorial spending and fiscal capacity of municipalities and departments, according to the methodology proposed and the information available in this document. This does not mean that the need for resources is COP \$91.5 trillion and that this amount

⁸ Considering the municipalities and departments resulting after debugging for outliers.

would solve all existing needs. It should be noted that the estimation of expenditure needs in this document assumes a budget constraint determined by resources spent in 2014, without this meaning that the spending of the same year was enough to meet the country's fiscal needs. Based on this methodology, it is important to point out that about 50% of the fiscal resources in Colombia were spent unequally in 2014.

It is possible that some of the inequalities in terms of quality and quantity of public goods and services, such as access to clean water, education, or health, are related precisely to disparities regarding the availability of public resources. It should not be assumed that Colombian municipalities must receive the same resources per inhabitant for different public goods and services. For instance, there are factors such as population dispersion, climate, initial coverage of water and sewage, and income of the population, among others, which can generate an uneven quality of education that could be persistent over time (Galvis and Bonilla, 2014). In reality, to reduce inequalities in Colombia, it is necessary to eliminate horizontal fiscal disparities through an equalization transfers system.

According to the budget execution of FUT, the total transfers from the Central Government to municipalities and departments of the sample reached COP \$66.5 trillion in 2014. From these, the SGP accounted for 52.6% with COP \$35 trillion. Resources from the *Fondo de Solidaridad y Garantía (Fosyga)*⁹ to the health sector were COP \$12.4 trillion, and transfers with no particular destination were recorded to be COP \$3.7 trillion. In addition, the other important transfer, known as the SGR, amounted to COP \$12.3 trillion in 2014, meaning that the available resources were more than sufficient to cover the estimated expenditure needs of municipalities and departments.

⁹ Fosyga is an account attached to the Ministry of Health and Social Protection whose resources are allocated to health in Colombia.

Given this situation, the proposal would be to create a single system of equalization transfers with the purpose of directing resources to municipalities and departments, depending on the existing fiscal gap in each territory. In order to establish itself as an equalization transfer system, the use of resources should not be conditioned for its execution in certain sectors, as is the case with the current SGP.

Implementing this system would involve significant changes in Colombia. First, a constitutional amendment would be necessary to modify Articles 356 and 357, which regulate the current system. Provided that the equalization system involves having winners and losers represented at the National Congress, the success of this change will depend on the balance of forces of the various political groups. Additionally, implementing a single transfer system equalization would involve merging the two existing systems (the SGP and the SGR). In this case, the constitutional reform would not be limited to the two articles mentioned, because the constitutional article 361, which regulates the royalties, would necessarily have to be modified. This type of reform would further complicate the feasibility of a successful procedure at Congress; it could address a problem that affects many players in various ways.

Furthermore, this reform must be supported by the national government. Probably, the current political and economic circumstances are not the best for the executive branch to support this initiative. On the one hand, the fall in prices of raw materials, particularly oil and coal, have brought a significant reduction in exports and revenues for the central government. Resources from the mining sector represented 18% of total revenues for the Colombian government, and it is projected at 7.3% for 2015. In this context, the Colombian government announced filing a tax reform project at Congress in the second semester of 2016 in order to cover part of the existing missing public finances and remain within the deficit target imposed by the Fiscal Rule Act (Law 1473 of 2011).

An additional point that would cause the Colombian government not to submit a reform of the transfer system is the political circumstances that come with the implementation of the peace agreement signed between the executive and the FARC. Probably, the current government would prioritize the investment of political capital to achieve the end of the war against FARC and to comply with all the commitments set forth in the agreement. One of the points implies processing some laws at Congress which are required to implement the peace agreement.

6. Conclusions

In general, municipalities and departments in Colombia are characterized by tax revenues which are lower than their potential collection, and public per capita expenditure below their needs. In addition, local authorities in the country have lower resources compared to their spending needs in an equal scenario, which does not allow them to offer more and better public goods and services to their population. The fiscal gap affects more relatively less-developed jurisdictions, which implies that in the long term, structural inequalities in populations and economic inefficiency through fiscally induced migration would persist.

However, despite the significant inequalities in Colombia, there is not any spending equalization transfer system that allows territorial entities with fewer resources to offer a good standard of public goods and services. Poverty levels in the regions, especially those located in the Colombian periphery, can be reduced with greater equity. Because of this situation, this article considers that a transfer system reform aiming at an equalization scheme should be part of public policy discussions.

Horizontal fiscal disparities hurt the lagged municipalities and departments, generating widening gaps between the quantity and the quality of public goods and services. It is not only essential to the nation to create an equalization transfers system, but also that local authorities in Colombia attempt to reach their potential

tax revenue. Currently, they collect less than their estimated fiscal capacity, especially in the case of municipalities. Additionally, more resources are not the answer: municipalities and departments should increase the quality of expenditure in order to improve the provision of goods and services.

Two components should be considered when designing a fiscal equalization transfers system: expenditure needs, which can be estimated using the methodology proposed in this document or through complementary methodologies, and fiscal capacity, since using the observed collection has the disadvantage of generating fiscal laziness. The only remaining uncertainty is if these fiscal gaps are maintained when controlled by the spending of the Central Government executed in municipalities and departments. Clearly, this type of expenditure does not respond to a national strategy of equalization of spending in a decentralized country such as Colombia.

7. References

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Annex

Annex 1. General Statistics

Variable	Source	Observations	Mean	Standard Deviation	Minimum	Maximum
Rural population	DANE, projected population 2014	1,122	10,074	11,191	201	156,266
Total housing in the country	DANE, General Census 2005	1,113	9,112	66,438	1	1,983,850
Poor population	DANE, General Census 2005	1,122	12,158	31,083	342	715,470
Enrollment public schools	Ministerio de Educación Nacional	1,122	7,714	31,769	-	839,122
Total population	DANE, projected population 2014	1,122	42,479	263,342	342	7,776,845
Subsidized population and uninsured poor	Ministerio de Salud y Protección Social	1,102	20,737	59,368	492	1,267,841
Local authority area in Km ²	IGAC	1,118	1,021	3,207	15	65,674
Homes in quantitative and qualitative deficit	DANE, General Census 2005	1,093	3,488	12,990	44	369,874
Municipal per capita fiscal revenue	CHIP, Formulario Único Territorial	1,076	278,171	172,035	215	1,339,404
Municipal per capita fiscal expenditure	CHIP, Formulario Único Territorial	1,095	1,542,623	997,143	31,960	9,972,714
Municipal fiscal expenditure norm	Own calculations	1,122	2,294,114	4,148,535	727,628	67,819,070
Municipal fiscal capacity	Own calculations	1,076	803,795	191,249	215	1,339,404
Departmental per capita fiscal revenue	CHIP, Formulario Único Territorial	32	196,361	162,990	77,225	1,011,397
Departmental per capita fiscal expenditure	CHIP, Formulario Único Territorial	32	1,128,078	936,046	358,498	3,932,215
Departmental fiscal expenditure norm	Own calculations	32	1,162,236	1,171,280	458,794	4,829,564
Departmental fiscal capacity	Own calculations	31	218,414	50,409	142,876	352,065

Source: elaborated by the authors.

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