

Quality of Government and Regional Development in Brazil: a preliminary analysis

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Extended Abstract

Since the 2000s there has been a growing interest in the quality of government amongst academics and policy makers. This concern stems from the perception that the quality of government institutions can produce different social and economic impacts on societies (B. O. Rothstein & Teorell, 2008). In general, the quality of government is understood as impartiality in the exercise of power, high quality in the delivery of public services and low corruption. Most studies on quality of government have focused on the national level. Nevertheless, recently a growing set of research has increasingly sought to investigate how sub-national governments affect geographical differences in economic output and development, using new indicators to measure sub-national government quality (Charron et al., 2014; Charron & Lapuente, 2013). The shift in focus has given rise to a series of empirical studies that set up links between the quality of government and regional development, in which innovation, economic growth, entrepreneurship and decentralisation have been examined. However, this growing body of studies has centred, to a large extent, their attention on European countries. This implies that the rest of the world, particularly developing countries, remains a black box (Iddawela et al., 2021).

Bearing in mind this gap in the literature, a regional quality of government index for Brazil, named BR-QoG, was developed. This effort is a novelty in Brazil and, at the same time, represents an important step towards a better understanding of regional realities and, as a consequence, of the country itself, which has some key particularities: it is the largest country in South America; the ninth economy in the world; a regional power in Latin America; and a highly unequal country. Furthermore, this effort is also a contribution to the existing literature insofar as the discussion on the quality of government, as mentioned above, has been largely directed towards the European context.

Brazil is the fifth-largest country in the world in terms of surface area - after Canada, China, Russia and the United States - and home to just over 214 million people. The country is a federal republic, and its subnational political structure comprises the federal

district (the Brazilian capital), 27 states and 5.568 municipalities. For merely statistical purposes, Brazil has set up additional territorial classifications consisting of five macro-regions (North, Northeast, Centre-West, South and Southeast), 510 immediate geographic regions and 133 intermediate geographic regions. However, this geographic macro-division of the Brazilian territory points out to a relevant aspect: the existing interregional disparity. In fact, the Southeast is by far the richest and most populated region in the country, having a highly diversified economy and accounting for one third of the Brazilian GDP, while the Northeast is the poorest region, with the lowest GDP per capita and the second largest population contingent of Brazil. This means that population and economic activity are highly concentrated in the country. It should be noted that the phenomenon of spatial concentration in Brazil has produced substantial pockets of dense settlement and economic activity, in which some attraction forces associated with benefits of agglomeration economies are the main vectors. Nonetheless, these benefits are far from linear or even permanent inasmuch as many negative externalities related to large populated cities can undermine efficiencies connected with agglomeration economies.

It is worth underlining here that Brazilian federalism ascribes wide spending responsibilities to municipalities. Despite having an important role in the development process of their regions, municipalities often have serious difficulties in performing their role efficiently. One of the main bottlenecks for the elaboration and implementation of regional public policies, especially in backward regions, is the insufficient capacity verified at the municipal level. Moreover, this lack of capacity is responsible for both poor public investment and the problems in generating endogenous growth in those regional. Within this context, developing human capital is an essential factor in promoting growth and development. Undoubtedly, investment in human capital needs to be accompanied by investments in infrastructure and other critical areas such as health and safety (including the fight against corruption) to produce the hoped-for positive effects in the regions. Although the difficulties are clear, progress has been made by municipalities that are located in both rich and poor macro-regions. This suggests that an explanatory factor for the success or failure of municipalities may lie in the quality of their governments, which is the focus of attention of this paper.

Inspired by Charron and Lapuente's work (2013), the BR-QoG measures the quality of the outputs generated by a regional government in both positive aspects, such as the existence of impartial policies that do not favour particular interests, and a negative one, such as the presence of corruption. In this way, the index attempts to measure the quality of local institutions (Rodríguez-Pose & Ketterer, 2020). The BR-QoG is based on four dimensions that can express the quality of government: corruption, crime, education, and health. For each dimension, a specific index, which is combined through factor analysis to compose the BR-QoG, was created. It is important to mention that while the European quality of government index (EQI) is based on surveys, the BR-QoG is developed from secondary data available on each of the dimensions of the index.

This paper aims at analysing the main effects of the quality of government in Brazilian regions, with particular interest in its effects on the regional growth. Therefore, a correlation was established between each of the BR-QoG dimensions and economic indicators of Brazilian regions, such as the regional GDP and the economic growth. This correlation makes it possible to clearly identify those governments that have contributed to promoting the development of their regions. Furthermore, this identification is crucial to show the role of the quality of government in boosting regional development in an emerging country like Brazil. Another point to be highlighted here is that the

methodology carried out in this paper denotes precisely to which BR-QoG dimensions helped most to the economic performance of Brazilian regions.

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Quality of Government and Regional Development in Brazil: a preliminary analysis

(Draft version - work in progress)

1. Introduction and brief theoretical remarks

In this paper we develop a new composite indicator on Quality of Government for Brazilian micro regions, named BR-QoG from four dimensions: crime, corruption, education, and health. We use our indicator, as well as its components, to explore the effect on GDP per capita. Our findings show that the impact of quality of government is positive on regional economic performance, indicating that the higher quality of government of regions, from the combination of low levels of crime and corruption and high levels of educations and health services of regions, higher will be the region's GDP per capita.

The inability of several governments around the world to design and implement effective policies, delivering quality public services, and combat persistent problems of corruption, patronage and influence peddling is at the root of concerns for economists and political scientists. These government quality problems are invariably associated with the poor performance of governments and their consequences for the general population. It is within this context that the assessment of the quality of governments has assumed a major importance, stimulating a recent and growing literature, conceptual and empirical, on the subject. This interest is based on the clear perception that the quality of government institutions generates positive or negative social and economic impacts on societies and on the promotion of socioeconomic development.

A central aspect of this discussion is the role of institutions. There is substantial literature that emphasizes that institutions, conceived as the rules of the game in a society (North, 1990), vary significantly among countries, which explains, at least in part, different economic performances. Institutions are crucial factors for the long-term economic growth of countries, whose economic success - or failure - would reside in political and economic institutions (Acemoglu et al., 2005). As governments are political institutions that not only set the rules of the game, but also receive and meet the demands of societies, the quality of governments, or good governance, can play a fundamental role in socioeconomic development.

Governance is usually defined as the traditions and institutions by which authority in a country is exercised (Kaufmann et al., 2011). Based on this definition, Kaufmann et al. (2010) constructed an indicator of global governance based on six complementary dimensions: voice and responsibility; political stability and absence of violence/terrorism; government effectiveness; regulatory quality; rule of law; and control of corruption. Even though this formulation has been subject of several criticisms (Langbein & Knack, 2010; Thomas, 2010), the crucial issue for this literature review is that they focus on the national scope. Therefore, regional differences regarding the quality of governments are not captured by this indicator.

Aware of both this insufficiency and the differences in the quality of regional governance, researchers from the Institute of Government Quality at the University of Gothenburg created the European Government Quality Index – EQI (Charron et al., 2014; Charron &

Lapuente, 2013; B. Rothstein et al., 2013). Although the EQI has been the subject of some adjustments (Charron et al., 2022; Charron & Lapuente, 2018; B. Rothstein et al., 2019), the main subject is that its construction brings together substantial surveys in European countries, based on indicators of World Bank governance, created by Kaufmann et al. (2010). In this way, several empirical studies have emphasized that the quality of a government is intrinsically related to its impartiality in the exercise of power, low corruption and the quality of public services provided (Charron et al., 2014; Charron & Lapuente, 2013, 2018; B. Rothstein et al., 2013, 2019). It should be noted here that this literature is completely in line with that which has emphasized that institutional quality plays an important role in promoting regional development (Rodríguez-Pose, 2013; Rodríguez-Pose & di Cataldo, 2015; Rodríguez-Pose & Ketterer, 2020).

The construction of the EQI made possible a diversity of empirical studies that associate the quality of governments to a series of relevant themes, such as innovation, economic growth, entrepreneurship, and decentralization. In general, those regions where the quality of government is more pronounced have a greater capacity to implement efficient public policies, which provides better economic results. Changes in the quality of government influence regional economic performance in Europe, especially in its peripheral regions (Rodríguez-Pose & Ketterer, 2020). This means that the quality of government plays an important role in regional economic growth, with low-growth regions benefiting most from this improvement. the quality of government has also shaped regional economic performance from 2001 to 2015, a period in which the financial crisis and economic slowdown affected all European Community countries (Bonanno, 2019). Among these findings, we can assume that the higher the quality of government institutions, the greater the probability of a region presenting greater economic growth.

An important connection is between quality of government and decentralization. A greater degree of regional autonomy leads to improvements in the population's quality of life as governments tend to be closer to citizens and their demands. The difficulty of making these improvements feasible in practice is due to the inability of many regional governments to deliver public services efficiently and responsibly. Recent research shows that the quality of governments constitutes a much more important element for economic growth than decentralization (Fitjar et al., 2019). This suggests that policymakers should consider mechanisms to improve the quality of regional governments before devising reforms in favour of decentralization. This point is in line with analyses that underlined that the improvement of government institutions would practically be a precondition for the efficiency of both public spending and investment in infrastructure (Crescenzi et al., 2016; Rodríguez-Pose & Garcilazo, 2015).

Innovation, considered the driving force behind economic development and one of the main objectives of European regional policy, is also affected by the quality of government. In fact, deficiencies in the quality of regional governments can become real obstacles not only for the elaboration, implementation, and the very functioning of smart specialization strategies, but also for the development of regional innovative capacity, especially in peripheral regions (Rodríguez-Pose & di Cataldo, 2015). In this line of argument, the quality of governments also impacts entrepreneurship. Regions where populations have a clear perception that governments are impartial and, at the same time, free from corruption have a markedly greater number of small and medium-sized enterprises (Nistotskaya et al., 2015).

2. Data and Methodology

Empirical studies on Quality of Government have suffered from lack of regional data that permit measure regional quality of government. In general studies are apply for countries level and use survey looking for perception to capture this indicator.

Under this perspective, our indicator represents an advance since we constructed a quality of government index for microregion level generated by a combination of four dimensions, crime, corruption, education, health. These dimensions are captured individually through several secondary data and not about perception. The individual components of our quality of government indicator are important because it can be contributed differently. Therefore, our indicator has two major characteristics, first, it is able to capture the multiple facets of Quality of Government identified in the literature into a unitary measure from secondary data; second, it is able to be easily generalized to different contexts. Specifically in this work, make it possible to compare the quality of government conditions of different Brazilian microregions.

Following Charron et al (2019), Pontarollo and Serpieri (2020) and Fiorino et al (2021) and employing annual data over the period 2008-2018 from different sources, we construct a composite indicator on Quality of Government through a normalization and weight elicitation which is based on Factorial Analysis (FA) and named BR-QoG. This procedure allows to transform multiple dimensions into a set of uncorrelated dimensions and to reduce dimensionality (Charron et al., 2019; Fiorino et al., 2021; Pontarollo & Serpieri, 2020).

Our approach consists of two stages: (a) normalization of data and (b) weight elicitation. Through normalization we remove the different scale of each variable and identify indicators that may be positively correlated with the phenomenon of interest. This stage is necessary to ensure that an increase in the normalized indicators corresponds to an increase in the composite indicator. Considering the h^{th} indicator I for microregion m , I_{hm} is transformed to I_{hm}^{std} , taking values within the interval $[0,1]$ according to the following equation:

$$I_{hm}^{std} = \frac{I_{hm} - \min(I_{hm})}{\max(I_{hm}) - \min(I_{hm})}$$

We employ the Factor Analysis for weight elicitation. This method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors. The factor loading of a variable quantifies the extent to which the variable is related to a given factor.

The same procedure is used to capture individual indicator for four dimensions of BR-QoG: corruption, crime, education, and health. The dimension of corruption is measure by the number of irregular accounts for each 100 thousand inhabitants in the micro-region (inhabitants' data from IBGE). We used the criminal occurrences for each 100 thousand inhabitants, which involves intentional homicide, bodily injury followed by death of the victim, and robbery followed by death, named the homicide rate, as proxy of dimension of crime. We calculated the dimension of education using two variables: education expenditure per total number of students enrolled in primary education and elementary school pass rate. We proxy the dimension of health using three variables: (i) the number of foetal mortality and avoidable mortality under-five years of age per 10,000 inhabitants;

(ii) the number of doctors and nurses who attend the public health for every 10 thousand inhabitants; (iii) water, sewage, and solid waste supply investment by the service provider per capita. Table 1 summarizes the construction of the BR-QoG, proxies and sources.

TABLE 1 ABOUT HERE

3. Results

3.1. Quality of Government of Brazilian microregion's (BR-QoG)

Fig 1 shows the spatial distribution of Quality of Government of Brazilian microregions by cluster analysis. The Quality of Government indicator has been normalized and varies 0 to 1, where the smaller values represent the less quality of government regions, and the higher values the most quality of government regions.

In 2018, evident territorial patterns can be observed¹:

- 136 (24%) microregions across North, Northeast and Middle of Brazil presented in 2018 the least quality of government (lighter green).
- 142 (25%) microregions are characterized by a low Quality of Government. This cluster is the regions that represented in 2018 second worse quality of Government. Most of the mesoregions are located the Northeast, followed by the North and Midwest of Brazil.
- 173 (31%) microregions, mainly in in Midwest, followed by the South and Southeast of Brazil, demonstrated a moderate quality of government.
- 103 (19%) microregions ranked as the most quality of government (darker green). They are only in Midwest, South and Southeast of Brazil (Figure 1).

FIGURE 1 ABOUT HERE

Thus, microregions located North, and Northeast of Brazil show a Quality of Government less than that of the South and Southeast. Figure 2 shows the evolution of the average of the individual indicators for each dimension and of the BR-QoG. By observing the evolution of the individual indicators and BR-QoG index, the exception of the Education Indicator, there does not seem to be a large temporal variation in the average.

FIGURE 2 ABOUT HERE

Among the 5 microregions that present the worst negative variations, 3 are in the Roraima state that already had medium-low quality of government and were moved downwards. Looking at the specific regions, we can highlight that the region of Arinos (MT) rose two positions; and Vassouras (RJ) felt two positions (Tables 2 and 3).

¹ Four mesoregions (Japurá; Oiapoque; Fernando de Noronha) present missing data in some of the individual dimensions, the BR-QoG in these mesoregions are missing.

TABLE 2 ABOUT HERE

TABLE 3 ABOUT HERE

Regarding individual indicators, Figure 3 shows the spatial distribution of each dimension of BR-QoG: crime; corruption; education and health in 2018.

FIGURE 3 ABOUT HERE

3.2 The effect of Quality of Government on GDP per capita

Our empirical model is the following:

$$GDP_{i,t} = \alpha + \beta BRQoG_{i,t-1} + T + \varepsilon_{i,t}$$

Where $GDP_{i,t}$ is GDP per capita in microregion i and year t . $Br-QoG_{i,t-1}$ is quality of government in microregion i in year $t-1$. T is a time dummy, α and β are parameters to be estimated and $\varepsilon_{i,t}$ error term. We employ a fixed effect model (which is the most suitable model according to the Hausman Test. Additionally, we estimate the effect on GDP per capita of each individual indicators of BR-QoG: crime; corruption, education and health. The results are reported in Table 4.

TABLE 4 ABOUT HERE

As expected, we found a positive and significant relation between quality of government and economic performance, model 1 in Table 4. Thus, we found significant and positive impact for quality of government on regional economic performance, suggesting that the higher quality of government of regions, higher will be the region's GDP per capita.

Therefore, the most efficient combination of low levels of crime and corruption and high levels of educations and health services shows the quality of government of regions that affect economic performance them. Although this result is in line with our theoretical expectations, it is extremely important since is the first shows empirically this at regional level.

Regarding individual indicators, the crime indicator (Model 2, table 4) is not significant. In this way, we cannot say the homicide rate is correlate economic performance of regions. On the other hand, corruption index is negative and significant (Model 3, table 4), indicating that regions with higher rate of corruption will be lower GPD per capita. Thus, regions that have more accounts judged as irregular are likelihood lower GDP per capita.

Concerning education indicator, the coefficient is positive and significant (Model 4, table 4), implying that regions with high education index will be higher GPD per capita. In this way, the combination of more education expenditure and better pass rates of regions revels regional education level that promote higher economic performance.

In model 5, the coefficient of health indicator is positive and significant, suggesting that regions with higher health level will be higher GPD per capita. In this way, the set of less child mortality, more assistance in public health and better water and sewage services of regions manifest the regional health level that affect economic performance of regions.

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Figures and tables

Table 1: BR-QoG Dimensions and Proxies

Dimension	Proxy	Source
<i>Corruption</i>	Accounts judged irregular by Federal Court of Accounts (TCU) for every 10 thousand inhabitants	CADIRREG and IBGE
<i>Crime</i>	Homicide Rate	Datasus
<i>Education</i>	Education Expenditure per total number of students enrolled in primary education	FNDE
	Elementary school pass rate	FNDE
<i>Health</i>	Number of fetal mortality and avoidable mortality under-five years of age per 10,000 inhabitants	Datasus
	N. of Doctors and Nurses who attend the public health for every 10 thousand inhabitants	CNES
	Water, sewage, and solid waste supply investment by the service provider per capita	SNIS

Source: author's own elaboration.

Table 2 – Top 10 highest variation regions of BR-QoG

Microregion	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Δ18-08	ΔGr.
Itaparica (PE)	0,202	0,231	0,231	0,365	0,379	0,417	0,301	0,327	0,376	0,413	0,432	0,230	1
Paranaguá (PR)	0,575	0,512	0,494	0,557	0,552	0,640	0,570	0,547	0,643	0,773	0,804	0,228	1
Arinos (MT)	0,517	0,526	0,458	0,572	0,653	0,626	0,607	0,602	0,543	0,574	0,743	0,226	2
Peçanha (MG)	0,373	0,493	0,554	0,548	0,580	0,560	0,531	0,592	0,540	0,522	0,597	0,224	1
Penedo (AL)	0,243	0,267	0,225	0,200	0,242	0,311	0,102	0,191	0,263	0,343	0,463	0,220	1
Maceió (AL)	0,250	0,303	0,222	0,210	0,233	0,308	0,228	0,296	0,390	0,420	0,453	0,202	1
Angicos (RN)	0,257	0,444	0,362	0,413	0,443	0,444	0,308	0,408	0,432	0,395	0,454	0,197	1
Recife (PE)	0,462	0,502	0,545	0,547	0,560	0,632	0,533	0,517	0,567	0,594	0,658	0,196	1
Ariquemes (RO)	0,286	0,263	0,309	0,362	0,359	0,385	0,302	0,327	0,358	0,461	0,480	0,193	1
Sertão do Moxotó (PE)	0,256	0,281	0,259	0,353	0,332	0,535	0,427	0,389	0,394	0,606	0,448	0,191	1

Source: author's own elaboration.

Table 3 – Top 10 lowest variation regions of BR-QoG

Microregion	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Δ18-08	ΔGr.
Caracarái (RR)	0,372	0,353	0,395	0,404	0,251	0,000	0,000	0,000	0,178	0,198	0,000	-0,372	-1
Vassouras (RJ)	0,761	0,736	0,685	0,621	0,580	0,683	0,556	0,473	0,489	0,549	0,541	-0,220	-2
Boa Vista (RR)	0,542	0,567	0,604	0,563	0,435	0,401	0,505	0,438	0,359	0,382	0,340	-0,203	-1
Sudeste de Roraima (RR)	0,467	0,447	0,265	0,247	0,218	0,450	0,137	0,252	0,325	0,221	0,269	-0,198	-1
Santa Maria Madalena (RJ)	0,799	0,704	0,663	0,620	0,780	0,757	0,663	0,620	0,628	0,525	0,626	-0,174	-1
Bacia de São João (RJ)	0,632	0,596	0,588	0,607	0,592	0,583	0,546	0,473	0,431	0,468	0,461	-0,170	-1
Pacajus (CE)	0,384	0,375	0,311	0,423	0,271	0,395	0,183	0,305	0,359	0,248	0,232	-0,152	-1
Macacu-Caceribu (RJ)	0,657	0,576	0,673	0,573	0,619	0,668	0,482	0,510	0,518	0,486	0,512	-0,145	-1
Jaguarão (RS)	0,651	0,675	0,576	0,532	0,578		0,570	0,580	0,533	0,451	0,510	-0,141	-1
Cotegipe (BA)	0,502			0,493	0,461		0,394	0,458	0,434	0,437	0,362	-0,140	-1

Source: author's own elaboration.

Table 4 – Main results

	(1)	(2)	(3)	(4)	(5)
Quality of Government _{t-1}	0.211*** (0.055)				
Crime _{t-1}		0.027 (0.046)			
Corruption _{t-1}			-0.047* (0.027)		
Education _{t-1}				0.246*** (0.060)	
Health _{t-1}					0.131** (0.061)
2009.Ano	0.142*** (0.004)	0.140*** (0.004)	0.140*** (0.004)	0.143*** (0.004)	0.143*** (0.005)
2010.Ano	0.278*** (0.006)	0.272*** (0.006)	0.271*** (0.006)	0.282*** (0.005)	0.277*** (0.006)
2011.Ano	0.374*** (0.007)	0.373*** (0.007)	0.373*** (0.006)	0.379*** (0.006)	0.376*** (0.007)
2012.Ano	0.481*** (0.007)	0.482*** (0.007)	0.482*** (0.007)	0.501*** (0.007)	0.476*** (0.007)
2013.Ano	0.561*** (0.008)	0.571*** (0.007)	0.572*** (0.007)	0.585*** (0.007)	0.569*** (0.007)
2014.Ano	0.628*** (0.006)	0.617*** (0.006)	0.619*** (0.007)	0.621*** (0.006)	0.617*** (0.007)
2015.Ano	0.671*** (0.008)	0.666*** (0.009)	0.670*** (0.008)	0.634*** (0.012)	0.665*** (0.009)
2016.Ano	0.732*** (0.009)	0.729*** (0.008)	0.732*** (0.009)	0.731*** (0.009)	0.726*** (0.010)
2017.Ano	0.778*** (0.009)	0.781*** (0.009)	0.781*** (0.009)	0.797*** (0.009)	0.777*** (0.010)
2018.Ano	0.820*** (0.010)	0.826*** (0.010)	0.829*** (0.010)	0.826*** (0.009)	0.822*** (0.010)
Constant	2.163*** (0.027)	2.268*** (0.011)	2.276*** (0.005)	2.158*** (0.027)	2.207*** (0.030)
Observations	6,091	6,106	6,138	6,114	6,138
ll_0	-911.8	-912.9	-923.1	-915.6	-923.1
ll	4811	4803	4829	4842	4832
r2_a	0.847	0.846	0.846	0.848	0.846
rss	73.48	74.13	74.51	73.45	74.43
N_clust	556	558	558	556	558

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figures

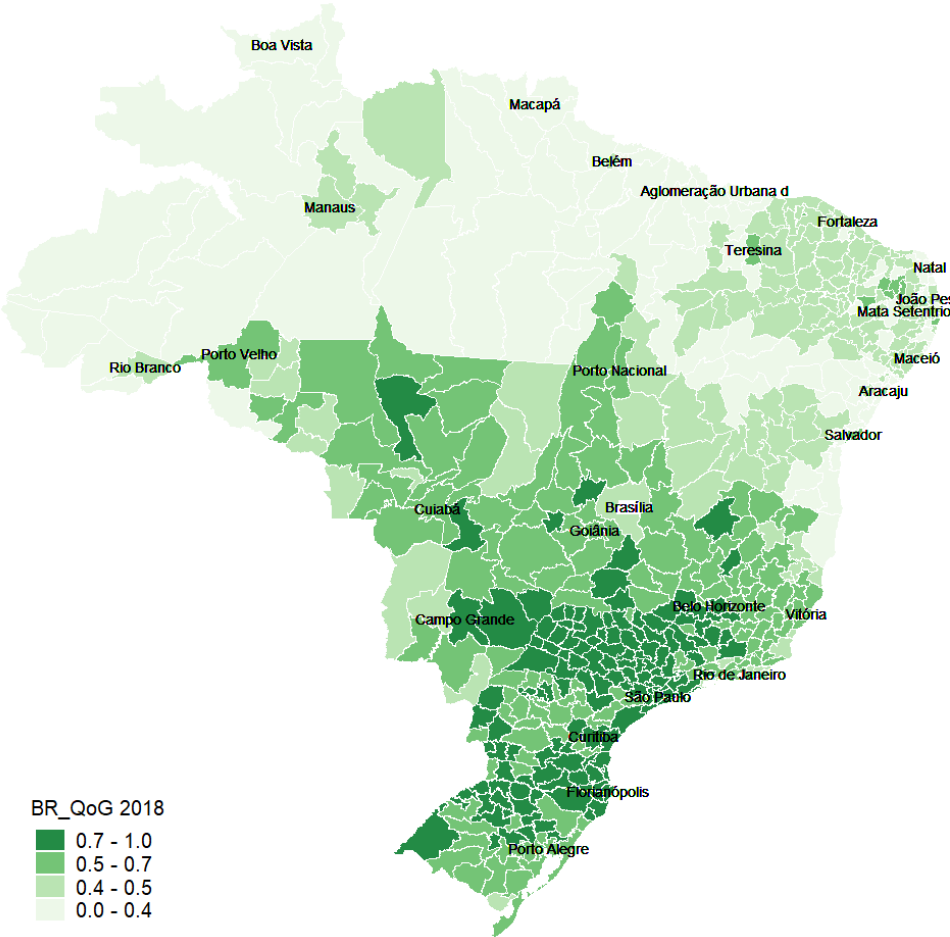


Fig. 1: Quality of Government indicator of Brazilian microregions in 2018

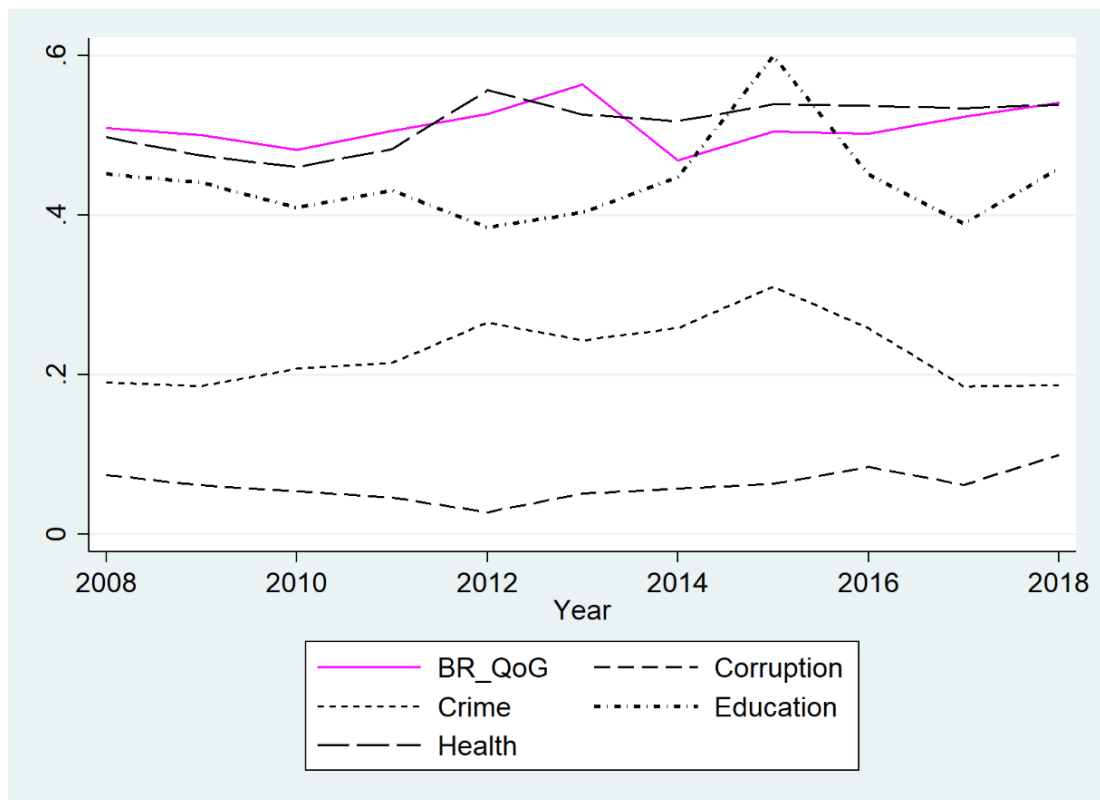


Fig. 2: The average of the individual indicators for each dimension and of the BR-QoG of Brazilian microregions

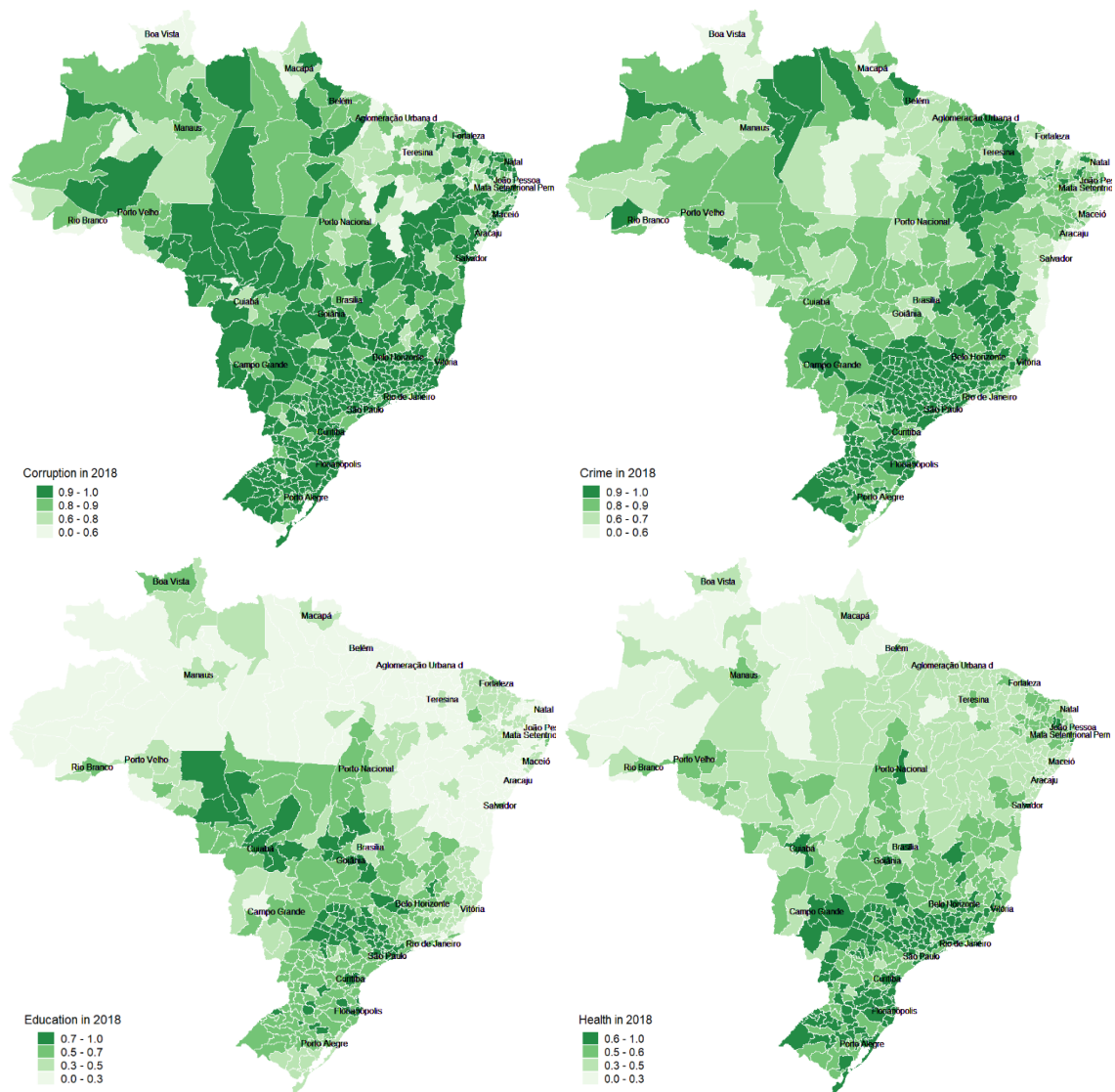


Fig. 3: Spatial distribution of Corruption, Crime, Education and Heath in 2018

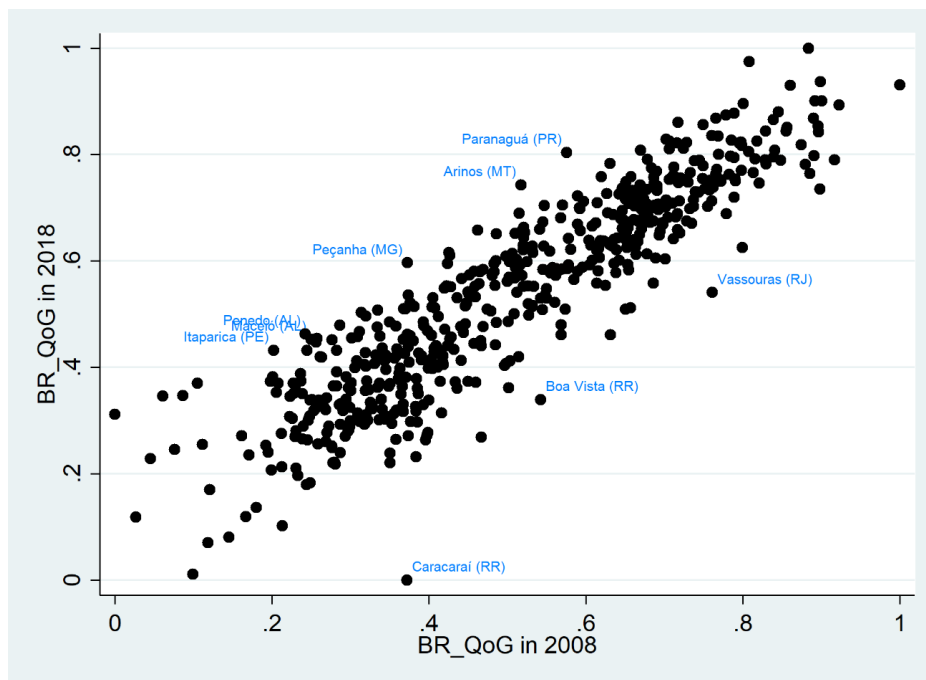


Figure 4: BR-QoG 2018 vs 2008

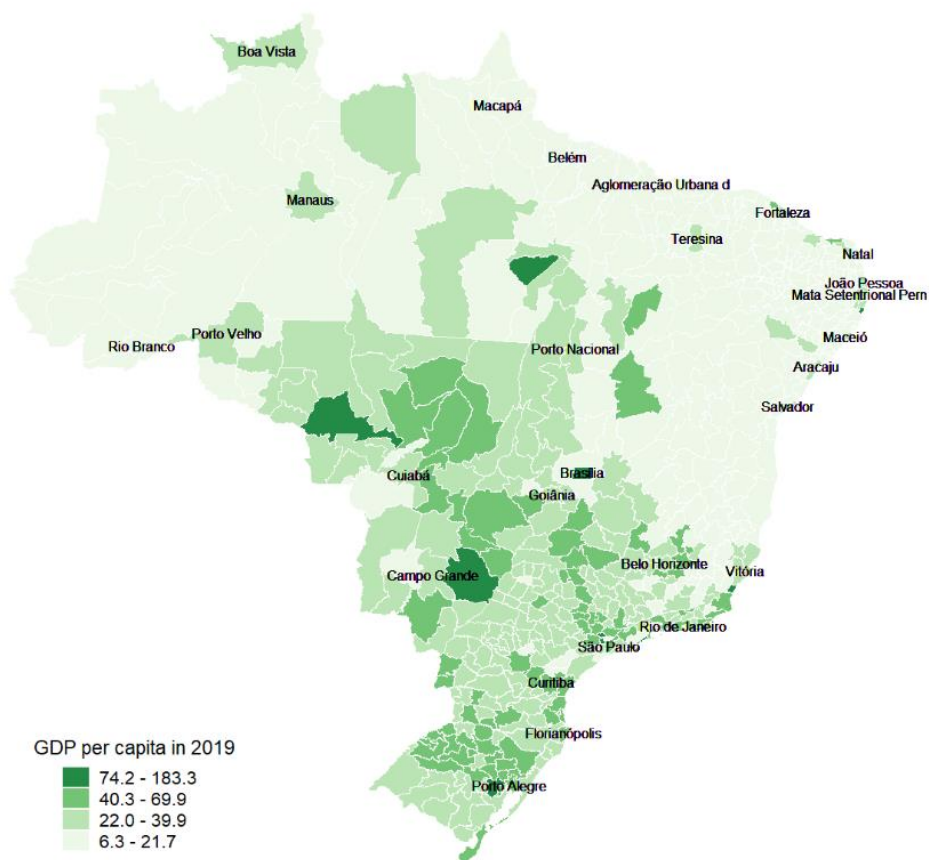


Fig. 5: GDP per capita of Brazilian microregions in 2018