

Corruption in Brazil:  
an analysis of irregularities at the state level

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# **Corruption in Brazil: an analysis of irregularities at the state level<sup>1</sup>**

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## **ABSTRACT**

This paper deals with corruption in the municipalities of Minas Gerais - one of the 26 Brazilian states - from a conception of corruption as misuse of funds by the political system. The argument focuses on the conduct of municipal public officials or politicians who deal with federal funds transferred to Minas Gerais municipalities. In order to conduct this study, we used the reports from the Program of Inspections on Public Lotteries produced by the federal agency Office of the Comptroller General (CGU). Since its inception in 2003 until 2009, this program has inspected 169 municipalities of Minas Gerais. Hence, the objective of this paper is to deal with the irregularities found by the CGU in these cities. First, we built a general profile of the situation in those cities surveyed by the CGU regarding the incidence of irregularities. By doing so, we highlighted which governmental areas would be in a more critical situation. These irregularities, in turn, were taken as proxies for the occurrence of corruption. Therefore, according to the amount of irregularities found, statistical tests were performed in order to establish which factors - indicated by the literature - could be taken as constraints of corruption at the local level. Thus, we identified political, social, economic and demographic characteristics that were associated with corruption. We demonstrated that the population size, the characteristic of the transfers (the amount of funds transferred by the federal government), municipal characteristics related to income and education, and the situation of the control in the city (the distance between

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the city and the capital) were significantly associated with the incidence of irregularities (corruption) in these municipalities. The first two characteristics – which are related to the “size” factor – had the strongest impact on the incidence of corruption. This information is part of a profile of corruption in the cities monitored by the CGU in the state of Minas Gerais, revealing both how this phenomenon is distributed in terms of areas and which possible factors can explain the occurrence of corruption in local governments.

Keywords: Corruption, Brazil, Local Government

## 1. Introduction

This paper is based on the author's Master Thesis, which is based on the premise that studying corruption is extremely important in Brazil. In recent years, despite the fact that the Brazilian government has improved control mechanisms to prevent corruption, particularly with the creation of institutions responsible for investigation and punishment, Brazil continues to experience a series of corruption scandals (CRIP, 2010). According to Power and Taylor (2011),

*Corruption is a troubling constant in the Brazilian political system, with instances of corrupt behavior readily apparent at the federal, state, and municipal levels and across all branches of government. Although the transition to democracy in 1985 raised expectations of increased transparency and accountability, each of the five postauthoritarian presidential administrations has been sullied by accusations of corruption (...), with important consequences in terms of both the policy-making process and public views of democracy (Power and Taylor, 2011, p. 1).*

While it is difficult to measure corruption, recent research shows that corruption in Brazil can cost around 1.35% of the nation's GDP (FIESP, 2006). However, the economic costs are not the worst effect of corruption. According to the Transparency International's Corruption Perceptions Index, Brazil ranks in the eightieth position in the world in terms of perceptions of corruption. Among the countries in the Americas, it ranks in eighteen out of the thirty-two countries. Interestingly enough, international rankings of Brazilian corruption are even more optimistic than Brazilian citizens. Transparency International's Global Corruption Barometer points out that among all the nationalities represented, Brazilians were the ones with the greatest overall concern with corruption (Transparency International, 2004)<sup>3</sup>. Brazilians also lead the survey in saying

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<sup>3</sup> See Avritzer (2008) for critiques on Transparency International's Index.

that corruption affects political life “to a large extent” in their country (Power and Taylor, 2011).

Corruption is present in all spheres of public life in Brazil and the political system has not yet developed efficient mechanisms to combat it. The creation of the Office of the Comptroller General (CGU) was an attempt to start such developments in Brazil. This agency has made great efforts in fighting corruption, including at the local level. CGU’s inspections aim to stimulate both rigorous control practices and the correct application of public resources at different government levels.

Therefore, we are interested in analyzing CGU findings from the Programme of Inspections from Public Lotteries, which audits the federal funds transferred to municipalities with less than 500,000 inhabitants<sup>4</sup>. Using this data allows us to determine the incidence of corruption in local government, since CGU’s reports verify whether the actions of public officials or political actors are (or not) in accordance with the law. Any violations of public sector regulations, revealed by auditors in the course of their investigations of federal transfers to local governments, are our measure of corruption. We refer to these violations as irregularities.

The phenomenon of corruption is understood here from one of its dimensions, namely the misuse of public funds by the political system. The focus on political corruption lies on the unlawful conduct of public officials or politicians.

The aim is to investigate the phenomenon of corruption in local governments of Minas Gerais investigated by CGU between 2003 and 2009<sup>5</sup>. The proposal is to draw a profile of the general situation of these municipalities and to articulate this framework with certain political, economic and social features of the same municipalities. Our idea is to capture factors discussed by the literature that could be taken as constraints of corruption at the local level.

Our focus is on Minas Gerais because according to the literature<sup>6</sup> it is a Brazilian state where we can find deeply entrenched practices historically linked to clientelism and corruption. Moreover, the case of Minas Gerais allows us to evaluate the close relationship between incidences of corruption and development, especially when we take into consideration the least developed municipalities in terms of income,

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<sup>4</sup> Currently, 5,560 Brazilian municipalities receive on average \$35 billion per year from the federal government, which represents approximately 15 percent of federal government’s revenue. For comparison’s sake, fiscal decentralization in the world is on average 6 percent (Ferraz and Finan, 2005).

<sup>5</sup> These years were chosen because 2003 was the first year of the Programme, while 2009 was the last year with available information while the database was being worked on.

<sup>6</sup> See for example Schwartzman, 1988.

employment, health and education. Since 2002, all 81 cities with the worst levels of development in Minas Gerais – which accounts for almost 10% of its municipalities – were targets of Federal Police operations. These would include an operation to disarticulate fraud scheme in bids to buy ambulances, an operation to disrupt sentence selling schemes for the release of federal resources, and an operation to investigate irregularities in construction works carried out with resources from federal parliamentary amendments that involved 114 city governments<sup>7</sup>.

The incidence of irregularities is representative of problems in the local government in Minas Gerais because cities are randomly selected for federal audits through a public lottery.

This paper begins with a theoretical analysis of corruption, explaining some of the main approaches that deal with this phenomenon. In the following section, the paper addresses our hypothesis on the factors that can influence the incidence of corruption, based upon the literature on corruption in Brazil. Finally, we deal with the construction of our database and present the main results regarding the literature's hypotheses that seek to understand the determinants of corrupt behavior.

## **2. Theoretical approaches on corruption**

The phenomenon of corruption in the twentieth century was mainly analyzed by two approaches. The first one, stemming from studies in the 1950s and 1970s, saw corruption through a structural-functionalist perspective, relating it to the problem of modernization. The second, which dominated the literature in the 1990s, emphasizes an economic perspective and is concerned with the costs and externalities generated in context of wider corruption (Filgueiras, 2006).

The first approach, also called the modernization theory, was concerned with how corruption could contribute or muddle the economic and political development of one country. Nye (1967), for example, claims that corruption can result in aggregate gains to the system, insofar as it contributes to the formation of private capital and may help overcome bureaucratic barriers and integrate elites. Thus, corruption contributes to the development because it forces modernization.

According to Filgueiras (2008), this theory relates corruption to stages of underdevelopment and tradition. Unlike modernized countries, nations with lower levels

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<sup>7</sup>“Estado de Minas” Newspaper, 30/08/2009.

of development were unable to institutionalize procedures consistent with the distinction between public and private spheres, which ended up legitimizing corrupt practices and the private appropriation of public resources. Traditional practices clash with the existing legal rules, making the democratic principle of the rule of law ineffective (Moisés, 2009).

This approach concentrates primarily on efforts to understand how institutions can transform the consequences of corruption into a positive outcome in terms of the political order. Notwithstanding, corruption in contemporary studies is no longer regarded as something beneficial for economic and political development: *an ample consensus exists that corruption does not grease the wheels of developing economies but rather creates distortions in policy choices, worsens the investment climate, and reduces overall societal well-being* (Rose-Ackerman, 1999, p. 150).

Although we do not agree that corruption can be positive, we recognize that understanding factors related to development may help to explain the phenomenon of corruption. One of our hypotheses claims that the municipal level of development may be associated with the occurrence of corruption, without thereby postulating that corruption may be beneficial.

Despite theoretical advances brought by this approach, it is interesting to note that in the current scenario the phenomenon of corruption is also present in many developed nations. Corruption is hardly a problem concerning only developing countries or economies in transition. This perception brings institutional structures into the debate of possible explanatory mechanisms of corruption. The turning point of corruption studies is situated in the 1990s, when corruption was examined in terms of its costs to the market economy, based on assumptions of rational choice and new institutionalism.

The authors of this new approach insist that corruption would not be restrained through an increase in bureaucratic power. This would actually result in greater discretionary power and greater incentive for kickbacks and bribery. According to the authors, instead of bureaucracy, the solution is the market. This market would be an arena of constant negotiation of the interests of economic and political agents. Rose-Ackerman (1999), for example, argues that corruption is encouraged when there are market failures on the political scene. This, in turn, encourages actors to behave in a rent-seeking way: maximizing their private income, and economic well-being, while also choosing to follow or not the rules. The cause of corruption is the existence of

monopolies and privileges in the public sector, which create incentives for agents to maximize their rents through private bribery and kickbacks.

The hypothesis of this approach refers to institutional structures capable of guaranteeing civil and political rights, press freedom and competitive electoral systems. These conditions enable accountability mechanisms to be triggered effectively by voters and institutions. In the case of this paper, we tested whether or not electoral rules affect the level of corruption in municipalities. In other words, we wanted to test if the possibility of reelection makes municipal representatives more concerned with the opinions of their constituents, and therefore prevents them from engaging in corrupt schemes.

However, there are other approaches that try to expand the scope of the concept of corruption. Some studies show that the perception of corruption erodes the basic foundations of trust upon which democracy must rest (Warren, 2004). Others understand that corruption depends on normative conceptions about social and political institutions, as well as on the values that define what is the public interest (Filgueiras, 2009). For Bignotto (2006), the discomfort that dominates Brazilian society regarding the state is not limited to complaints against the inefficiency of legal mechanisms of punishment. Therefore, corruption is not limited to problems within the public machine, but it is also connected with social values. Our hypotheses in this paper do not exhaust the phenomenon of corruption, given that it is also connected with cultural practices and social values.

This literature on corruption clearly illustrates that this is a theoretical field in dispute in Political Science. There is no consensus on what precisely corruption is and how to study it. There are those who emphasize developmental or institutional aspects, rule of law and the creation of a competitive market to inhibit corruption. There are those more concerned with the concept of corruption linked to its cultural aspects. In this paper, when we discuss our hypotheses, we test the ideas linked mainly to the definition of corruption as an illegal behavior of those who have a central role in municipal administration, such as municipal public officials and mayors. However, we recognize that relying upon other approaches may be useful and contribute to the understanding of the phenomenon.

### 3. Brazilian studies on corruption

As part of a recent anti-corruption campaign, the Brazilian government began to audit the municipal expenditure of federally transferred funds. CGU has disclosed objective data on corruption involving federal resources executed by municipalities. CGU's reports were used in this paper with the intention of providing a general framework of corruption in the municipalities investigated in the state of Minas Gerais. They were also used in an attempt to find possible determinants of corrupt behavior in these municipalities. Based on the literature that has already dealt with corruption in Brazil and has already used CGU reports, we elaborated four initial groups of explanatory variables of corruption.

The first group, named *electoral circumstances*, postulates that any study on the different levels of government in Brazil must take into account the effects and incentives included in the possibility of reelection for a second term<sup>8</sup>. Some analysts are aware that this incentive changes rulers' choices – including the choice of practicing or not in a corrupt activity. Meanwhile, through the exercise of voting, the voter would reward the "good administration" to continue for another term. Thus, it is understood that reelections encourage more responsible behavior and less corruption.

Ferraz and Finan (2005) investigated the differences in behavior between mayors elected for the first and second term by using CGU reports. They concluded that mayors who are in their second and final term are significantly more corrupt than first-term mayors. In particular, second-term mayors on average divert R\$188,431.40 more than first-term mayors, which is approximately 4 percent of the total amount transferred to municipalities. In this paper we will test this hypothesis, namely: mayors in the second term (who do not rely on the possibility of reelection) tend to be more corrupt. In this case, public officials are concerned about their electoral future and therefore want to preserve their political images and their future eligibilities.

One criticism directed at Ferraz and Finan's study can be found in Leite (2010). According to Leite's critique, when the authors compare the performance of mayors in the first and second terms, they are in fact comparing municipalities with very distinct characteristics. The group of mayors in the second term dealt with lower literacy and income rates, which are two variables generally associated with higher levels of corruption. Thus, the results of greater corruption may not necessarily be the result of

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<sup>8</sup> Studies concentrating on how reelection incentives affect political corruption were only possible in Brazil after 1998, when a constitutional amendment allowed mayors to run for a second consecutive term.

reelection incentives, but due to socio-economic characteristics. In light of this critique, we introduce a second group of explanatory variables, treated as potential determinants of corruption: *municipal characteristics*.

Contemporary research views economic development as a strong predictor of corruption at the world level (Power and Gonzalez, 2003). Economists and political scientists often cite the level of economic development as an important explanatory variable. Treisman (2000) argues that economic development promotes literacy, education and the expansion of non-personalized relationships, which together increases the chances that government corruption will be recognized and addressed.

Following this tendency, Fernandes, Sousa and Ramos (2008) sought to establish relationships between socioeconomic factors and corruption in Brazilian states. They found a significant negative association between the educational level of adults and the incidence of irregularities. Thus, the higher the average years of schooling of adults, the lower the incidence of corrupt behavior. The explanation for this association is that higher levels of education reduce the informational asymmetry between citizens and their political representatives.

According to the literature that employs characteristics of the municipality as explanatory variables, the corruption of local governments varies according to literacy levels, economic development or socio-economic inequality. For example, Albuquerque and Ramos (2006) verified the influence of characteristics of the municipality in corrupt behavior, such as educational levels and its "wealth" (its GDP). Following their hypothesis, wealthier and more educated populations monitor their municipal representatives, which, in turn, would limit corruption.

Moreover, Bardhan and Mookherjee (2005), while not focusing on Brazil, suggest that the effects of decentralization – a phenomenon that occurred in Brazil after 1988 Constitution – are ambiguous and depend on the context. If different regions are heterogeneous in relation to levels of literacy, economic development and socioeconomic inequality, the association of local governments with corruption will vary among regions, leaving lagging regions worse off in terms of corruption. This context of heterogeneity exists between Minas Gerais regions, which leads us to the assumption that the less economically and socially developed regions will have higher incidences of corruption.

Zamboni Filho and Litschig (2006) deal with our third group of explanatory variables: *municipal control*. According to them, municipalities that have local

presences of the Judiciary and Public Prosecution have 15% less incidences of irregularities in the implementation of federal resources. Moreover, the presence of the media (measured as the presence of radio stations) reduces corruption. Another factor that favors corrupt actions is the distance of the municipality in relation to the state capital. When this distance increases, the auditing and sanctioning bodies are also more distant. This study shows the importance of taking into account factors that influence the incidence of corruption such as the presence of the local judiciary, the media and the municipality's distance from the capital.

Besides these authors, Bardhan (2002) argues that in democratic countries, central governments are faced with institutions that limit their opportunities for rent-seeking, such as the media and regulatory agencies, which tend to be not only less effective at the local level as well as often absent. Thus, the absence of these institutions at the local levels gives less visibility to cases of corruption, which encourages corrupt practices at this level.

The study of Ferraz and Finan (2005) also found that the reelection effect varies with the provision of information in municipalities. This means that the effects of reelection, in terms of diminishing corrupt behavior, are higher in municipalities that have the presence of local media. The presence of local radio stations reduces corruption: second-term mayors in municipalities with radio stations are less corrupt than those in municipalities without such presence.

Finally, Fernandes, Sousa and Ramos (2008) found a significant and positive association between the amount of federal transfers and the incidence of corruption. Thus, our research looks at a fourth group of variables considered as the *characteristics of federal transfers*. The idea is to explore whether or not the increase of transferred funds expands opportunities for rent-seeking. In addition to these authors, Albuquerque and Ramos (2006) also pose the hypothesis that mayors tend to divert a greater amount of resources when faced with more bulky transfers. The argument is that a greater amount of resources would increase the potential returns from the misuse of office. Thus, corruption tends to be positively correlated with the volume of resources transferred.

With these studies in mind, the objective of this paper is to, first, create a profile of corruption in Minas Gerais and then test constraints factors that may be related to this phenomenon.

## **4. The CGU and its audit reports**

### **4.1 The Programme of Inspections from Public Lotteries**

With a series of well-publicized federal corruption scandals, including the impeachment of a former president, much of our understanding of corruption and its institutional sources in Brazil, has been limited to the national scale (Ferraz and Finan, 2005). While corruption at the local level, which has increased substantially as result of the Brazil's decentralization, has received much less attention.

CGU's reports help us fill this gap and begin providing possible explanations for the incidence of corruption at the local level. Our focus is on municipalities from Minas Gerais monitored by the CGU in its Programme of Inspections from Public Lotteries, since its inception in 2003 until 2009, when the reports were available from the first until the 29<sup>th</sup> drawing. We want to create, through the audit reports, a profile of the phenomenon of corruption in these municipalities and try to highlight what some of the variables that exert some influence on this phenomenon would be.

This anti-corruption program was designed to audit the application and execution of federal funds transferred to municipalities. Every month CGU sends approximately 10 auditors<sup>9</sup> to 60 randomly-selected municipalities across the 26 states to examine the allocation of federally-transferred funds, inspect the quality and completion of public construction work, and conduct interviews with key members of civil society. The auditors search for irregularities involving the federal resources that were sent up to two years before the visit. Each visit usually lasts seven days and results in a detailed audit report documenting any irregularity associated with either the federal transfers or federally-funded social programs. Reports are subsequently sent to the federal judiciary system for potential prosecution.

Each report contains the total amount of federal funds that was transferred to the current administration and thus audited, as well as, an itemized list describing each irregularity, in what sector it occurred (health, education, etc.), and in most cases the amount of funds involved.

Reports show that municipal corruption in Brazil assumes a variety of forms. Illegal procurement practices, diversion of funds, and over-invoicing for goods and services are among the most common ways local politicians find to appropriate

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<sup>9</sup> It is important to mention that these auditors are hired based on a civil servant examination and prior to visiting the municipality, they receive extensive training on the specificities of the sampled municipality. Also, there is a supervisor for each team of auditors.

resources. While Brazilian law requires a competitive bidding process with at least three participants for any project that costs more than R\$80,000 per year, local mayors usually manipulate the public procurement process. In one municipality for example, a mayor posts calls for bids only one hour prior to its deadline, and surprisingly enough reports show that only a firm owned by the mayor's brother posted his bid within the time limit. In other procurement bids, irregularities appear because firms of family members or friends have either benefitted from insider information on the value of the project, or certain restrictions have been imposed to limit the number of potential bidders. Another common form of corruption is related to mayors diverting education and health funds towards the purchase of cars, fuel and apartments for friends and in some cases, the mayor himself is a direct beneficiary (Ferraz and Finan, 2005).

It is with these reports that we construct our indicators of political corruption<sup>10</sup>.

## 4.2 Our database

In our database we used all CGU reports that focused on the municipalities of Minas Gerais, totaling 169 municipalities<sup>11</sup>. The municipalities taken as our case studies can be seen in the map below:

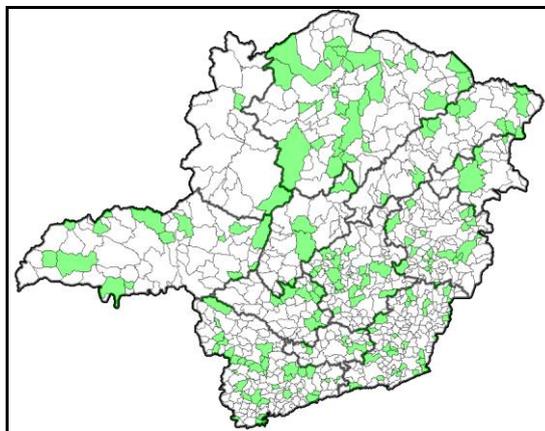


FIGURE 1 - Municipalities from Minas Gerais monitored by CGU between 2003 and 2009

We began our analysis by counting how many irregularities occurred in each municipality, taking these irregularities as proxies for corruption since they show some deviation from the law. However, as we read the reports, it became clear that these irregularities represent different "levels" of corruption. With that in mind, another

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<sup>10</sup> See Appendix I for our translation of an extract from an audit report.

<sup>11</sup> The goal of our analysis is try to expand the conclusions drawn from these cases to the state of Minas Gerais. Our reference population relates to all municipalities in Minas Gerais with less than 500,000 inhabitants that could potentially have been audited by CGU.

variable was created: whether or not there are “serious” cases of corruption. In this paper we define serious cases of corruption as those including: fraud, coercion, overbillings, high absence of documents, the process of directing bids, inquiries made by prosecutors or by the Federal Police, the annulment of mayors’ mandates and/or special processes of investigation which aim to quantify debits and identify those responsible for damages to the federal treasury.

The creation of this new variable has its own grounding in the literature that uses CGU reports. Ferraz and Finan (2005), for instance, separate irregularities that are related to corruption from others that simply expose poor administration. They defined political corruption as: 1) irregularities related to fraud in bids, 2) misuse of public funds and 3) overpricing. Zamboni Filho and Litschig (2006) point out that CGU’s reports show irregularities ranging from improper financial reporting to lack of oversight in project implementation and even the improper use to actual theft of public resources. It is important to keep in mind that when we refer to the amount of irregularities, we are dealing with a large spectrum of corruption, which can include serious cases to less severe irregularities.

Thus, these two variables – the amount of irregularities and the existence of serious corruption cases – help us start building a general framework of the phenomenon of corruption in Minas Gerais municipalities.

According to Table 1, a total of 14,860 irregularities were found, with an average of 87.93 irregularities in each municipality and a standard deviation of 38.26. The minimum of irregularities found was 7 and the maximum was 211 in a single municipality. The majority of cases are in the range between 50-150 irregularities. From this total of irregularities, 2,258 (14.4%) represent problems involving bids. In a report in the journal “Agência Brasil” (27/09/2004), it was reported that bidding processes topped fraud evidence in municipalities audited by CGU. However, in our analysis this number was not as high. Table 1 also shows that a total of 4,483 inspections were carried out with an average of 26.53 inspections in each municipality, with a standard deviation of 10.96. Most municipalities received between 10 to 40 inspections.

These irregularities coincide with the definition proposed in this paper that claims that corruption is any type of action that does not follow the law. However, as already mentioned, not all irregularities correspond to severe cases of corruption. In 104 municipalities (61.5%), we did not find serious cases of corruption referring to federal

resources transferred to them. This means that in most municipalities, the problems found refer to "lower" levels of corruption.

## **5. Corruption by thematic areas**

In order to create a profile of the incidence of irregularities in municipalities of Minas Gerais regarding the use of federal funds, we turn the focus to the governmental areas that are responsible for the implementation of federal programs in the municipalities. How is the distribution of irregularities by thematic area? To answer this question one must be aware of two factors: not all of the municipalities receive the same amount of inspections and not all areas were inspected in all municipalities. Hence, we weighted the amount of irregularities found by the number of inspections in each governmental area.

We then present a map of how corruption is distributed by governmental areas in the municipalities of Minas Gerais audited by CGU between 2003 and 2009. Table 2 shows the areas and the level of corruption (low, medium and high), taking into account the amount of irregularities encountered, which were then weighted by the number of inspections<sup>12</sup>.

This analysis of the irregularities found in each area illustrates that the areas with the highest incidence of corruption (highest absolute number of irregularities, highest average of irregularities per municipality, lower occurrence of no irregularities found) are, for the most part, precisely those areas which receive a greater number of inspections by the CGU. The exception here would be the area of Environment. From a total of 4,483 inspections, the area of Education received 16% of the inspections, Social Work received 14.5% and Health received 25.7%. Together, these three areas received 56% of CGU's inspections. According to this data, one can wrongly conclude that the high incidence of corruption would be derived from the larger amount of inspections. Although we find a statistically significant association between the number of irregularities and the number of inspections, these three areas continue to show a higher incidence of irregularities even when controlled by the amount of inspections. The health area presents the most severe situation in the case of irregularities related to corruption in Minas Gerais.

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<sup>12</sup> We divided the number of irregularities found in each governmental area by the number of inspections that the area experienced.

Irregularities in the Environment area ranged from problems in bids, absence of inspection in national parks, to problems in landfill or water supply. Few municipalities received inspections in this area, but what the numbers show is that whenever there was an inspection regarding environmental programs, we found on average four irregularities.

The other three areas (Education, Social Work and Health) are those that have more programs and activities funded by the federal government, which is largely due to the decentralization process that occurred in Brazil after 1988. This process deeply influenced these three areas of social policy (Leite, 2010). Currently, Brazilian local governments have the transference of federal resources guaranteed, regardless of their governance capacity or tax effort. The considerable decentralization effort in Brazil was based on the idea that local government can be more democratic, more participatory, more amenable to control and therefore, less corrupt. Despite this effort, examples of deviations and corruption remain<sup>13</sup>. As a result, one can say that even with decentralization, there is corruption, and, unfortunately, it occurs more in areas that are a priority if we want to overcome the social inequalities in Brazil.

## **6. Corruption incidences in Minas Gerais**

In order to understand some of the corruption constraints at the local level, it is necessary to analyze those factors that could be responsible for encouraging or restricting the decisions of municipal administrators. From the literature on corruption constraints in Brazil, we present the following general hypotheses, which were classified into four groups:

1) Electoral circumstances influence the incidence of corruption, and mayors in the first term (since they are worried about their future eligibility) are less likely to take part in corrupt practices.

2) Social, economic, educational and demographic characteristics of the municipality can influence the incidence of corruption. If the population becomes wealthier, more educated and developed, it will tend to control representatives and therefore, the incidence of corruption will be smaller.

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<sup>13</sup> Brazilian decentralization lead to perverse effects, such as fiscal irresponsibility of subnational units, the increasing volume of complaints of corruption and inefficiency in subnational spheres, the limited effectiveness of the mechanisms of social participation and limited control of public policies (Leite, 2010).

3) The presence of control institutions, such as the media, tend to decrease the incidence of corruption in municipalities. An increase in the distance from the main institutions of oversight and control, usually located in the state capital, tend to increase the incidence of corruption.

4) If more federal funds are transferred to the municipalities, the greater the incidence of corruption.

In order to obtain information on these four characteristics, we used data from the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística (IBGE)). Table 3 presents the results of the variables that were tested and whose associations with the number of irregularities were statistically significant<sup>14</sup>.

From these results, we are able to draw the first conclusion: the first hypothesis was not corroborated. This means that the possibility of reelection is not associated in municipalities of Minas Gerais with the incidence of irregularities. Thus, we conclude that electoral circumstances do not impact the occurrence of corruption in Minas Gerais. This contradicts the arguments present in the literature argument regarding the importance of reelection incentives.

On the other hand, the hypothesis referring to the second group of variables was confirmed. Firstly, the region<sup>15</sup> is associated with the occurrence of irregularities. In Minas Gerais, the less developed regions (such as the North and Jequitinhonha) tend to have more corruption, whereas more developed regions (such as the South and Central) tend to have fewer cases of corruption. This finding supports the idea that development is an important explanatory factor when analyzing corruption.

With regards to the significant correlations found between GDP per capita, uneducated people, illiteracy rate, Human Development Index, Gini Index, percentage of indigent and the amount of irregularities, we can say that these variables are also, to some extent, related with development indicators. The higher the GDP per capita, the higher the Human Development, the lower the amount of people living in extreme conditions of poverty, illiteracy and uneducated people, and the lower inequality, you will find less irregularities. Thus, these results reinforce the perception that lower levels of corruption are related to higher levels of development.

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<sup>14</sup> In order to measure the association between categorical variables (the possibility of reelection and media presence) we used the chi-square test between them and the variable "number of irregularities" categorized (degree of incidence of irregularities: very high, high, medium, low, very low).

<sup>15</sup> Minas Gerais is divided into 12 regions: Central, Zona da Mata, Vale do Jequitinhonha, Vale do Mucuri, Vale do Rio Doce, Triangulo Mineiro, Campo das Vertentes, Norte, Noroeste, Sul, Alto Paranaíba, Centro-Oeste.

When considering the third group of hypotheses, there was no association found between the presence of the media (local newspapers and radio) and the incidence of corruption. This contradicts the current literature. A possible explanation for this is the fact that local media is usually controlled by the powerful groups in municipalities. If the local media is censored, its ability to function as a control on corruption is diminished.

However, the distance from the capital proved itself relevant. In other words, the proximity of the central institutions of control affects the incidence of irregularities. The greater the distance from the center or capital, the lesser influence of the control and regulatory units. This distance could encourage municipal officers to act corruptly because they are not afraid of being caught.

Finally, as more resources are transferred to local governments, political actors may think that deviations "will not be perceived", which may lead us to find more irregularities. If the city government has access to fewer resources, any diversion of funds could be perceived by the public or even by oversight bodies. However, when the amount of transferred funds is greater, the easier it is to deviate such funds without attracting much attention.

It was shown that (1) municipal characteristics, (such as the population size, the Human Development Index, the Gini Index, the level of income and education, the amount of indigents and the region), (2) the characteristic of transfers (the amount of resources transferred by the federal government), and (3) the control situation at the municipality (the distance from the state capital) were significantly associated with the incidence of irregularities in the studied municipalities. Contrary to the literature, the presence of local media and the possibility of reelection are not associated with corruption incidence in Minas Gerais.

The intention of these findings was to capture the extent to which these variables impact the incidence of irregularities through a regression analysis. However, before analyzing the data through this type of analysis, it is important to recognize that many of these variables are measuring the same dimension of the problem. For example, the illiteracy rate and the Human Development Index are highly correlated. In order to solve this problem and summarize the data, we conducted a factorial analysis with principal components extraction as a means of establishing whether there was a pattern in the relationship between these variables. The goal of this technique is to establish the

dimensionality of data by finding which variables are highly correlated and group them into a single factor. The results of this test are shown in Table 4.

The model of this factor analysis included variables that were statistically associated with the incidence of irregularities. With an explanatory power accounting for 83% of the variance, the resulting matrix highlighted four latent factors<sup>16</sup>. The first factor was formed by the Human Development Index, the number of indigents and the illiteracy rate (with weights above 0.9). We understood this first factor as being related to characteristics of the human development level of the municipalities. The second factor grouped different variables, such as the amount of uneducated people, the size of the population, and the amount transferred to municipalities (all with a weight greater than 0.9). It is worth mentioning that one variable concerning education appeared in the same factor as the amount of resources monitored and the size of the population. In our opinion, it would make more sense if the educational variables were all in the same factor, however this did not occur. This is the reason why we prefer to talk about “human development” and “size” as the more important characteristics of each factor. These two factors were the most significant (greater variance explained: 30.5% and 27.5% respectively). The third factor aggregated geographical variables: region and distance from the capital. Finally, the last factor was formed by the economic characteristics: municipal wealth (GDP per capita) and the degree of inequality (Gini coefficient). The percentage of variance explained by factors 3 and 4 remained around 12%.

We collected information about the 169 municipalities of Minas Gerais, bearing in mind the four groups of hypotheses presented previously. Some of them were confirmed, while others were dismissed. However, after the factorial analysis, the variables statistically associated with the occurrence of irregularities were aggregated into four new factors. These factors point out that municipal characteristics, included in our second group of hypotheses, should be divided into at least two different factors: human and economic development. Secondly, the geography of Minas Gerais should be considered as a separate factor – region and distance from the capital. Finally, we have a factor that combines schooling, population size and amount of resources monitored. We refer to this last one as the “size” factor.

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<sup>16</sup> KMO test scored 0.657, which allows us to conclude that the factor analysis is appropriate. Additionally, Bartlett's test of sphericity was statistically significant, allowing us to conclude that the variables are correlated and can be grouped into factors.

From this information, we now turn to the question of what is the impact of each factor on the incidence of irregularities in municipalities of Minas Gerais. In order to answer this question, we conducted a multiple linear regression analysis using the OLS model. The amount of irregularities is our dependent variable and one variable from each of the four factors became our independent variables<sup>17</sup>.

In the first regression model, presented in Table 5, the illiteracy rate, the amount of resources audited, the distance from the capital and the GDP per capita were selected as our explanatory variables. With an  $R^2$  of 0.128, this model tells us that all these variables impact the incidence of irregularities in the direction expected by the literature. With at least 90% confidence<sup>18</sup>, it is possible to say that an increase of one real<sup>19</sup> in GDP per capita has a negative, but small impact (approximately 0.000034) on the number of irregularities. What this entails is that the richer the municipality, the lower the level of corruption. An increase of 1 km in the distance from the capital, *ceteris paribus*, increases the incidence of irregularities by 0.41. This shows that we should consider the geography as a relevant factor, since increasing the distance from the state capital increases the incidence of corruption.

In addition, a 1% increase in the illiteracy rate increases by 0.5 the occurrence of irregularities. Considering the relevance of education and its signs, this means that the decrease in the illiteracy rate (meaning an increase in the years of education of the adult population) acts as a deterrent to corruption, when other variables are held constant. This led us to accept the null hypothesis that education reduces corruption, as was found for example in Albuquerque and Ramos (2006). These authors suggest that the higher the education, the lower the asymmetry of information between the population and the public agents.

Moreover, the total amount of transferred funds has a positive and significant relation to corruption. This means that, *ceteris paribus*, for larger amounts of federal transfers to municipalities, a higher number of irregularities is expected. We found that with an increase in one thousand reais (490 dollars), the amount of resources audited

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<sup>17</sup> In the “Human Development” factor, we chose the illiteracy rate, while in the geographical factor, we chose the distance from the capital. In the economic factor we chose the GDP per capita and in the “size” factor we could not make a specific claim about which variable we should choose. Hence, we tested two regression models, one including the size of population and the other including the amount of resources. We did not want to run a third regression with the percentage of uneducated people because we have already included an educational variable (the illiteracy rate).

<sup>18</sup> Since we are dealing with a relatively small number of cases (169), we think that a significance level of 0.1 is acceptable.

<sup>19</sup> Real is the Brazilian currency. It corresponds to approximately 0.49 dollars.

would enhance by 8 the number of irregularities. This last variable is the one with the greatest impact on the incidence of irregularities (with a standardized beta of 0.2).

In the second model, we switched the amount of resources audited to include in the model the size of the population (both variables are located within the same dimension, according to the factorial analysis). We now have a model with explanatory power around 0.137 and whereupon all variables have an impact on the occurrence of irregularities in the directions expected by the literature. Furthermore, in this model we can affirm with more confidence that the distance of the capital and the illiteracy rate have an impact on the incidence of irregularities (with a significance level of 0.05%). However, in order to defend that the GDP has an impact, we still would have to accept a significance level of 0.1. Again, the impact of the increase in the GDP per capita has a negative effect on the irregularities. This means that the richer the population, the fewer irregularities one will find, but this is still a small impact. Moreover, maintaining everything else constant, yet increasing the distance from the capital by 1 Km, one increases irregularities in 0.45. By increasing 1% in the illiteracy rate, the irregularities increase by 0.62. The population size and the amount of irregularities are positively related: if you increase the population by 1,000 people, there is an approximate increase of 0.1 in the incidence of irregularities. Also in this case, the variable that has the strongest impact is the “size” factor (the size of the population, with a standardized beta of 0.236).

Thereby, we conclude that the four factors impact corruption municipalities of Minas Gerais. Lack of education positively impacts corruption: the more illiterate the population is, the greater the incidence of corrupt behaviors. Wealth negatively impacts corruption: if the municipality has a higher GDP per capita, one will find lower levels of corruption. If the distance from the capital increases, a characteristic associated with both geography and control, there is also the possibility of greater incidence of corruption. Finally, an increase in the size of the population and in the amount of resources audited increases the incidence of irregularities. These data corroborate theories concerned with the impact of development in corrupt behavior. On the other hand, it is worth mentioning that these factors do not have the same impact. We demonstrated that the “size” factor – size of population or resources audited – has the strongest impact.

We decided to only include in the regression models the variables that previously were correlated with our dependent variable (number of irregularities).

However, since the literature on corruption in Brazilian municipalities places great emphasis on the role of reelection as a factor that impacts corruption, we included the variable “possibility of reelection” as an explanatory variable in both models. Nevertheless, it was not statistically significant nor did it change the values of the previous independent variables. We can affirm that at least in Minas Gerais, the fact of being in the first or second term did not affect the incidence of irregularities, contrary to what the literature defends.

It is also important to note that the coefficient of determination ( $R^2$ ) of both models is very low. This means that our models are not explaining the full variation in the incidence of irregularities. This may indicate a problem of omitted variables bias. We tried to be parsimonious by not including all the initial variables and therefore opted to include in our models only one variable from each factor. However, it should be noted that there may be other variables that help us explain the incidence of irregularities.

Furthermore, as we said previously, our measure of corruption (amount of irregularities) refers to lower levels of corruption. This means that we are not specifically analyzing the serious cases of corruption. What we are measuring with the amount of irregularities can also be understood from the perspective of “lack of capacity”. Some irregularities found show that municipal administrators and mayors may not have the capacity to govern, as they may get lost in their bureaucratic work. The amount of rules and laws that they have to deal with can immobilize them, and, in order to get things done, they override certain rules. We should make an effort to study serious cases of corruption deeply and to separate them from the daily formal wrongdoings<sup>20</sup>.

Nevertheless, our results serve to draw an initial profile of the phenomenon of corruption. Corruption cases are understood as the misuse of public funds, and range from small problems, related to the lack of capacity, to serious cases.

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<sup>20</sup> Our next step in this research is to understand whether the occurrences of serious cases of corruption are determined by the same variables as the ones related to the amount of irregularities. Initial attempts to deal with the occurrence of serious cases of corruption as our dependent variable led to some striking conclusions. For example, when analyzing our four explanatory factors, the only variable statistically significant was the “size” (size of population or the amount of resources audited). This can mean that serious cases of corruption may not be explained by developmental issues, and may be more related to the “size” hypothesis: the bigger the population or the bigger the amount audited, the greater the incidence of corruption.

## 8. Conclusion

Our starting point is that we should try to understand corruption in order to help the construction of mechanisms that prevent such behavior. We conclude that the governmental areas in worse situation in relation to corruption are: Health, Environment, Social Work and Education. Furthermore, we show – by using correlation and regression analyzes – that corruption is associated with development indicators. Understanding this may constitute another incentive for the promotion of economic, educational and social aspects throughout the state of Minas Gerais, mainly in regions with poorer performance in relation to these indicators, such as the North and Jequitinhonha-Mucuri. In addition, it is also important to state here that corruption, though a little more concentrated in such regions (less developed), covers the state of Minas Gerais as a whole. All regions present some kind of irregularities or serious cases.

Using the information contained in CGU's audit reports as a measure of corruption, the focus was on the relation between corruption and political and socioeconomic factors. Our empirical results, however, do not corroborate all of the assumptions previously made. Reelection and the presence of the media were not associated in Minas Gerais with the occurrence of corruption. Contrary to previous papers that presented reelection and media effects on corruption, we demonstrated that in the case of Minas Gerais, this does not follow. As Leite (2010) has already pointed out, developmental aspects, such as economy and education, are the factors responsible for the incidence of corruption cases.

Nonetheless, development was not the only predictor of corruption. The distance from the capital is important and we can think of it as a control constraint in the corrupt behavior of municipal officials. Geographically speaking, the further away from the control center – usually localized in the state capital – the higher the incidence of corruption. Yet more important than the developmental and geographical aspects, is the size factor. Larger populations and larger amounts of resources are associated with a larger incidence of corruption. This means that larger populations and transfers produce more opportunities for corruption.

Understanding corruption helps us to think about how we can build a stronger sense of public interest in Brazilian local governments, which are marked by political standards of clientelism and patrimonialism. The fact that corruption is widespread in

local governments also helps us to relativize the myth that the local level is particularly virtuous, where citizens participate more actively and resources are better managed. The many examples described herein offer a less optimistic scenario: the local level can be virtuous, but this may not necessarily be the case.

This findings presented here, by using data from the CGU to address the phenomenon of corruption, understands corruption to be those illegal practices carried out by local political agents. However, it is also important to recognize that the phenomenon of corruption is not completely explained by this approach. We could also look at corruption in a broader way, taking it as actions that go against the public interest. Thus, the relations between the variables listed here are not exhaustive: we were able to build a profile only about what can be achieved by analyzing the reports of CGU. Furthermore, in future work with reports from CGU, our suggestion is to separate the different types of irregularities and begin deeply analyzing serious cases of corruption. It may be worth examining if, for example, the many irregularities found in the municipalities are more related to a lack of management capacity on the part of the municipal administration than corruption itself.

Finally, even though we recognize the limitations of the analysis presented here, we hope that this paper may enlighten some major and salient aspects of the phenomenon of corruption. We expect that this paper will lead to the construction of more and better mechanisms that will actually tackle this kind of practice in our state and in our country. We believe that the more we know about corruption, the more likely that it will no longer be naturalized as an irredeemable Brazilian “evil”.

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## **9 Appendix I: An Example of audit report**

### **National program for agricultural development**

**Activity:** Financial assistance for municipal infrastructure and public service projects.

**Objective:** Financial support to municipal governments with a view to implement, modernize, amplify, rationalize and reallocate infrastructure related to small scale agricultural development.

**Inspection orders:** 149529 and 149532

**Objects inspected:** Rural electrification, sewage and transportation systems

**Local executing agent:** government executive branch

**Type of transfer:** Contract n° 105034-13.

**Resources transferred:** R\$ 163.127,92

**Scope of inspection:** Total amount

### **3.1) Irregularity in procurement related to the electrification project**

#### **Fact:**

Out of three firms that participated in the bidding, two of them were represented by the same engineer who also wrote the project specifications. This is contrary to art. 9, of law n° 8.666/93 .which prohibits the participation of the author of the project in the bidding- and reduces effective competition, which is contrary to § 1.o, art. 3º, of the same law.

**Evidence:** Analysis of related procurement documentation.

**Mayor´s justification:** No comment.

**Auditors´ conclusion:** Irregularity maintained.

## 10. Appendix II: Tables

Table 1: Summary Statistics of irregularities and inspections, MG, 2003-2009

	Irregularities	Irregularities in bids	Inspections
Mean	87.93	13.36	26.53
Standard Deviation	38.26	13.84	10.96
Minimum	7	0	6
Maximum	211	83	84
Total	14860	2258	4483

Table 2: Incidence of corruption in governmental areas, based on the amount of irregularities per inspection, MG, 2003-2009

Incidence of Corruption	Governmental areas	Irregularities per inspection
High	Health	5,7
	Social Work	4,4
	Environment	4,1
	Education	2,97
Median	National Integration	2,9
	Sports	2,6
Low	Culture	2,27
	Development, Industry and Foreign Trade	2,0
	Cities	1,99
	Economy	1,7
	Tourism	1,57
	Agrarian Development	1,37
	Social Security	1,1
	Energy	1,1
	Labor and Employment	0,9
	Agriculture, Livestock and Supply	0,85
Communication	0,6	

Table 3: Statistically significant associations, MG, 2003-2009

	Variable	Significance level	Pearson Coefficient
Statistically significant correlations – with the amount of irregularities	GDP per capita	0.10	-0.14
	Uneducated or less than 1 year of study	0.01	0.25
	Illiteracy rate	0.01	0.24
	Size of population	0.01	0.23
	Human Development Index	0.05	-0.19
	Gini Index	0.01	0.19
	Percentage of indigents	0.01	0.22
	Capital distance	0.01	0.21
	Amount of resources audited	0.05	0.17
Statistically significant association – with the degree of irregularities incidence	Region	0.01	Not applicable

Table 4: Principal Component Factor Analysis, MG, 2003-2009

	Factors			
	1	2	3	4
Illiteracy rate	<b>,956</b>	-,092	,104	,103
Percentage of indigents	<b>,941</b>	-,011	-,034	,161
Human Development Index	<b>-,940</b>	,176	,041	-,095
Uneducated or less than 1 year of study	,006	<b>,961</b>	-,040	,069
Size of population	-,201	<b>,935</b>	-,121	-,001
Amount of resources audited	-,058	<b>,903</b>	-,030	-,017
Region	-,138	-,201	<b>,825</b>	,038
Capital distance	,521	,059	<b>,672</b>	-,107
Gini Index	,102	,167	,230	<b>,803</b>
GDP per capita	-,159	,130	,307	<b>-,737</b>

Note:

- Principal Component Factors Analysis (PCR) with Varimax Rotation and Kaiser normalization. Variables with factors higher than 0.6 are highlighted.

Table 5: Coefficients and estimated standard errors, ordinary least squares models (OLS) for the dependent variable number of irregularities, MG, 2003-2009

Dependent Variable: Number of irregularities			Standardized Coefficients	R-squared
1	Constant	64.237*** (7.218)		0.128
	GDP per capita	-.00003* (.000)	-.138	
	Capital distance	.041* (.023)	.158	
	Illiteracy rate	.533* (.302)	.160	
	Amount of resources audited	.0008*** (.000)	.206	
2	Constant	59.541*** (7.614)		0.137
	GDP per capita	-.0003* (.000)	-.142	
	Capital distance	.045** (.023)	.174	
	Illiteracy rate	.626** (.305)	.188	
	Size of population	.0002*** (.000)	.236	

Notes:

- Robust standard errors are in brackets.
- \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%
- Observations: 169