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GROWTH ACCELERATION PROGRAM (PAC): A DESCRIPTIVE STUDY OF ACTIVE AND PASSIVE WASTE

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ABSTRACT

In 2007, the Brazilian government implemented the Growth Acceleration of Program (PAC), with the objective of encouraging Brazil's economic growth, with investments in the areas of sanitation, housing, transportation, energy and water resources. This program, in its first phase (2007-2010), contributed in a decisive way to the increase in the supply of jobs and in the generation of income in Brazil. However, according to "Instituto Trata Brasil" 86% of the sanitary sewage works from the PAC were paralyzed, or delayed or not started until December 2012. Also, in 2008 and 2009, through the special edition of the Inspection Program by Public Sweepstakes, the Federal Comptroller General's Office found several irregularities in 110 Brazilian municipalities covered with PAC funds. In this context, the objective of the study was to analyze the irregularities verified by the CGU, in the application of the federal resources destined to the sanitation and housing areas of the Brazilian municipalities through the first stage of the PAC. The main source of data for the survey were CGU's reports from the PAC and Census 2000 data, made available by IBGE. The techniques of Content analysis were used to classify the irregularities, verified by the CGU, in active waste (corruption) and passive (mismanagement). The Descriptive statistics were used to analyze the profile of irregularities and the municipalities audited. It was observed that the most frequent wastes in the municipalities audited are those classified as Overbilling and Fraudulent Bidding (classified as active waste); and “Bad Administration” and “Irregular Bidding”, in the form of passive waste.

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1 INTRODUCTION

The process of evaluating the execution of Government Programs is relevant to verify the achievement of objectives and the adequacy of federal resources management. This type of evaluation is the responsibility of the Brazilian government Federal Department of Internal Control (SFC, in the Portuguese abbreviation), responsible for overseeing and evaluating "the execution of government programs, conducting audits and evaluating results from federal public administrators management, investigating complaints and representations, exercising control of credit operations and also carrying out activities in support of external control" [Comptroller General of the Union's Office (Portuguese: Controladoria-Geral da União, abbreviated CGU)], 2017a).

SFC has the administrative structure of CGU regional units to carry out internal control activities throughout the country. The focus of the SFC auditors' work is to improve the management and execution of public policies aiming at improving the provision of public services as well as the defense of government property and the increase of management transparency. During audit work, the main procedures are the analysis of accounts and documents, personal and physical inspection of works and services in progress and, in situations that the auditors consider relevant, contact with the population occurs directly or through community councils and other organized entities. These procedures make it possible to collect evidence on the legality and to evaluate results from the execution of Government Programs(CGU, 2017a).

In order to give transparency and publicity to results from its audit work, CGU discloses this evidence through auditing and supervision reports. Inspection reports from the Public Sweepstakes Inspection Program (PFSP, in the Portuguese abbreviation) present an evaluation of the effective application of federal public resources destined to fulfillment of the purpose in the governmental action(CGU, 2017a). This type of report contains useful evidence to establish a diagnosis of the irregularities found by the CGU in the processing of resources intended to comply with governmental policies through Government Programs.

These evidences of legal nonconformity are used in this study to identify indicators of corruption and inadequate management of federal resources applied in municipalities via Brazilian government Growth Acceleration Program (PAC, in the Portuguese abbreviation), a program for which, upon recommendation by the Brazilian Presidency of the Republic, a special edition of the PFSP was carried out in order to follow up the regularity in the use of its resources and thus avoid diversions that could compromise the effectiveness of its actions (CGU, 2009). Thus, the objective of this study is to analyze irregularities verified by the Comptroller General of the Union's Office in the application of federal resources destined to sanitation and housing areas in Brazilian municipalities through the first stage of the Growth Acceleration Program..

Surveying the irregularities profile can contribute to identification and improvement of indicators relevant to PAC performance evaluation and observation of trends of indicators of active or passive waste in the use of resources destined to the program. In addition, the study can contribute to analyzing results from indicators of active or passive waste according to geographic and populational characteristics of municipalities audited by CGU. This analysis of the indicators, considering the municipalities' geographic and populational characteristics, may suggest probable assumptions to be explored in future research.

This type of analysis is relevant due to PAC's social importance and the volume of resources invested in such program. In PAC's first phase, investments represented approximately BRL 619 billion until December 31, 2010, according to PAC's 11th Complete Debriefing (2007-2010) (Brazilian government Ministry of Planning, Budget and Management [MPOG], 2010). In addition, according to a study from Brazilian institute Instituto Trata Brasil (ITB), by 2012, only 14% of the total of 138 works in the area of sanitation related to the PAC, that is, 114 PAC1 works and 26 PAC2 works, were completed. Thus, until December 2012, 86% of the sewage works were paralyzed, delayed or not yet started.

The ITB study concluded that the works delays are due to deficiencies in the quality of the projects originally sent to the federal government, problems in biddings, bureaucracy in transfer of resources, slowness in environmental licensing process, lack of coordination among the actions of federal, state and municipal levels in scheduling and focus on the execution of larger projects, among other aspects (ITB, 2013). Furthermore, based on the latest ITB survey in 2015, this situation has persisted in recent years, considering that by 2015 only 32% of PAC's sewage works were completed (ITB,2016).

The scenario mentioned indicates possible problems of mismanagement and legal nonconformity in the application of PAC's federal resources in the second case, especially when it suggests the presence of problems in bidding. Therefore, understanding the mechanisms of fraud and, consequently, the types of waste that may have occurred in PAC's management, can help in understanding the mode of operation of corrupt people at the municipal level. Thus, it is expected, with the study results, that there is a contribution to the improvement of possible indicators to be used in Government Programs execution evaluation.

This paper has five more sections, besides this introduction. The following sections present a brief history of PAC and a review of the literature on the topic proposed. The fourth one covers the methodological procedures performed in the study to meet the objectives proposed. The fifth one describes the results found. Finally, the sixth section presents the conclusions obtained based on this research results.

2 THE GROWTH ACCELERATION PROGRAM – PAC

The Growth Acceleration Program (PAC, in the Portuguese abbreviation), an initiative from the Brazilian federal government, has been launched in 2007 with the purpose of encouraging Brazil's economic growth, with investments in the areas of sanitation, housing, transport, energy and water resources. Through PAC, the government's main objective was to increase investments in infrastructure to eliminate the main bottlenecks that limit economic growth and to increase corporate productivity in addition to stimulating private investment growth and reducing regional inequalities. PAC's federal resources have generally been transferred to federal, state and municipal agencies or legally qualified entities to be applied in specific projects in the municipality and to meet certain public policies (MPOG, 2017).

According to MPOG (2017), developed as a strategic plan to resume planning and investments in the country's structural sectors, PAC, in its first phase, has decisively contributed to increasing the supply of jobs and income generation and increased public and private investment in fundamental works. According to MPOG's data, in its early years (2007-2010), PAC[1] has contributed to increase Brazilian public investments, the GDP (which was 1.62% in 2006 went to 3.27% in 2010) and for the generation of new jobs (8.2 million jobs were created during its implementation period). For the Brazilian Ministry of Planning, PAC was important for the country during the severe global financial crisis between 2008 and 2009, since it guaranteed employment and income to Brazilians. Therefore, it has contributed to the continued consumption of goods and services. It kept the economy active and reduced the effects of that crisis on domestic companies.

Also, according to the PAC's first stage 11th Complete Debriefing (2007-2010), released in December 2010, the program has initially foreseen investments in the amount of BRL 657.4 billion for the 2007 to 2010 period . By October 2010, BRL 559.6 billion were invested, 85.1% of the total estimated. In the areas of housing and basic sanitation, around BRL 215.6 and BRL 40 billion were destined to be invested in such areas, respectively (MPOG, 2010).

3 PREVIOUS STUDIES

There are studies that have used indicators of corruption and mismanagement to analyze public resources inadequate management both in the international context and in the Brazilian context. For example, international literature presents studies by Hart, Shleifer and Vishny (1997), Di Tella and Schargrodsky (2003) and Bandiera, Prat and Valletti (2009). At the national level, studies carried out by Mendes (2004), Ferraz, Finan and Moreira (2008), Vieira

(2011), Dias, Matias-Pereira, Farias and Pamplona (2013), Marin, Gama and Campelo (2014) and Caldas, Costa and Pagliarussi (2016).

Within the international literature, Hart *et al*. (1997) have investigated when it would be beneficial for the government itself to provide prison service or choose to outsource through private institutions in the context of the United States. The authors have developed a mathematical model to analyze the relationship between cost versus benefit of providing directly or outsourcing prison services. This model has considered the existence of corrupt managers in this type of decision. In relation to public managers' corrupt behaviors, the authors argued that in situations where the problems of favoring private companies in public contracts are greater than the problems of sponsoring interest groups (providing jobs to workers who have supported the politician in elections) the provision of service by the government itself is more indicated. Public service privatization, on the other hand, is more appropriate when problems of sponsoring interest groups are greater than the problems of favoring private companies in public procurement.

Di Tella and Schargrodsky (2003) have developed a study having as its object of research the sectors of purchases in public hospitals in the city of Buenos Aires, Argentina, during 1996 and 1997. The objective of the research was to investigate the relationship between prices paid for basic hospital supplies, the salaries paid to employees responsible for purchasing such inputs and the implementation of a policy by the local government to combat corruption in said sector. The survey results pointed to a reduction of approximately 10% in the prices paid for inputs due to the repression of corruption, which occurred through hospital audits. In addition, regarding the relationship between prices paid for inputs and the hospital purchasing officials' salaries, the authors concluded that it is necessary to jointly implement a policy aimed at improving these employees' salaries and intensifying audits in order to improve procurement efficiency in this sector.

Also, in the international context, Bandiera *et al.* (2009) have developed a theoretical framework to study the characteristics of unnecessary expenses that occur in public resources administration in Italy. The authors have classified these expenditures into two categories: active waste and passive waste. The first one, active waste, also called corruption, occurs when public agents obtain direct or indirect benefits for themselves, causing damages to the public entity. As for the second category, called passive waste or inefficiency, public agents do not obtain direct or indirect advantages for themselves. Such waste comes from a number of factors, such as: over-regulation in the public sector and lack of competent public officials who should be encouraged to minimize procurement costs incurred by public administration.

After the construction of the theoretical framework on active and passive waste, Bandiera *et al.* (2009) have empirically verified whether these wastes are determinants of the cost of products bought by Italian public bodies. To do so, the authors analyzed 21 items purchased by 447 employees responsible for the purchasing sector in several Italian public agencies in the 2000-2005 period. Using statistical techniques, Bandiera *et al*. (2009) have developed a mathematical model to analyze the impact of the two forms of waste on the price of the products acquired. It was found that, from of the total of active and passive waste that occurred in the purchase of goods carried out by Italian public bodies, on average, 83% of the expendable expenditures occurred due to passive waste (public management inefficiency). In this regard, the authors clarify that this result does not indicate that corruption is not an important issue in the administration of public resources. The aim, according to them, is to highlight a type of waste that receives little attention from public agencies and that often occurs in the management of these resources, causing damage to the public sector.

In Brazil, a study by Mendes (2004) had the objective of analyzing the profile of irregularities present in the municipal management of the Fund for Maintenance and Development of Elementary Education and Valorization of Education Professionals (FUNDEB, in the Portuguese abbreviation, formerly FUNDEF). In order to do so, the author used the findings present in reports from the 1st to the 9th sweepstakes of CGU's Public Sweepstakes Inspection Program (PFSP, in the Portuguese abbreviation) related to 67 municipalities that were granted funds from FUNDEB. The research results showed that 18 types of irregularities occurred in FUNDEB's municipal management. The most common are the following irregularities: Ineffectiveness at FUNDEB's social monitoring and control council (73%),

diversions of resources from FUNDEB's 40% share (63%), diversion from purpose for expenditure not characterized as regular education (60%), low quality of managerial control (52%) and evidence of fraud in bidding processes (43%).

Ferraz *et al*. (2008) have analyzed effects of corruption and mismanagement on education spending on the performance of elementary school students. The main sources of data that the authors used were results from Brazilian government so-called Brazil Test from 2005 and audit reports from PFSP regarding sweepstakes 2 to 16[2]. The first source of data was used as a proxy for the students' cognitive abilities, while the second one was used to construct indicators of corruption and mismanagement by classifying findings present in the audit reports in one of the 20 categories preestablished by the authors. In order to achieve the objective proposed, the authors developed a model of educational production function incorporating effects of corruption and mismanagement. It was found that, controlled by other characteristics, corruption significantly reduces students' performance in the Brazil Test and negatively affects other school indicators, such as the students' passing rate and the dropout rate.

Vieira (2011) has analyzed in a study the characteristics of improbity (corruption) in municipal public administration and has investigated the possible causes and effects of this improbity. To identify misconduct in municipal public management, the authors classified the findings present in the audit reports from the 20th to 30th PFSP sweepstakes in: information and comments, formal failures, average failures and serious failures. Having done that and based on the main hypotheses described in the literature and using some statistical tests, the author has empirically analyzed corruption causes and effects in the public sector. The main results showed that the degree of irregularity significantly differs among political and administrative areas of the country and that corruption is negatively associated with the municipalities' socioeconomic development and with institutional capacities to control opportunism.

Dias *et al*. (2013), based on the theoretical framework on active and passive waste presented in a study by Bandiera *et al.* (2009) and in the variables used in a research by Ferraz *et al.* (2008), have developed a study to identify factors of active waste (corruption) and passive waste (inefficiency) related to irregularities that occurred in health expenditures from transfers from the federal government to Brazilian municipalities. Therefore, findings present in the PFSP audit reports, derived from the 31st and 32nd sweepstakes, were classified as active or passive waste. The authors have used the same variables used in the study by Ferraz *et al.* (2008) to identify active and passive waste in CGU's audit reports. By means of the factorial analysis multivariate statistical technique, three passive waste factors were identified, statically associated with irregularities that occurred in health spending in the municipalities audited. These are: Administrative inadequacy, poor supervision and low compliance. As for active waste, it was not possible to present a factor representing it, since the research data did not present adequate levels of significance. Moreover, the study pointed to the need for greater concern on the part of the responsible bodies, the academy and the population for passive waste that, as well as active waste, significantly affects the quality of the services rendered. In addition, the authors have highlighted the urgent need to "implement governance mechanisms in the public sector, which could reduce active and passive waste" (Dias *et al*., 2013, p. 206).

Marin *et al.* (2014) have investigated the types of active and passive waste that occurred in the application of federal resources destined to the municipalities of the Brazilian State of Pará for the development of programs and actions coordinated by the Ministry of Cities. The authors used 21 categories, the same ones used in the study by Dias *et al*. (2013), with the inclusion of the variable "Lack of Advertising" to classify the findings present in the audit reports from the PSFP into active and passive waste. The universe of analysis of the research was 23 audit reports carried out in the municipalities of Pará from 2003 to 2013, which involved the 4th to 38th sweepstakes. By means of the content analysis technique and the percentage quantification of the irregularities present in the audit reports, the authors have verified that the two types of waste are present in the sample analyzed. The most frequent ones are: resource diversion (19%), classified as active waste, and irregular bidding (38%) and lack of advertising (31%), classified as passive waste.

Finally, the study by Caldas *et al.* (2016) has aimed to investigate the relationship between corruption and the composition of government spending in Brazilian municipalities. The

main sources of data used by the authors were the audit reports of the CGU's Public Sweepstakes Inspection Program 20th to 30th sweepstakes, transfers from the federal government resources available in the federal government Transparency Portal and the municipalities' expenditures accounting data obtained on the website of the Brazilian Department of National Treasury (FINBRA, Portuguese abbreviation for Brazil Finances). The first data source was used to develop corruption measures. For this, the authors used only the findings classified by CGU's auditors into average failures and severe failures. As for the second and third data sources, they have been employed to describe the composition of the federal government transfers to municipalities and municipal expenditures. It has been verified, by means of multiple regression econometric models, that there is an association between the occurrence of corruption and expenditures with social assistance, education, health and other functions. In the case of education and health expenditures, the authors point out that this relationship was significantly positive. They indicate that higher levels of corruption in municipalities cause higher spending on education and health.

4 METHODOLOGICAL PROCEDURES

4.1 Description of the data source

The main source of the research data was in the reports of the CGU's auditors from the special edition of the Public Sweepstakes Inspection Program (PFSP). In this edition, which was released in 2008 and 2009, the selected municipalities were inspected exclusively for the application of resources from the Growth Acceleration Program (PAC), involving the sanitation and housing areas. Two sweepstakes were carried out selecting municipalities with up to 500 thousand inhabitants, except the capitals, 50 municipalities in 2008 and 60 municipalities in 2009, equivalent to 110 municipalities. The analysis universe of this research consisted of 108 of these municipalities drawn and audited, because two reports were not available in the CGU system (CGU, 2017b).

Another source of data used was the 2000 Census developed by the Brazilian Institute of Geography and Statistics (IBGE, in the Portuguese abbreviation). Census 2000 data were used to identify the socioeconomic and geographical profiles of the municipalities analyzed and thus complement the information contained in the audit reports. These data allowed a detailed descriptive analysis of the results obtained in the audit reports content analysis with the socioeconomic and geographical profiles of sampled municipalities. The descriptive analysis made it possible to relate the indicators of active and passive waste obtained in the content analysis with the municipalities' context at the time they were audited by the CGU.

It is noteworthy that the inspection reports were chosen because they allowed to collect information regarding the application of PAC's federal public resources in the Brazilian municipalities, since the audits were carried out based on an on-site visit. These visits have as their goals the examination of accounts and documents to carry out personal and physical inspection of the works and services in progress, besides collecting information from the population by means of interviews and questionnaires. Consequently, the inspection reports include information concerning the number of inspections carried out and the amount of funds invested, as well as indicating the irregularities contained in the works. Thus, based on this information, it was possible to survey the active and passive waste that occurred in PAC's works in the areas of sanitation and housing.

4.2 Content analysis

Interpretation of the GCU audit reports content was based on the content analysis technique. The main method of analysis was the categorial one. It clarifies that, according to Bardin (1977, p. 27), the content analysis "is a set of techniques of communications analysis" and the categorial analysis method consists of a classification process.

In order to apply the categorization method, variables mentioned in studies by Ferraz *et al.* (2008), Dias *et al.* (2013) and Marin *et al.* (2014) were considered. This study was based on 21 types of irregularities grouped in the active and passive waste categories to develop the

content analysis using the categorization method. Table 1 describes the variables used to classify the (active or passive) types of waste:

Table 1
Category of active and passive waste

Active waste	
Constructs	**Description**
Overbilling	It occurs when prices paid are above market prices or when the quantity purchased far exceeds the municipality's needs.
Bidding with resource diversion	It occurs when there is evidence that the service tendered and paid was not provided.
Resource diversion	It occurs in cases where there are expenses without proof of the physical part or service rendered.
Fraudulent bidding	It occurs when the executing agent, in the bidding, uses relatives or third parties for their own benefit or to benefit others.
Nonpayment of a tribute	It occurs when the municipality fails to pay any tribute.
Inexecution of a resource	It occurs when the federal government transfers the money but the municipality does not use it.
Work unfinished or with irregular execution	It occurs when the agency in charge leaves work unfinished and pays the corresponding installment (paralyzed work).
Lack of or weak board action	It occurs when the board does not demonstrate to be acting in the inspection of expenses of the area.
Clientelism	It occurs when city mayors spend public resources for the explicit purpose of obtaining votes.
Irregular execution of social programs	It occurs when the control or registration of social programs is irregular.
A white elephant	It occurs when there is a construction or purchase of assets that are disproportionate to the municipality's needs.
Irregular bidding	It occurs when there is an irregularity in the bidding documents.
Bidding fractionation	It occurs when the executing agent splits the expenses to be carried out in different biddings aiming to change the type of bid required, according to regulation established by law.
Bidding lacking competition	It occurs when the bidding does not present a minimum of 3 competitors.
Diversion of purpose for the same sector	It occurs when the resource is used for the PAC's works but for an objective that is different from that initially agreed with the federal government.
Diversion of purpose to another sector	It occurs when the resource is used in another sector for an objective that is different from that initially agreed with the federal government.
No counterpart has taken place	It occurs when the municipality does not provide the counterpart of its responsibility.
Lack of advertising	It occurs when city mayors do not notify political parties, labor unions and business entities about money transfer from the federal government to carry out works in the municipality.
Work finished with irregularity	It occurs when work is done in its entirety but there are some minor irregularities.
Irregularity unrelated to the executing agent	It occurs when there are irregularities that are not under the executing agent's responsibility.
Mismanagement	Any other irregularity pointed out by the CGU that does not meet the other criteria above and results in deterioration in the provision of public service and failure to achieve the program objective.

Note. Source: Adapted from Ferraz, C., Finan; F., & Moreira, D. B. (2008). Corrupção, má gestão, e desempenho educacional: evidências a partir da fiscalização dos municípios. *Anais do Encontro Nacional de Economia*, Salvador, BA, Brasil, 36. Dias, L. N. S., Matias-Pereira, J., Farias, M. R. S., & Pamplona, V. M. S. (2013). Fatores Associados ao Desperdício de Recursos da Saúde Repassados pela União aos Municípios Auditados pela Controladoria Geral da União. *R. Cont. Fin-USP, 24*(63), 206-218. Marin, T. I. S., Gama, D. S. S., & Campelo, S. (2014). Corrupção e Ineficiência nos Repasses Federais: uma análise dos gastos do Ministério das Cidades nos Municípios Paraenses (2003-2013). *Anais do Congresso USP de Iniciação Científica em Contabilidade*, São Paulo, SP, Brasil, 11.

It should be emphasized that the word waste is defined in this study as any irregularity that results in the loss of public resources, either through mismanagement or corruption. In order to distinguish active and passive waste categories, definitions used by *Dias et al.* (2013)

were used. Thus, active waste occurs when “some private entity obtains financial advantage over financial loss caused to the public entity” (Dias *et al.,* 2013, p. 207) and is also termed corruption. As for passive waste, it occurs “when the public treasury is damaged but there is no financial benefit for the private entity in return” (Dias *et al.,* 2013, p. 207) and is considered as inefficiency or mismanagement. In the case of subcategories, the study by Ferraz *et al.* (2008) was the main basis for identifying 20 types of irregularities, which were grouped in the categories corruption (active waste) and mismanagement (passive waste). A new variable was added in the passive waste category, called “Lack of Advertising”, defined by Marin *et al.* (2014), which also based on the study by Dias *et al.* (2013) were used.

5 RESULTS PRESENTATION

5.1 Descriptions of municipalities

The main characteristics of the municipalities analyzed are described in Table 2. The municipal sample represents the audited values of approximately BRL 307.58 and BRL 261.58 million, generating 117 and 133 Service Orders (SO) for CGU auditors in 2008 and 2009, respectively. These amounts audited are distributed by ministerial portfolio, BRL 235,912,624.77 and BRL 219,180,822.73 to the Ministry of Cities, with 58 and 80 SO, BRL 61,802,315.27 and BRL 35,524,889.78 for the Ministry of Health, with 52 and 47 SO and BRL 307,580,208.07 and BRL 9,865,268.03 for the Ministry of National Integration, with 7 and 6 SO, respectively, for the years 2008 and 2009.

Table 2
Audited value, Service Order (SO) number and location of municipalities

Year	**2008**	**2009**
Total number of Service Orders	117	133
Total amount audited (BRL)	307,580,208.07	261,580,653.41
Total of cities		
Location		
Midwest	4	4
Northeast	23	25
North	6	7
Southeast	8	14
South	8	9

Note. Source: Research data.

The socioeconomic characteristics mean values of the audited municipalities’ population and of the total of Brazil are shown in Table 3. These averages show how, in most indicators, the audited municipalities differ from the average of Brazilian municipalities. In general, the data show that the municipalities audited have lower average socioeconomic indices compared to the national average. This shows that the audited municipalities present socioeconomic conditions that are lower than the country average.

Table 3
Average socioeconomic characteristics of the audited municipalities’ population and the general averages of Brazilian municipalities

Indicators	**Audited 2008**		**Audited 2009**		**Brazil**	
	Average	Standard Diversion	Average	Standard Diversion	Average	Standard Diversion
Expected years of schooling	8.07	1.68	7.95	1.79	8.34	1.80
Illiteracy rate - 11 to 14 years old	9.74	8.36	10.17	9.18	7.52	8.23
Illiteracy rate - 18 years old or older	26.27	14.13	25.95	14.49	23.56	13.52

Continue

Table 3 (continued)

Indicators	Audited 2008		Audited 2009		Brazil	
	Average	Standard Diversion	Average	Standard Diversion	Average	Standard Diversion
GINI	0.55	0.06	0.55	0.06	0.55	0.07
% of extremely poor	24.12	17.46	24.79	17.56	20.69	17.21
% of poor	45.26	23.11	45.86	23.71	41.06	22.78
% vulnerable to poverty	67.23	20.88	67.00	21.97	63.90	20.71
Per capita income (BRL)	306.47	185.85	315.15	197.70	338.54	192.44
THEIL	0.52	0.11	0.52	0.11	0.51	0.14
% of the population in households with bathrooms and running water	55.36	29.85	54.74	32.28	62.66	30.93
% of population in households with density > 2	42.58	15.19	43.61	14.99	38.14	14.92
% of the population in households with garbage collection	76.46	29.57	76.05	27.21	79.20	25.59
% of the population in households with electricity	84.19	16.88	84.14	17.45	86.61	17.03
% of people in households with inadequate water supply and sewage	15.43	15.40	18.19	20.02	13.47	15.60
Municipal Human Development Index (HDI)	0.50	0.10	0.51	0.11	0.52	0.10
Rural Population	10,534.73	13,591.49	7,114.31	5,525.55	5,722.38	10,370.68
Total population	40,415.29	63,663.78	37,942.29	72,744.20	30,511.96	185,672.80
Urban population	29,880.55	57,784.69	30,827.98	71,827.02	24,789.57	178,967.49

Note. Source: Research data.

The profile reported in Table 3 is complemented with the analyses presented in the following tables. It can be observed in Table 4 that more than 50% of the municipalities analyzed have low or very low Human Development Index (HDI). Also, it is verified that the sampled municipalities are needier than the national average.

Table 4

Percentage distribution of municipalities by Human Development Index range of municipalities audited and means of total municipalities in Brazil

	MHDI		
Classification	% of audited ones in 2008	% of municipalities in 2009	% of Brazil
Very low	46.94	57.63	41.80
Low	30.61	16.95	29.7
Average	20.41	22.03	26.1
High	2.04	3.39	2.4
Very high	0	0	0

Note. Source: Research data.
IDHM ranges: Very low: 0 to 0.499; Low: 0.500 to 0.599; Average: 0.600 to 0.699; High: 0.700 to 0.799; Very high: 0.800 to 1.

The Gini coefficient and Theil index, presented in Table 3, have indicated that the sampled municipalities present a high level of inequality and income concentration, respectively. This finding is complemented with information contained in Table 5. It shows that most of the municipalities analyzed had a per capita income below the minimum wage in 2008 and 2009, which was approximately BRL 465.00.

Table 5
Municipalities' percentage distribution by income groups of the average per capita household income

	2008	
Range (BRL)	Number of municipalities	% of municipalities
103.91 to 158.92	12	24.5
158.93 to 239.45	13	26.5
239.46 to 449.92	12	24.5
449.93 to 899.91	12	24.5
	2009	
Range (BRL)	Number of municipalities	% of municipalities
86.79 to 150.36	15	25.4
150.37 to 233.83	15	25.4
233.84 to 442.80	15	25.4
442.81 to 830.87	14	23.7

Note. Source: research data.

Also, in Table 6 it is possible to notice that the expectation of years of study for the population up to 18 years of age in the municipalities audited was equanimous in the ranges presented. However, most of the ranges were below 11 years. It indicates that the majority of the population with up to 18 years of age in the sample does not finish high school courses. This context is aggravated when compared to the average illiteracy rate for the sampled population aged 18 years or older, reported in Table 3, which shows that 26.27% and 25.95% of the municipalities' population analyzed, respectively, in the years 2008 and 2009, cannot read or write a simple note.

Table 6
Municipalities' percentage distribution by ranges of expectation of study years up to 18 years of age

	2008	
Range	Number of municipalities	% of municipalities
4.75 a 6,70	12	24.5
6.71 a 8,13	13	26.5
8.14 a 9,50	12	24.5
9.51 a 11,25	12	24.5
	2009	
Range	Number of municipalities	% of municipalities
3.99 a 6,39	15	25.4
6.40 a 7,90	15	25.4
7.90 a 9,35	15	25.4
9.36 a 11,60	14	23.7

Note. Source: Research data.

Information presented in Tables 2 to 6 above shows that, in general, the municipalities audited in 2008 and 2009 are concentrated in the Brazilian northeastern region and are needier than the national average. In addition, its population has a low educational level, since a significant part, at the age of 18 years, has not yet completed high school and presented an average illiteracy rate of 26.27 and 25.95, respectively, in the periods of 2008 and 2009.

5.2 Analyses of irregularities

Irregularities mentioned in the CGU's reports were segregated according to the origin of the resource. Therefore, they shall be described for each Brazilian Presidential Ministry. The resources audited are transfers from the Ministries of Cities, Health and National Integration. It should be noted that there are municipalities that have received resources from the three ministries. On Table 7 it is possible to visualize the amount of municipalities that obtained

resources in each Ministry. It is noteworthy that the Ministry of Cities had the largest number of municipalities that received the PAC I resources.

Table 7
Number of municipalities audited by CGU according to distribution of resources per Ministries

Ministry	of Cities	of Health	of National Integration
2008	32	29	3
2009	43	28	4

Note. Source: Research data.

Table 8 shows the percentages of irregularities found for each municipality audited in 2008 per Ministry (Cities, Health and National Integration). In general, the resources used in the projects linked to the Ministry of Cities were destined to construction and improvements in the area of housing of the municipalities and come from the PAC's first stage. In the case of the Ministry of Cities, in the active waste category the variables with the highest percentages were "Overbilling", with 12.50%, and "Fraudulent Bidding", with 9.4%. Regarding irregularities of the passive waste modality, the facts that presented the highest percentages were "Mismanagement", with 62.50%, "Irregular Bidding", with 31.30%, "Lack of Advertising" with 25.00% and "Irregularity unrelated to the executing agent", with 21.90%.

In relation to the Ministry of Health, most PAC resources were used to improve municipal sanitation. Table 8 shows that for active waste all types of irregularities obtained the same percentage, 3.4%. As for the passive waste modality, the findings with the highest percentages were "Mismanagement" (69%), "Irregular Execution of Social Programs" (27.60%), "Irregularity unrelated to the executing agent" (24.10%) and "Irregular Bidding" (20.70%).

For the Ministry of National Integration, PAC resources were used in the projects to implant, expand or improve sanitary sewage in municipalities that cover the basins of Brazilian São Francisco and Paraíba Rivers. It can be seen in Table 8 that in the active waste category, the variable "Overbilling" (33.30%) presented a higher percentage. As for the passive waste category, the variables that presented the highest percentages were "Mismanagement" (100%) and "Irregular Bidding" (66.7%).

Table 8
Details of waste types in percentage of municipalities analyzed per Ministry – 2008

Waste Category	of Cities	of Health	of National Integration
Active waste	**% of municipalities**	**% of municipalities**	**% of municipalities**
Overbilling	12.50	3.40	33.30
Fraudulent bidding	9.40	3.40	0.00
Bidding with resource diversion	0.00	3.40	0.00
Resource diversion	0.00	3.40	0.00
Passive waste			
Mismanagement	62.50	69.00	100.00
Irregular execution of social programs	12.50	27.60	0.00
Irregularity unrelated to the executing agent	21.90	24.10	33.30
Irregular bidding	31.30	20.70	66.70
No counterpart has taken place	0.00	10.30	0.00
Work unfinished or with irregular execution	9.40	6.90	33.30
A white elephant	3.10	6.90	0.00
Work finished with irregularity	0.00	6.90	0.00
Lack of or weak board action	0.00	3.40	0.00
Diversion of purpose to another sector	0.00	3.40	0.00

Continue

Table 8 (continued)

Waste Category	of Cities	of Health	of National Integration
Passive waste	**% of municipalities**	**% of municipalities**	**% of municipalities**
Diversion of purpose for the same sector	0.00	3.40	0.00
Lack of advertising	25.00	0.00	33.30
Bidding lacking competition	3.10	0.00	0.00
Nonpayment of a tribute	0.00	0.00	0.00
Inexecution of a resource	3.10	0.00	0.00
Clientelism	0.00	0.00	0.00
Bidding fractionation	0.00	0.00	0.00

Note. Source: Research data.

The percentage of irregularities found for each municipality audited for the year 2009 is presented in Table 9, according to the three government ministries analyzed. In general, the resources allocated by the Ministries of Cities, Health and National Integration to municipalities were used in the same activities of 2008.

For the Ministry of Cities, in the active waste modality, it is reported in Table 9 that the irregularities with the highest percentages were “Overbilling” (14%), “Resource Diversion” (7%) and “Fraudulent Bidding” (4.7%). For passive waste, the findings with the highest percentages were “Mismanagement” (62.8%), “Lack of Advertising” (44.2%) and “Irregular Bidding” (39.5%).

Table 9 shows that, in the active waste category, irregularities with the highest percentages were “Overbilling”, with 17.9%, “Fraudulent Bidding” and “Resource Deviation”, both with 3.6%, for the Ministry of Health. Regarding irregularities in the passive waste modality, the facts that presented the highest percentages in the analyzed municipalities were “Mismanagement” (82.10%), “Irregular Execution of Social Programs” (21.4%) and “Irregular Bidding” (17.9%).

As for the Ministry of National Integration, it is reported in Table 9 that, in the active waste category, variables “Overbilling” and “Resource Diversion” also represent 25% of the municipalities analyzed. As for the passive waste modality, categories that presented the highest percentage of verification were “Mismanagement”, with 75%, “Irregular Bidding” and “Work unfinished or with irregular execution”, both with 25%.

Table 9
Details of waste types in percentage of municipalities analyzed per Ministry – 2009

Waste Category	of Cities	of Health	of National Integration
Active waste	**% of municipalities**	**% of municipalities**	**% of municipalities**
Overbilling	14	17.9	25
Fraudulent bidding	4.7	3.6	0
Bidding with resource diversion	0	0	0
Resource diversion	7	3.6	25
Passive waste			
Mismanagement	62.8	82.1	75
Irregular execution of social programs	4.7	21.4	0
Irregularity unrelated to the executing agent	25.6	7.1	0
Irregular bidding	39.5	17.9	25
No counterpart has taken place	2.3	0	0
Work unfinished or with irregular execution	4.7	7.1	25
A white elephant	0	0	0
Work finished with irregularity	4.7	0	0
Lack of or weak board action	4.7	0	0

Continue

Table 9 (continued)

Waste Category	of Cities	of Health	of National Integration
Passive waste	**% of municipalities**	**% of municipalities**	**% of municipalities**
Diversion of purpose to another sector	0	0	0
Diversion of purpose for the same sector	0	0	0
Lack of advertising	44.2	10.7	0
Bidding lacking competition	0	0	0
Nonpayment of a tribute	2.3	3.6	0
Inexecution of a resource	11.6	0	0
Clientelism	0	0	0
Bidding fractionation	2.3	3.6	0

Note. Source: Research data.

Results in Tables 8 and 9 show possible inefficiencies resulting from management carried out by those in charge of managing resources passed through the PAC. As shown previously, in the active waste category, the highest frequencies were observed in the irregularities “Overbilling” and “Fraudulent Bidding”. An example of overbilling is when auditors find purchases of items at prices above those practiced by the market. In the fraudulent bidding category, irregularities were found when there was evidence that the bidding process was directed to an organization that had a kinship relationship with a political agent.

The following examples of mismanagement were recurringly recorded in the CGU reports for the years 2008 and 2009 in the passive waste category: irregularities in the documentation of projects sent by the city hall to obtain funds from the PAC and delays in the municipality in regularizing pending issues indicated in the transfer agreements signed between the city and the competent bodies to manage the program resources. Another frequent type of irregularity was “Irregular Bidding,” which was due mainly to completion of the bidding process before approval of the basic project by the agency in charge and the lack of evidence of an analysis of the work costs having been carried out in order to support the verification of the tenders submitted in the bidding dossiers. It is emphasized that there is a possibility that the absence of personnel with adequate knowledge of the Bidding Law be the reason for the relevant percentage of “Irregular Bidding”.

Regarding the “Irregularity unrelated to the executing agent”, which is a set of irregularities committed by the bodies in charge of selecting the municipalities that shall benefit from the PAC programs, it was observed in the CGU’s reports that such irregularities, in general, have occurred due to delay in analysis of documentation sent by the executing agent (in most cases the executing agents are the city halls themselves) interested in obtaining resources from the PAC. This situation indicates problems in management by these bodies, which jeopardizes an effective execution of works and has as consequence noncompliance with the program objective.

“Lack of Advertising” was a recurrent type of irregularity found by the CGU in the PAC1 audit reports. This irregularity occurred when the municipality stopped notifying political parties, labor unions and business entities about money transfer from the federal government to carry out works in the municipality. Lack of advertising the execution of resources indicates a possible absence of transparency from the city hall’s actions. In addition, it should be investigated if the “Lack of Advertising” was intentional or because of deficiencies in administrative management due to noncompliance with the minimum rites required by public legislation.

Regarding the “Irregular Execution of Social Programs”, duplicity of beneficiaries, beneficiaries who did not meet the program requirements and outdated beneficiaries program registration were frequent in the CGU reports.

In addition, as previously mentioned, the CGU audit reports consistently perceived the irregularity “Work unfinished or with irregular execution”. Examples of this irregularity are the execution of work items outside the specifications of the basic project approved to be executed and delayed works.

6 CONCLUSIONS

The objective of the study was to analyze irregularities verified by the CGU in the application of federal resources destined to sanitation and housing areas in Brazilian municipalities by means of the PAC's first stage. In this study, irregularities found by the CGU's auditors were classified as active and passive waste. CGU's inspection reports and the 2000 Census data, made available by IBGE, were used. It was decided to carry out content analysis and descriptive procedures in order to reach the objective proposed.

It is observed that the municipalities that are the object of analysis of this research present a profile of social deprivation when compared to the national average and have a population with low educational level. It is possible that these municipalities' profile may contribute to the high percentage of active and passive waste, evidenced in the analyses presented. Previous studies have shown that the municipalities' socioeconomic vulnerability can be conducive to greater corruption and mismanagement. In this sense, Mendes (2004), based on Mendes' (2001), argues that there are indications that irregularities and mismanagement are concentrated in vulnerable municipalities with low schooling and living conditions. Also, Vieira (2011) stresses that corruption can have negative effects on social well-being. In his study, the author mentioned has perceived that there is a statistically significant negative association between the HDI and the failures verified by the CGU in the municipalities audited.

Regarding the waste profile, it is observed that the irregularities that presented a greater percentage of findings are classified as passive waste, with emphasis on the irregularity classified as "Mismanagement", which presented the highest percentage in the three government ministries analyzed. This result corroborates findings from Dias *et. al* (2013) and Marin *et. al* (2014). In their study, Dias *et. al* (2014) emphasize the need for greater concern with passive waste because, according to the authors, this type of waste is not given due attention by the responsible bodies, the academy and the population. However, the authors argue that such waste significantly affects the quality of the services offered to the population and causes damage to the public coffers.

In addition, it is worth mentioning that the scenario verified in 2008 and 2009 by the CGU auditors in the works of PAC1, via special edition of the PFPS, still persists. In a new survey carried out in 2015 by ITB, in 183 sanitary sewage works (110 for PAC1 and 71 for PAC2), it was observed that only 32% of the works were completed and that the factors that generated delays and stoppages are the same ones found in previous surveys carried out by ITB. They are: deficiencies in the quality of the projects originally sent to the federal government, problems in the bidding processes, bureaucracy in the transfer of resources, slowness in the process of granting environmental licenses, among other aspects (ITB, 2016). In view of this, it can be seen that the bodies responsible for the PAC have not taken steps to correct the irregularities found in 2008 and 2009 by the CGU auditors in PAC1 works, which could jeopardize the performance of the actions carried out under the program.

Finally, it is suggested that future research verify the existence of an association between the profile of the municipalities audited and the irregularities verified by the CGU, besides the reapplication of this study in other areas audited by the CGU and an evaluation of the degree of performance of social control versus the level of occurrence of irregularities.

NOTES

[1] Considering the PAC first stage. Also called PAC1.

[2] For the construction of indicators of corruption and mismanagement, Ferraz *et al.* (2008) have not used audit reports from sweepstakes 8, 11, 12, 13 and 15, since they were not available when the survey was conducted.

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