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THE IMPACT OF THE BOLSA FAMÍLIA PROGRAM ON GDP OF MUNICIPALITIES OF THE STATE OF SERGIPE (BRAZIL): 2004-2012

Abstract

The objective of the present paper is to observe whether the Bolsa Familia Program (PBF) – a Brazilian conditioned cash transfer program had influence on GDP growth of the municipalities of the state of Sergipe during the years 2004-2012. Its innovative feature lies in the investigation of the macroeconomic impacts of PBF in the state of Sergipe. In this sense, the work is structured in four sections, besides the introduction: in the first one the origins, the contemporary design and the PBF macroeconomic as well as consumption impacts are presented. The second section briefly describes the focused region: the state of Sergipe, which is the smallest Brazilian state, meanwhile the third section presents the data and methodology employed as well as analyses the results of the experiment which does not prove the PBF influence on GDP of the investigated municipalities. Finally, the main conclusions are summarized.

Key words: State of Sergipe (Brazil), Bolsa Família Cash Transfer Program, local GDP

1. INTRODUCTION

Nowadays the government actions have been developed to eradicate and reduce poverty, whose main face is the insufficient income. According to the website of the Ministry of Social Development and Fight against Hunger (MDS), "insufficiency of income is a relevant indicator of deprivation, but is not the only one. Social, geographical and biological factors multiply or reduce the impact exerted by the yields on each individual. Among the most disadvantaged lacks education, access to land and inputs for production, health, housing, justice, family support, access to credit and opportunities "(www.mds.gov.br, acessed 08.01.2013).

In this sense, the government instituted the Brazil without Misery Plan, which was based on three pillars: income transfer; access to public services and productive inclusion. According to the objective of the plan expressed in the same website, it is possible "to raise the per capita family income, increase access to public services, to actions of citizenship and social welfare, and increase access to employment and income opportunities through actions of productive inclusion in urban and rural areas."Actually, the plan is an expansion of the Bolsa Família Program (PBF) (www.mds.gov.br, acessed 08.01.2013).

According to Fagnani (2012, p. 6), the social policies of the Brazilian government have been recognized in the report of 26 October 2011 of the Organization for Economic Cooperation and Development (OECD), where it was stressed that "never it has seen poverty and inequality fall so fast" as in Brazil. According to the Ministry of Social Development, this was due to the Bolsa Família Program (PBF), which is one of the pillars of Brazil without Misery. The goal of the program is to reduce poverty of the Brazilian regions and, therefore, the release of funds is due to the registration of people of each region. The idea is that this release occurs in the best possible way to meet all the people in poverty and misery conditions. Thus, state and local governments must ensure that this objective is fully met and that the Bolsa Família Program bears good results according to the needs of each region (www.mds.gov.br).

So this paper starts from the assumption that the PBF has not only micro but also macroeconomic impacts and the lower the economic strength of a city, the more important must be such impacts in relative terms. In this sense, the study aims to observe the impact of the direct income PBF transfers on GDP of municipalities in the state of Sergipe between 2004 and 2012.

In order to achieve this end, the work is divided into four sections, besides this introduction: the first one presents the origins, the contemporary design and the macroeconomic impacts of PBF as well as its effects on the consumption of its beneficiaries. The second section briefly describes the focused region, while the third section presents the data and methodology employed, and analyzes the results obtained from panel data analysis, too. Finally, the main conclusions are summarized.

2. ANALYSIS OF THE BOLSA FAMÍLIA PROGRAM

This section presents the origins, the contemporary design, the evolution of the program's coverage in the state of Sergipe in the period 2004-2010, and report the results of research on its macroeconomic impacts and on the consumption of the beneficiaries.

2.1. The Origin of the Bolsa Família

The implementation of liberalizing policies in Latin America since the mid-1980s and the following decade was not able to promote sustained economic growth in the region and brought negative consequences such as a worsening of income distribution and social vulnerability.

Thus, the Gini index, calculated from data of individuals of working age with positive income reported in the National Survey of Sample Households (PNAD), departs from 0,584 in 1981 to 0,636 in 1989 showing an increase in the concentration of income in that decade; oscillates slightly and reaches a new peak of 0,604 in 1993 to maintain some stability by the end of the 1990s.

Figure 1 shows the evolution of Brazilian Gini Index in the 1981-2009 period.
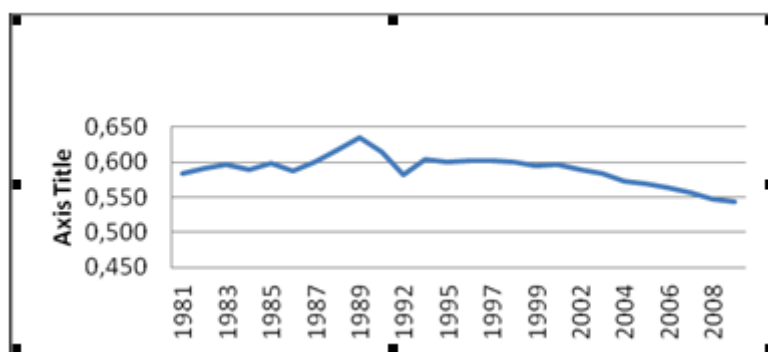

Figure 1: Gini Index– Brazil – 1981-2009

Source: www.ipeadata.gov.br (accessed 07.29.2013)

In the 1990s, a set of income transfer policies – conditional and unconditional – began to be implemented at the national level, among which the following can be mentioned: Bolsa Escola, a conditional cash transfer program to attendance at primary education, the Fome Zero and Bolsa Alimentação Programs, who sought to associate the transfer to food security, the first unconditionally and the second conditional on carrying out health and vaccination

check ups; and Vale Gas, which granted subsidies to poor families to buy cooking gas (Soares et al, 2010).

The Bolsa Família Program (PBF) is the integration of the four programs being set up in October 2003 and converted into Law 10.836 approved in January 2004.

According to Marques (2013), the PBF integrates the second generation of welfare programs introduced in Latin America to offset the negative consequences caused by the macroeconomic policies adopted in the region in the 1980s and 1990s, in particular the increase in the number of individuals in social vulnerability situation.

Such policies have as common features:

• Focus on poor and indigent families, especially with children and adolescents;

• Settlement of conditionalities and

• Goal of human capital accumulation by their beneficiaries in the long run.

As specific features of the Bolsa Família, in relation to other conditional cash transfer programs existing in Latin America, can be highlighted: i. self-declared income by households. This figure, however, is confronted by Ministry of Social Development (MDS) with consumption information contained in the Cadastro Único (Application Form). If consumption is 20% higher than the reported income, this information must be checked; ii. existence of an unconditional benefit (fixed amount) for families in extreme poverty and iii. decentralization in program management, where the inclusion of families in the Application Form is done by municipalities, as well as information updating and verification of compliance with the conditionalities. The direct deposit in the accounts of the beneficiaries and the transfer of funds to municipalities for program management are in charge of the Ministry of Social Development.

To boost the efficiency of local governments in the management of PBF, MDS created a decentralized management index, which measures the performance of municipalities in updating their records and informations related to the conditionalities. A good performance in the index ensures the injection of additional resources to the localities.

Another distinctive character of PBF is its size: according to Russel (2013), it is the largest conditional cash transfer program in the world, with coverage estimated by the author to about 41 million individuals. Nevertheless, for Marques (2013), according to data from June 2011, the PBF catered for 12,4 million families. Considering that each poor family has 4,4 members on average (Marques, 2013, p. 301), this implies the coverage of a contingent of 54,7 million people or 28,6% of the Brazilian population. According Andrade et al (2012)

PBF encompassed about 11 million households representing about 45 million people or 25% of the country's population.

Notwithstanding the differences in estimated coverage by these authors, no one disputes the importance of the program in terms of scope. At the end of the 1st. half of 2013, the MDS website information showed that the PBF attended 11,87 million households.

2.2. The Bolsa Família – Contemporary Design:

The PBF has its focus on families in poverty and extreme poverty situation, defined in terms of family monthly per capita income (ypc). Families with ypc ≤ R$ 70,00 are considered in extreme poverty, while families classified as poor are those where R$ 70,00 <ypc ≤ R$ 140,00.

The monthly benefits of the program are threefold:

• basic allowance in the fixed amount of R$ 70.00 - unconditional - for extremely poor families,

• variable allowance of R$ 32.00 per 0-15 years old child up to the limit of three and

• variable allowance of R$ 38.00 per 16-17 years old child up to the limit of two teenagers by family.

The latter are conditioned on minimum school attendance (87% in the first case and 75% in the second), vaccination of children under seven years of age, health monitoring of 14-44 years old women as well as of nursing mothers and their babies, besides conducting pre-natal examinations in pregnant women.

So in case meeting conditionalities, an extremely poor family can receive a maximum benefit of R$ 242,00 per month, equivalent to 35,7% of the minimum wage in May 2013. If, nevertheless, family stay with ypc below R$ 70,00 the program transfers extra allowance until this minimum level is reached (strategy recently implemented under the Brazil Without Misery Program).

It is important to remember that the program's coverage was expanded in 2008 with the creation of benefit for teens.

Regarding its focus, according to Soares et al (2010), the PBF is one of the top ten among 122 existing cash transfer programs in the world. For the authors, however, there is a trade-off between efficiency in targeting and expanding coverage. In spite of this, given its magnitude, it seems that the PBF solved this dilemma satisfactorily.

Marques (2013) points to an institutional weakness, in that the PBF is not part of funding for social security so that its resources depend on the existence of budgetary allocation. In addition, "in legal terms, it may suffer disruption or

even be extinguished in the case of a new president have different comprehension with respect to poverty reduction strategies" (p. 309).

The profile of conditionalities is linked to the idea of human capital accumulation by the beneficiaries. You can define human capital as the stock of skills and knowledge capable of providing an individual increasing their productivity and hence an additional stream of income (JORGE, 2011, p. 47). The accumulation of human capital is thus closely linked to the acquisition of education, but according to Becker (1975) one can get human capital through work experience, training, health, nutrition, information and even through migration, as well.

By this way, targeting the provision of improvement in education, health and nutritional status of beneficiaries, the PBF seeks to elevate their stock of human capital as a tool for overcoming poverty (Marques, 2013). However, while the main beneficiaries are children and adolescents, the strategy for overcoming poverty is a long-term one, since that will be achieved by the next generation.

In this sense, Soares et al (2006) suggest that an income positive shock, but transitory, should not be ground for exclusion of the Program due to the high turnover of the Brazilian labor market. The argument can be added to concern over the possibility of disruption in human capital accumulation by the beneficiaries.

According to Oliveira and Sousa (2009), however, the conditioning is not always able to generate the desired results because: i. Potential beneficiaries may not want to participate in the program, even if it is well targeted and ii. monitoring compliance with the conditionalities can be costly or performed ineffectively.

In the case of PBF monitoring of school attendance is made by the schools themselves and sent to the Ministry of Social Development (MDS), while health agents and service centers are responsible for monitoring the health conditions. The monitoring of health conditionalities, which was quite poor at the beginning of the implementation of PBF (ANDRADE ET AL, 2012) improved gradually and had reached a coverage of almost 60% by the end of 2008, according to Soares et al (2010) and 73,2% at the end of the 1st half of 2013, according to the MDS website information.

In May 2011 the PBF was improved and integrated into the Plan Brazil without Misery. By the way, various government coordinated actions with respect to social programs were implemented. Thus, the PBF was included in the PPA 2012/2015 aiming to "improve the socioeconomic conditions of poor and, above all, extremely poor families through direct income transfer and coordination with other policies promoting emancipation".

Let's see how the program's coverage has evolved in the state of Sergipe.

2.3. Evolution of the Bolsa-Família coverage:

Nationally, the number of households covered goes from 6,571,839 in 2004 to 12,778,220 in 2010, or roughly doubles (growth 94.4%), representing the addition of 6.2 million families in the period.

With regard to the state of Sergipe R$ 272.6 million were paid through PBF in 2010, which puts him to 17th position in terms of transfers among Brazilian states. With just over 230,000 families in the program, the state is ranked 17th. as well as in terms of beneficiaries.

The number of families covered by PBF in the state goes from 113,100 in 2004 to 230,400 in 2010, corresponding to the incorporation of 117,300 families in the period, ie more than double (expansion 103.64%).

Municipalities with more families are Aracaju, Nossa Senhora do Socorro, Lagarto, Itabaiana and São Cristóvão, with respectively 34,747, 19,037, 11,568, 9,780 and 8,074 families. Aracaju, Nossa Senhora do Socorro, Itabaiana and São Cristóvão are also among the municipalities that have incorporated more beneficiaries in the period, along with the city of Estancia.

Due to the small size of most municipalities in Sergipe, nineteen of them had less than 1,000 families covered by the program in 2010.

Regarding the amount of resources paid through PBF, the volume of funds transferred almost quadrupled in the period (expansion 297.5%), from R$ 68.6 million in 2004 to R$ 272.6 million in 2010.

During this last year, the localities that received the highest value were Aracaju, Nossa Senhora do Socorro, Lagarto, Itabaiana and São Cristóvão, whose amount received through the PBF is, respectively, R$ 35.6; R$ 21.3; R$ 14.7; R$ 10.6 and R$ 9.9 million. While the first four municipalities received more than R$ 10 million in 2010, fourteen locations in turn, received under R$ 1 million in that year, according to data from the MDS website.

In this sense, the PBF is a program aimed to combat poverty increasing acquisition of human capital of their beneficiaries, but the interactions of these individuals, combined with the volume of funds transferred by the program end up generating a positive externality to heat the local economy and thus contribute to the growth of municipalities, especially the smallest.

2.4. Effects of the Bolsa Família Program:

Cash transfer programs have macroeconomic effects, as well as microeconomic effects on beneficiaries. The latter are particularly affected by the content of conditionality. In this section the macroeconomic effects of PBF will be focused, as well as the effects on consumption of beneficiary families.

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2.4.1. Macroeconomic Effects:

Low-income families often have high marginal propensity to consume. Thus, it is expected that cash transfers received by PBF beneficiaries are spent on consumer goods, particularly non-durable goods such as food or clothing. The expenditure of this resource, by the way promotes the local economy, with significant multiplier effect mainly in low-income municipalities (Marques, 2013).

Both public and private spending have a multiplier effect on additional income. There is a multiplier effect because every increase in income generates an increase in consumption, which in turn increases income again, making the final increase larger than the initial increase caused by greater government spending and creating a cyclical process of increasing income and consumption.

Thus, MDS (2011, p. 144), citing an IPEA study states that "spending on the PBF is characterized as the largest multiplier effect on the income of families (every R$ 1,00 spent results in R$ 1,82 impact on income), and one of the largest multiplier effect on GDP (every R$ 1,00 spent results in R$ 1,44 impact on GDP)."

Yet about the macroeconomic effects, Campelo and Neri (2013) argue that income transfers that favor the poorest households have the highest multiplier effects and commented that, among these, the PBF has the best multiplier effect: they estimate that every R$ added spent in PBF stimulate a growth of R$ 1,78 in GDP. I.e. the Bolsa Familia Program plays an important role in the Brazilian macroeconomic dynamics, especially in the small municipalities whose economy is very dependent on such transfers.

2.4.2. Consumption:

At the microeconomic level, Oliveira e Sousa (2009) estimated the impact of PBF on total consumption of the beneficiaries, as well as its composition. The results are shown in the table below:

Table 1

PBF Effects on the Consumption – Beneficiaries x Control Group II – Brazil (R$ annual amount)

VARIÁBLE	POOR	EXTREMELY POOR
Total Consumption	-	R$ 458,65
Food Expenditures	R$ 278,12	R$ 388,22
Education Expenditures	R$ 31,80	-
Children´s Apparel Expenditures	R$ 16,12	R$ 31,94

(-) not significant

Source: Oliveira e Sousa (2009).

The table shows the annual difference in expenditures between the PBF beneficiary families and low-income families not covered by income transfer programs. Since the values are positive, it can be seen that poor households spent more on food, education and children's apparel as compared to the control group. Families in extreme poverty beneficiaries of PBF in turn spent more in terms of total consumption, expenditures on food and children's clothing.

To Oliveira e Sousa (2009), this result is interesting, because the allowance received as cash transfer could not result in an immediate increase in consumption, given that beneficiaries could use the money to pay off debts or undertake.

Soares et al (2010) attribute this result to the likely perception on the part of beneficiary families, that the transfer should be used in the interests of their children. The fact that the benefit is delivered to mothers certainly contributes to this perception.

3. THE STATE OF SERGIPE

Sergipe is the smallest state in Brazil and is located in the Northeast Region. Map 1 shows that it has an area of 21,910.3 km2, representing only 0.3% of the country and 1.4% of the Northeast areas.

Sergipe is limited to the north with the state of Alagoas through the São Francisco River which separates both states, to the west and south borders on Bahia and to east, with the Atlantic Ocean.

In 2010 the state had 2,068,017 inhabitants and its population density was 94.3 people per square kilometer; in the last decade the population growth was 1.5% per year. The total population of Sergipe corresponds to 1.1% of the Brazilian population (IBGE).

Map 1 – Limits and Extreme Points – Sergipe

Source: SUPES/SEPLAG (2014)

Its gross domestic product was R$ 23.9 billion; the highest GDP per capita in the Northeast region equivalent to R$ 11,572.44 (IBGE, 2010). The service sector accounts for 59.7% of GDP, as the industrial and agricultural sectors account respectively for 25.5% and 4.1% of GDP. Taxes on product net of subsidies amounted to 10.7%.

Municipalities in the state are in general small: only two of them, Aracaju – the capital – and Nossa Senhora do Socorro have more than 100,000 inhabitants. The vast majority (68% or 51 cities) have fewer than 20,000 inhabitants.

The same occurs with regard to the economic size of these locations: only four counties have a GDP of more than R$ 1 billion, while the economy of about half, 38 cities or 50,7%, reached less than R$ 100 million in 2010. In localities of fragile economies, such as these reported, it is likely that cash transfer programs have a more significant economic impact, which makes the state of Sergipe appropriate to carry out this study, despite of its small size.

The size and reduced economy ends up to be reflected in the level of development of these municipalities: with regard to HDI-M, most cities of Sergipe (43 or 57.3%) is classified in the low human development category and only the capital, Aracaju, reaches the high human development category.

In 2007, the state government created eight planning areas in order to regionalize investment decisions, increase participation of society in the decision-making process and thus attack three concentrations existing in the state: the concentration of income and production structure in its coastal strip which at that time accounted for 70% of value added, and industrial concentration around the Petrobras and CHESF which accounted for nearly 40% of Sergipe industrial GDP. (Teixeira et al, 2010).

Map 2 shows the distribution of Sergipe planning territories: Baixo São Francisco (14 municipalities); Alto Sertão (07 municipalities); Agreste (15 municipalities); Centro Sul (05 municipalities); Grande Aracaju (09 municipalities); Leste Sergipano (09 municipalities); Médio Sertão (06 municipalities) and Sul Sergipano (11 municipalities).

Table 2 confronts the amounts transferred by the PBF with municipal GDP's and calculates their impact on the local economy, considering a multiplier effect of 1.8:
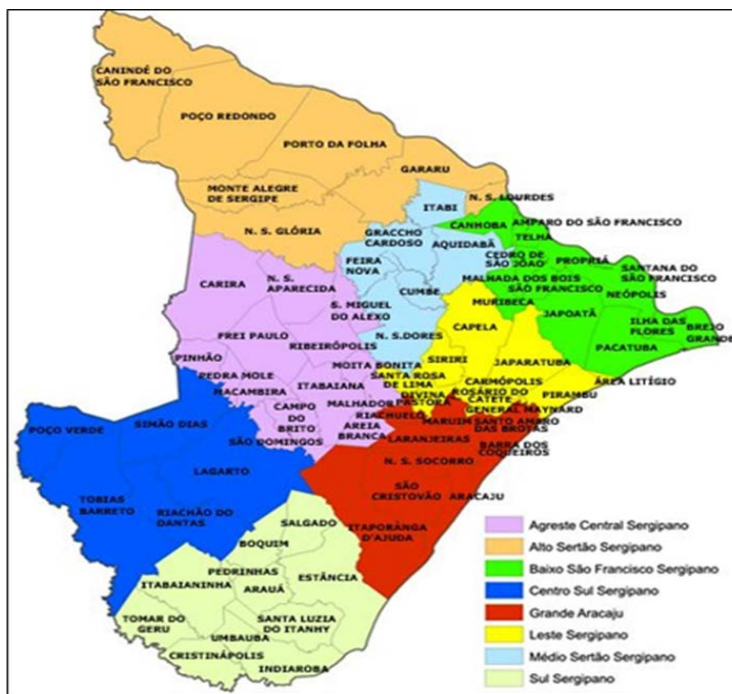
Map 2 –Planning Areas – Sergipe

Source: SUPES/SEPLAG (2014)

Table 2

Bolsa Família Resources and Impacts on GDP –With and without Multiplier
Effect – 2012

MUNICIPALITY	PBF Value Transferred	Value considering Multiplier Effect	GDP	% of GDP	% of GDP considering Multiplier Effect
Amparo de São Francisco	561042	1077201	18469054	3,04	5,83
Aquidabã	4298766	8253631	142671105	3,01	5,79
Aracaju	51262718	98424419	9813851609	0,52	1,00
Arauá	2960500	5684160	70589138	4,19	8,05
Areia Branca	3804280	7304218	130047550	2,93	5,62
Barra dos Coqueiros	4448168	8540483	333515485	1,33	2,56
Boquim	6253668	12007043	294652052	2,12	4,07
Brejo Grande	2023086	3884325	57110660	3,54	6,80
Campo do Brito	3723346	7148824	116939272	3,18	6,11
Canhoba	1183866	2273023	30208789	3,92	7,52
Canindé de São Francisco	7030250	13498080	1399830529	0,50	0,96
Capela	6932392	13310193	267146001	2,59	4,98
Carira	5161030	9909178	147503367	3,50	6,72
Carmopolis	2811364	5397819	620406715	0,45	0,87
Cedro de São João	1334006	2561292	35242691	3,79	7,27
Cristinápolis	4449804	8543624	109120486	4,08	7,83
Cumbe	919222	1764906	29635909	3,10	5,96
Divina Pastora	1064288	2043433	211624004	0,50	0,97
Estancia	11753018	22565795	1303712678	0,90	1,73
Feira Nova	1576476	3026834	42331158	3,72	7,15
Frei Paulo	2733050	5247456	194721792	1,40	2,69
Gararu	3539840	6796493	80742712	4,38	8,42
General Maynard	538698	1034300	19125183	2,82	5,41
Graccho Cardoso	1778172	3414090	41017621	4,34	8,32
Ilha das Flores	2401196	4610296	47602808	5,04	9,68
Indiaroba	4405614	8458779	99512977	4,43	8,50
Itabaiana	15176728	29139318	1005866162	1,51	2,90
Itabaianinha	10610630	20372410	250449941	4,24	8,13
Itabi	1220116	2342623	38640205	3,16	6,06
Itaporanga d' Ajuda	7463138	14329225	600482748	1,24	2,39
Japaratuba	3715506	7133772	619527282	0,60	1,15
Japoatã	3653742	7015185	101034831	3,62	6,94
Lagarto	20004342	38408337	865259485	2,31	4,44
Laranjeiras	5872642	11275473	1010389032	0,58	1,12
Macambira	1565544	3005844	43968696	3,56	6,84
Malhada dos Bois	881498	1692476	30111370	2,93	5,62
Malhador	2727370	5236550	76136590	3,58	6,88

Maruim	3541006	6798732	204414352	1,73	3,33
Moita Bonita	1982790	3806957	71659907	2,77	5,31
Monte Alegre de Sergipe	3631166	6971839	92774961	3,91	7,51
Muribeca	1658322	3183978	58514814	2,83	5,44
Neopolis	5022692	9643569	165026628	3,04	5,84
Nossa Senhora Aparecida	2334842	4482897	80459176	2,90	5,57
Nossa Senhora da Gloria	7911258	15189615	346380842	2,28	4,39
Nossa Senhora das Dores	5727240	10996301	217584931	2,63	5,05
Nossa Senhora de Lourdes	1642434	3153473	42042523	3,91	7,50
Nossa Senhora do Socorro	29316702	56288068	2049719308	1,43	2,75
Pacatuba	4191824	8048302	111861631	3,75	7,19
Pedra Mole	724434	1390913	21850498	3,32	6,37
Pedrinhas	2311250	4437600	50293335	4,60	8,82
Pinhão	1386874	2662798	41139348	3,37	6,47
Pirambu	1964252	3771364	69584609	2,82	5,42
Poço Redondo	9009224	17297710	187705974	4,80	9,22
Poço Verde	6007542	11534481	133678448	4,49	8,63
Porto da Folha	7619018	14628515	197471551	3,86	7,41
Propria	5909202	11345668	313990016	1,88	3,61
Riachão do Dantas	5488382	10537693	113901537	4,82	9,25
Riachuelo	2246118	4312547	148608454	1,51	2,90
Ribeiropólis	3571660	6857587	152027072	2,35	4,51
Rosário do Catete	2087730	4008442	408965323	0,51	0,98
Salgado	4194778	8053974	118824982	3,53	6,78
Santa Luzia do Itanhy	4293272	8243082	101227623	4,24	8,14
Santa Rosa de Lima	1046768	2009795	26201708	4,00	7,67
Santana do São Francisco	2031343	3900179	41939351	4,84	9,30
Santo Amaro das Brotas	2641976	5072594	107527486	2,46	4,72
São Cristovão	14469674	27781774	590068921	2,45	4,71
São Domingos	2548782	4893661	66069671	3,86	7,41
São Francisco	807888	1551145	23585720	3,43	6,58
São Miguel do Aleixo	1083802	2080900	27030731	4,01	7,70
Simão Dias	9741316	18703327	374946437	2,60	4,99
Siriri	2102580	4036954	162853112	1,29	2,48
Telha	792656	1521900	21369704	3,71	7,12
Tobias Barreto	11010288	21139753	337076507	3,27	6,27
Tomar do Geru	3836358	7365807	77866561	4,93	9,46
Umbaúba	5249006	10078092	167750043	3,13	6,01

Source: www.mds.gov.br e www.seplag.se.gov.br , (accessed 06.10.2013) :

The fourth column of the table shows the direct impact of the value transferred by PBF as a proportion of municipal GDP in 2012. Note that the PBF

transfers account for 0.45% to 5.04% of the local product; with the lowest impact just occurring in Carmópolis, city of great economic dynamism, and the greatest impact occurring in the municipality of Ilha das Flores.

Based on the multiplier effect of the program estimates referred to in section 2.4.1, – around 1.8 – it tried out to estimate the direct and indirect impact of PBF in each municipality. This impact is expressed in absolute value in column 2, and as a percentage of GDP in the last column of the table. When considering the multiplier effect, the PBF impact shall range from 0.87% to 9.68% of GDP.

So, it seems that the resources transferred under PBF have a non-negligible impact on the state economy. It is now necessary to verify the validity of this hypothesis through an estimate of greater consistency, which is done in the next section.

4. MODEL DESCRIPTION AND ANALYSIS OF RESULTS

This section briefly describes the data panel analysis technique as well as the model estimated and its results. Finally, it presents the analysis of the latter.

4.1. Description of the Technique

In this work panel data analysis technique will be used, which is the combination of cross-sectional analysis with the time series. Among the advantages of this technique we can enumerate the increased number of degrees of freedom from (N - k) to (NT - k), increased robustness of the tests t and F, as well as more efficient estimators.

Despite its neighborhood and sharing many common features as small size and little substantial economies, each municipality of the analyzed region has its specificities and some of them, such as social capital, for example, may have some influence on GDP, or even on the efficient operation of the PBF, without being directly observed. Thus, the fixed effects technique assumes that these unobserved variables are correlated with the explanatory variables in the model.

The technique of random effects, on the other hand, requires strict exogeneity, that is, the absence of correlation between the explanatory variables and the idiosyncratic error as well as absence of correlation also with the unobserved variables.

If the results of the fixed effects estimates and random-effects differ, it is necessary to choose which technique is most appropriate. An instrument available for such judgment is Hausman specification test which consists in comparing the estimates of fixed effect and random effect, testing the hypothesis of independence between the unobserved variable, which is assumed to be variable

in time, and explanatory variables. In the case of a significant difference between the estimates, it rejects the hypothesis of independence, which is a technical assumption of random effects (Wooldridge, 2002, p. 288-291). In this case, the fixed effects technique is considered more suitable.

In the case of small samples using fixed effects estimation, errors tend to be negatively correlated[1], which makes indispensable a correction provided by the robust variance matrix.

4.2. Description of the Model

The basic model was built in order to determine which variables have the greatest impact on GDP growth of cities in the state of Sergipe. Given the importance of income transfers to the small towns, they were included as independent variables: values passed on the Bolsa Família Program - focus of this analysis - value of social security benefits (pensions and retirements) and transfers from the Fundo de Participação dos Municípios (FPM). Considering that all cities of Sergipe receive royalties, this information was also included among the explanatory variables. Finally, to capture the dynamics of local economies, the value added of the three economic sectors: agriculture, industry and services was included. In addition, the amount of tax on transactions regarding the circulation of goods and services (ICMS) transferred to each municipality has been included to reflect the strength of the local economy. Although it is constituted as a transfer, it is directly related to the municipal economic dynamism, given the principle of derivation[2]. Table 3 presents the set of model variables.

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[1] The proof will not be presented here, but a very didactic one can be found in Wooldridge (2002, p. 270).

[2] The principle of derivation consists of preserving, in the resources distribution, the original location of the taxable event. In Sergipe, 75% of the ICMS amount transferred to municipalities should obey the principle of derivation (SILVA, 2013).

Table 3

Model Variables – Descriptive – 2012 (R$ thousand)

MUNICIP ALITIES	GDP	VALUE ADDED			ICMS Transfers	Royalties	Social Security	PBF	FPM
		Agriculture	Industry	Services					
Amparo de São Francisco	18469,05	1230,33	2235,96	14328,30	2042,63	202,81	309,36	561,04	5820,51
Aquidabã	142671,11	19348,61	11948,87	104183,22	2726,67	3370,94	25998,52	4298,77	11650,38
Aracaju	9813851,61	5976,29	1482584,42	6869736,92	159786,52	35079,40	706467,30	51262,72	196146,34
Arauá	70589,14	10047,03	5929,92	51427,01	2171,47	1368,75	7751,17	2960,50	7511,55
Areia Branca	130047,55	23533,12	12417,57	88082,13	2552,51	309,62	9560,85	3804,28	11650,38
Barra dos Coqueiros	333515,49	3764,82	139646,27	166363,46	5048,66	3611,32	5241,21	4448,17	13592,12
Boquim	294652,05	6836,71	83356,05	168465,26	3190,54	285,52	26511,53	6253,67	13592,12
Brejo Grande	57110,66	7349,09	13408,01	34941,04	2088,10	284,70	2417,63	2023,09	5825,19
Campo do Brito	116939,27	7578,06	16406,24	87233,20	2488,40	316,84	19741,66	3723,35	9708,65
Canhoba	30208,79	5400,75	2843,52	20938,89	1988,16	85,71	3748,71	1183,87	5825,19
Canindé de São Francisco	1399830,53	24720,01	1181625,19	179281,47	64904,05	12042,45	22734,30	7030,25	13592,12
Capela	267146	38836,31	44915,40	168571,82	16963,20	4015,82	21285,35	6932,39	15487,83
Carira	147503,37	16589,29	15515,45	106780,28	3117,55	253,78	22440,03	5161,03	11650,38
Carmopolis	620406,72	3155,45	467019,88	118645,57	8488,10	43997,74	5815,51	2811,36	9708,65
Cedro de São João	35242,69	3083,74	3052,75	27792,75	2054,60	149,06	1460,86	1334,01	5825,19
Cristinapólis	109120,49	8747,16	11904,65	82916,69	3742,87	218,88	8204,99	4449,80	9708,65
Cumbe	29635,91	6169,11	2216,23	20310,11	1974,28	150,04	958,07	919,22	5825,19
Divina Pastora	211624	2604,01	178958,08	27313,88	2512,58	6477,59	851,60	1064,29	5825,19
Estancia	1303712,68	29640,86	484132,60	528248,25	26679,50	4557,11	72430,09	11753,02	23300,77
Feira Nova	42331,16	9639,94	3025,96	28165,79	2007,41	168,57	837,26	1576,48	5825,19
Frei Paulo	194721,79	17283,24	53842,31	96515,27	5734,12	233,16	15747,69	2733,05	9708,65
Gararu	80742,71	17701,61	6301,65	54207,12	2049,68	180,80	9194,90	3539,84	7766,92
General Maynard	19125,18	596,59	3063,09	14943,47	1970,98	296,83	193,07	538,70	5825,20
Graccho Cardoso	41017,62	8811,96	3673,13	27165,08	1990,31	149,06	1659,01	1778,17	5825,26
Ilha das Flores	47602,81	4893,37	4357,25	36938,18	2135,75	106,76	3830,60	2401,20	4893,76
Indiaroba	99512,98	15194,03	8500,41	71305,30	2183,11	249,48	2912,18	4405,61	9708,65
Itabaiana	1005866,16	36463,38	96430,32	742349,29	11528,17	642,21	87358,11	15176,73	27184,23
Itabaianinha	250449,94	14407,46	30958,93	189988,13	3324,68	341,85	32715,83	10610,63	17475,58
Itabi	38640,21	6654,42	4088,30	26224,32	2066,09	223,21	5797,37	1220,12	5825,19
Itaporanga d' Ajuda	600482,75	25165,96	279772,16	211227,36	9192,37	5452,20	16220,46	7463,14	15533,85
Japaratuba	619527,28	29323,22	470725,46	108197,99	7349,57	15023,65	14679,94	3715,51	11650,38
Japoatã	101034,83	22598,10	9643,60	63916,38	3166,83	221,73	9872,55	3653,74	7766,92
Lagarto	865259,49	75915,91	132491,10	564311,29	8880,80	575,71	98368,70	20004,34	29125,96

Laranjeiras	1010389,03	20526,21	356111,18	432332,01	34373,41	288,65	10800,85	5872,64	13592,12
Macambira	43968,7	4389,76	3767,67	33936,47	2063,67	165,77	7077,24	1565,54	5825,19
Malhada dos Bois	30111,37	1992,04	2820,14	23361,56	3221,36	158,49	564,85	881,50	5825,19
Malhador	76136,59	8303,18	6268,76	58225,39	2127,47	208,32	10358,88	2727,37	7766,92
Maruim	204414,35	9206,07	69373,11	105345,00	4269,24	1795,58	12115,18	3541,01	9708,65
Moita Bonita	71659,91	9229,03	5764,08	53370,24	2183,83	266,70	14889,10	1982,79	7766,92
Monte Alegre de Sergipe	92774,96	13314,46	7220,54	68158,56	2168,75	234,18	10929,67	3631,17	9708,58
Muribeca	58514,81	5050,71	11587,65	38240,63	2078,56	211,30	1143,95	1658,32	5825,20
Neopolis	165026,63	25699,78	23988,11	101630,91	3732,10	281,47	20832,66	5022,69	11650,56
Nossa Senhora Aparecida	80459,18	9430,88	15655,88	46951,69	2178,50	149,06	9661,85	2334,84	5825,19
Nossa Senhora da Gloria	346380,84	35796,19	50491,00	222824,73	5132,93	359,15	36433,36	7911,26	15533,85
Nossa Senhora das Dores	217584,93	24063,32	32003,31	143613,19	3210,95	285,52	26935,96	5727,24	13592,12
Nossa Senhora de Lourdes	42042,52	6206,53	3533,05	30635,37	2217,01	162,60	6948,33	1642,43	5650,03
Nossa Senhora do Socorro	2049719,31	5055,71	299346,09	1342467,46	24976,16	2115,50	25456,08	29316,70	63576,01
Pacatuba	111861,63	19007,02	21092,26	66986,79	5296,21	537,70	10953,92	4191,82	7767,57
Pedra Mole	21850,5	2379,44	1745,22	17135,45	1947,19	162,37	2367,49	724,43	5825,19
Pedrinhas	50293,34	2190,64	4681,09	41616,77	2125,41	228,21	1218,25	2311,25	6769,81
Pinhão	41139,35	4276,30	3549,92	31429,81	2026,16	209,43	1136,81	1386,87	5825,19
Pirambu	69584,61	4937,92	17240,59	44987,55	2588,48	10539,31	2586,42	1964,25	5825,19
Poço Redondo	187705,97	28816,95	15799,17	134933,35	2330,21	317,26	18513,61	9009,22	15533,85
Poço Verde	133678,45	7906,73	11968,79	106864,31	2544,46	247,28	27100,36	6007,54	11650,38
Porto da Folha	197471,55	27796,27	20113,40	140642,15	2533,58	354,06	25029,60	7619,02	13592,12
Propria	313990,02	9777,37	54292,19	211298,97	5876,54	288,69	48381,69	5909,20	13592,12
Riachão do Dantas	113901,54	16585,55	9172,56	84989,43	2076,19	244,55	18449,67	5488,38	11650,38
Riachuelo	148608,45	7371,05	75836,13	53393,03	4321,38	2138,79	3652,54	2246,12	5825,19
Ribeiropólis	152027,07	9799,70	27557,30	100273,07	3608,18	241,03	22663,18	3571,66	11650,38
Rosário do Catete	408965,32	10142,27	246908,26	98163,84	16280,17	8821,06	3843,56	2087,73	5825,19
Salgado	118824,98	10387,37	12640,94	90315,93	2400,54	250,62	17147,07	4194,78	11650,38
Santa Luzia do Itanhy	101227,62	20566,88	7343,96	69497,40	2057,60	150,55	1499,30	4293,27	8022,30
Santa Rosa de Lima	26201,71	4105,95	2130,72	19212,05	1986,24	227,26	630,07	1046,77	5825,19
Santana do São Francisco	41939,35	4615,28	3994,90	32192,02	ND	ND	3272,02	2031,34	ND
Santo Amaro das Brotas	107527,49	9066,40	39899,73	54946,39	2440,01	2089,20	8733,12	2641,98	7766,92
São Cristovão	590068,92	26006,99	118211,42	400880,84	7474,95	1815,91	24336,14	14469,67	25242,50
São Domingos	66069,67	4517,03	9245,50	48444,25	2448,42	294,71	7414,13	2548,78	7766,92
São Francisco	23585,72	2525,37	1930,50	18274,45	1954,49	123,35	548,61	807,89	5825,19

São Miguel do Aleixo	27030,73	3877,17	2129,61	20037,06	1950,13	144,06	431,55	1083,80	5825,19
Simão Dias	374946,44	66032,72	49477,23	223864,20	5360,54	378,13	45012,78	9741,32	17475,58
Siriri	162853,11	10212,96	105532,02	42403,57	3217,80	3900,59	4381,74	2102,58	5825,19
Telha	21369,7	2502,21	2109,84	16131,38	1985,34	144,15	541,51	792,66	5825,19
Tobias Barreto	337076,51	17034,71	40857,76	251689,94	4297,87	387,08	53006,31	11010,29	19417,31
Tomar do Geru	77866,56	7136,25	7124,65	60655,09	2147,96	184,53	11681,57	3836,36	7766,92
Umbaúba	167750,04	6523,81	16707,06	130445,79	3023,30	253,78	15322,87	5249,01	11650,38
MEAN	**370975,89**	**13781,63**	**94456,19**	**218850,84**	**7680,18**	**2459,45**	**24497,60**	**5239,67**	**13451,71**
Standard Error	**1160862,7**	**13411,93**	**235373,46**	**802005,46**	**20095,16**	**6877,06**	**82000,73**	**7117,01**	**23016,94**

It was attempted to avoid the analysis of a single year to minimize problems arising from exceptional situations that could bias the results. So it was opted for the analysis of the last eight years available. As the information to GDP has a time lag of two years (t - 2), the analysis period comprehends the years 2004-2012.

Information about the GDP and the value added of agriculture, industry and services are provided by SEPLAG/SE under the Regional Accounts project which calculates the GDP's state together with the IBGE. Data are expressed in thousand R$.

The FPM transfers and the amount received as royalties was obtained from the National Treasury website and are expressed in R$.

The transfers of ICMS, in turn, were provided by the state Department of Finance (SEFAZ/SE), while the value of social security benefits was granted by the Ministry of Social Security. Both information is expressed in R$.

The amount of allowances paid through PBF, in turn, was obtained from the state unit of MDS. All data are expressed in current values.

For estimation purposes, the original information was standardized[3] in order to minimize the possibility of heteroskedasticity.

Table 3 presents the information concerning the dependent and independent variables, as well as their means and standard deviations. For reasons of size only the data for the year 2012 were presented.

The assumptions of multiple regression model were tested in software SPSS 13.0, but not included in the work for size reasons, which are the following: Strong occurrence of multicollinearity, which led to the withdrawal of three model variables - value added of services sector, transfers from Fundo de Participação dos Municípios (FPM) and the state tax on Goods and Services (ICMS). The model with the remaining variables showed low VIF's (between 1.4

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[3] The standardization was made in the conventional way by subtracting the mean and dividing each variable by standard error of the sample.

and 5.1), absence of residuals autocorrelation - according to the Durbin-Watson test - and the presence of heteroskedasticity as the results of White´ Test.

Thus, panel data analysis was performed using software STATA 12.0 as well as the robust variance matrix due to the heteroskedasticity detected by the White test.

4.3. Analysis of Results

Table 4 shows the results of the estimates of fixed and random effects, performed in Stata 12.0, using the robust variance matrix.

Table 4

Results of Estimations

	FE	RE
r2 within	0,5230	0,5061
between	0,9635	0,9808
overall	0,9618	0,9794
Constant	0,00005	-0,00001
	[0,569]	[0,999]
VAAgric.	0,15773**	0,00535
	[0,021]	[0,454]
VAInd	0,28564*	0,29471*
	[0,000]	[0,000]
Royalties	-0,01112	-0,01014
	[0,328]	[0,262]
Social Security	0,29859**	0,66945*
	[0,024]	[0,000]
PBF	0,08645	0,09297
	[0,266]	[0,228]
F	33,53	
	[0,000]	
χ^2		3.841,48
		[0,000]

*significant 1% error
** significant 5% error
p-value in brackets

Observing the table, it can be seen that the fixed effects model explained 52% of variance of GDP in the period. Note that only the coefficients of value

added of agriculture, industry and transfers of social security benefits are statistically significant and have the expected signs. Bolsa Família allowances, however, do not seem to contribute to GDP growth of the state's municipalities.

On the other hand the random effects model has a coefficient of determination (r2 overall) of about 98%, but only the value added of industry and social security disbursements are statistically significant and have the expected signs. Again, the payments of Bolsa Família do not seem to contribute to GDP growth of the state's municipalities.

Despite the PBF disbursements have been shown to be not statistically significant in the two estimates, the results differ and thus is necessary to perform the Hausman test to identify the most appropriate technique. As we used the robust variance matrix, however, the Hausman test can not be applied. In this case, it applies the Sargan-Hansen test, whose result of 59.218 (p-value = 0.000) indicates the fixed effects model as the most appropriate[4].

Thus, the value added of agriculture and industry, as well as of social security transfers, explain about 52% of GDP growth in the municipalities, especially the last two, whose β appears to be more significant. Bolsa Família allowances, however, seem not statistically affect the municipal GDP, in spite of representing a significant percentage of the economy of smaller localities.

5. MAIN CONCLUSIONS

This article started from the assumption that the PBF has not only micro but also macroeconomic impacts and the lower the economic strength of a city, the most important must be such impacts in relative terms. In this sense, the study aimed to observe the impact of direct income PBF transfers on GDP of municipalities in the state of Sergipe between 2004 and 2012.

The state of Sergipe was chosen because it is made up of small towns and reduced economic dimension, where the transfer of funds of the Union and states often have significant weight in the composition of their tax revenues.

Tthen a simple model was built seeking to observe the effect of four transfer revenues on the municipal GDP: FPM, royalties, social security disbursements and PBF allowances. To capture the dynamics of the local economy the value added of the three sectors of the economy and the value of the ICMS transfers were included.

The model explained 52% of variance of GDP in the period. It was verified that the coefficients of the value added of agriculture, industry and social

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[4] When the Hausman test generates a negative signal or a non-positive definite matrix, Prof. Mark Schaffer of Heriott-Watt University (Edinburgh) suggests replacing it by the Sargan-Hansen test, which produces a necessarily positive result whose interpretation is similar to the Hausman test. (www.statalist.com.it/hausmannegative/).

security benefits are statistically significant, ie, disbursements of the Bolsa Familia program does not appear to have statistically contributed to GDP growth of municipalities in Sergipe.

Obviously, it is a simple model that can be enhanced with the inclusion of other relevant variables such as the Municipal Human Development Index (HDI) or some institutional information from municipalities. Thus, the improvement and extension of this work could indicate fruitful paths for future research.

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