Universidade de Brasília

Faculdade de Economia, Administração e Contabilidade

Departamento de Economia

Crédito Bancário e Políticas Públicas

Thiago Luis dos Santos Pinto

Brasília

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Tese apresentada ao Programa de Doutorado em Economia da Universidade de Brasília como requisito à obtenção do título de Doutor em Ciências Econômicas.

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À Carol e aos meus pais, uma vez mais.

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"Somos exatamente o que sonhamos."

Resumo

Esta tese consiste em 3 artigos. No primeiro artigo verifico se os bancos públicos brasileiros seguiram critérios políticos na concessão de crédito no período estudado (2003 a 2013). Verifico também quais os efeitos que alterações na oferta de crédito dos bancos provocaram nos seus respectivos lucros. Os resultados revelam a existência de motivação política na oferta de crédito: quanto maior a votação do partido do governo nas eleições presidenciais em um município, maior foi o incremento na oferta de crédito dos bancos públicos nesta localidade. O inverso aconteceu com os bancos privados. Encontramos ainda uma relação significativa e positiva entre o lucro e o aumento da oferta de crédito. Emprestar mais gerou lucros maiores para bancos públicos e privados. No entanto, os retornos obtidos pelos privados foram superiores aos dos públicos ao ofertar mais crédito. No segundo artigo investigo os efeitos do crédito público no desenvolvimento e crescimento das cidades brasileiras após a crise de 2008. Os resultados mostram que as cidades em que o volume de crédito público é maior do que o de crédito privado apresentam maior evolução nos índices de desenvolvimento do que as demais. No entanto, o aumento da participação do crédito público é prejudicial a esse desenvolvimento: a evolução do IFDM e do IDH é pior em cidades onde a participação do crédito público no total de empréstimos aumentou após a crise de 2008. Esses resultados são os mesmos para as mesorregiões e microrregiões brasileiras. Por outro lado, não há uma relação significativa entre crédito público e PIB per capita. Somente nas macro e micro regiões observamos um efeito positivo de aumentos do crédito público no PIB per capita das regiões. No terceiro artigo verifico se o Bolsa Família foi usado com fins eleitorais. Os resultados mostram que as cidades que elegeram um candidato do partido do governo nas eleições para prefeito de 2012 receberam mais benefícios do que aquelas onde os candidatos do partido do governo não foram eleitos. Da mesma forma, cidades com alto percentual de votos para o partido do governo nas eleições presidenciais de 2006 receberam um aumento maior nos benefícios do que cidades com menor percentual. Os mesmos resultados são obtidos nas eleições presidenciais de 2010 nas regiões Centro-Oeste e Nordeste. Nossos resultados também mostram que os Índices de Desenvolvimento da Firjan parecem ser mais relevantes para explicar a distribuição dos benefícios do Bolsa Família do que o PIB per capita. Entretanto, muitas vezes estas variáveis não são nem ao menos estatisticamente significantes, o que fortalece nossas conclusões sobre manipulação na distribuição de benefícios.

Palavras-chave: Crédito Bancário, Crédito Público, Finanças, Banking, Desenvolvimento, Crescimento, Políticas Públicas, Política.

Abstract

This thesis consists of 3 articles. In the first article I investigate the credit behavior of Brazilian banks in the period of 2003 to 2013. I examine if politics play a relevant role in public credit allocation and if this allocation affects government-owned banks profits. The results reveal that politics influence public credit allocation. The higher the percentage of votes the government party receives in a city, the higher the increment in credit supply of government-owned banks in this city. The opposite occurs when I analyze the credit supply of private banks. I also find a significant and positive relationship between ROA and the raise of credit supply. However, increases in credit supply causes lower increases in the ROA of state-owned banks than in the ROA of private banks. In the second article I investigate the effects of public credit on the development and growth of Brazilian cities after 2008 crisis. The results show that public credit influence the development of Brazilian cities. Cities in which public loans volume is higher than private loans volume show a greater evolution in both FDI and HDI in the post-crisis period. However, the increase in the market share of state-owned banks in the credit market is harmful to this development. The evolution of both FDI and HDI is worse in cities that become more dependent of public credit after 2008 crisis. These results also apply to Brazilian macro and micro regions. On the other hand,I can not find a significant relationship between public credit and per capita GDP in Brazilian cities. Only in Brazilian macro and micro regions we observe a positive effect of increases in the market share of public credit on per capita GDP. In the third article I investigate the use of Bolsa Família, a Brazilian social program designed to reduce poverty and social inequalities, for electoral purposes. The results show that cities that elect a candidate from government party in 2012 mayoral elections where previous mayor is not affiliated to this party receive more benefits than cities that do not elect government party candidates. Similarly, cities with higher percentage of votes in favor of government party in 2006 presidential elections receive more benefits than cities with lower percentage. I also observe this result in 2010 presidential elections in Midwest and Northeast regions. The results also show that Firjan Development Indexes (FDI and FDI-I) seem to be more relevant to explain Bolsa Família benefits distribution than per capita GDP. However, these variables are not even statistically significant in many cases. It strengthens our findings of manipulation in benefits distribution.

Keywords: Banking Credit, Public Credit, Finance, Banking, Development, Growth, Public Policies, Politics.

Lista de Figuras

Lista de Tabelas

Lista de Siglas

BC   Banco Central do Brasil

Firjan   Federação das Indústrias do Estado do Rio de Janeiro

FDI   Firjan Development Index

FDI-E   Firjan Development Index - Education

FDI-H   Firjan Development Index - Income

FDI-I   Firjan Development Index - Health

FMMI   Firjan Fiscal Management Index

GDP   Gross Domestic Product

HDI   Human Development Index

IBGE   Instituto Brasileiro de Geografia e Estatística

IDH   Índice de Desenvolvimento Humano

IFDM   Índice Firjan de Desenvolvimento Municipal

IPEA   Instituto de Pesquisa Econômica Aplicada

PIB   Produto Interno Bruto

TSE   Tribunal Superior Eleitoral

Contents

1 Introdução

O objetivo deste trabalho é fundamentalmente responder às seguintes questões de pesquisa:

1. Os bancos públicos seguiram critérios políticos na concessão de crédito?

2. O incremento da oferta de crédito levou os bancos públicos a obter maiores lucros? E os bancos privados?

3. O crédito público influenciou o desenvolvimento e o crescimento das cidades brasileiras?

4. O Bolsa Família foi utilizado com fins políticos?

As três primeiras perguntas foram motivadas pela grande expansão do crédito promovida pelos bancos públicos nas últimas duas décadas no Brasil e pelo expressivo número de casos de corrupção e de ingerência política nas empresas do governo federal. A quarta e última pergunta foi motivada pelas denúncias de manipulação dos programas sociais do governo federal, supostamente com fins eleitorais. Como denominador comum de todas as perguntas estão os efeitos de supostas distorções tanto da utilização do crédito público quanto dos benefícios dos programas sociais.

Para responder às perguntas foram produzidos três artigos. No primeiro verifico se os bancos públicos brasileiros seguiram critérios políticos na concessão de crédito no período estudado (2003 a 2013), e quais os efeitos que alterações na oferta de crédito dos bancos públicos e privados provocaram nos seus respectivos lucros. Os resultados revelam a existência de motivação política na oferta de crédito: quanto maior a votação do partido do governo nas eleições presidenciais em um município, maior foi o incremento na oferta de crédito dos bancos públicos nesta localidade. O inverso aconteceu com os bancos privados. Encontramos ainda uma relação significativa e positiva entre o lucro e o aumento da oferta de crédito. Emprestar mais gerou lucros maiores para bancos públicos e privados. No entanto, os retornos obtidos pelos privados foram superiores aos dos públicos ao ofertar mais crédito.

No segundo artigo investigo os efeitos do crédito público no desenvolvimento e crescimento das cidades brasileiras após a crise de 2008. Os resultados mostram que cidades em que os bancos públicos foram a principal fonte das operações de crédito apresentam índices de desenvolvimento melhores do que as demais. No entanto, o aumento da participação do crédito público é prejudicial a esse desenvolvimento: a evolução do IFDM e do IDH é pior em cidades onde a participação do crédito público aumentou após a crise de 2008. Esses resultados são os mesmos para as mesorregiões e microrregiões

brasileiras. Por outro lado, quando olhamos para o PIB per capita, os resultados não são tão conclusivos. Somente quando aplicamos nossos testes em macro e micro regiões observamos um efeito positivo do aumento da participação do crédito público no PIB per capita das regiões. Não obtemos os mesmos resultados ao aplicar nossos modelos nas cidades.

No terceiro artigo verifico se o Bolsa Família, programa social destinado a reduzir a pobreza e as desigualdades, foi usado para fins eleitorais. Os resultados mostram que as cidades que elegeram um candidato do partido do governo nas eleições para prefeito de 2012 receberam mais benefícios do que aquelas onde os candidatos do partido do governo não foram eleitos. Da mesma forma, cidades com alto percentual de votos para o partido do governo nas eleições presidenciais de 2006 receberam um aumento maior nos benefícios do que cidades com menor percentual. Quando olhamos para as regiões brasileiras separadamente, podemos ver os mesmos resultados para as eleições presidenciais de 2010 no Centro-Oeste e Nordeste. No Sudeste, as cidades que elegeram candidatos do partido do governo para prefeito em 2012 onde já estavam no poder foram as que receberam mais benefícios, não aquelas em que não estavam no poder. Nossos resultados também mostram que os Índices de Desenvolvimento da Firjan parecem ser mais relevantes para explicar a distribuição dos benefícios do Bolsa Família do que o PIB per capita. No entanto, muitas vezes estes índices não são nem ao menos estatisticamente significantes. Isso fortalece as conclusões sobre manipulação na distribuição de benefícios.

Os três artigos utilizam metodologias semelhantes, baseadas em modelos de diferenças em diferenças para verificar como as variáveis de interesse se comportam nos períodos pré e pós tratamentos. Os modelos principais são uma composição de três variáveis explicativas, em linha com o modelo DD de Angrist Pischke (2009). A primeira é a variável independente principal (por exemplo, o nível de votação do partido do governo), que teoricamente responde pelas alterações na variável dependente. A segunda é uma dummy para indicar o um critério de seleção (total ou parte dele), como a dummy que diferencia os bancos públicos dos privados. E a terceira é uma interação entre as duas primeiras, com a finalidade de observar se o tratamento é realmente significativo.

Todos os dados utilizados são secundários, coletados de bases de acesso público, tais como o Estban, o PIB dos municípios do IBGE, o Ipeadata do IPEA, o resultado das eleições do TSE etc. O período abrangido foi de 2002 a 2014, embora nem todas as informações estivessem disponíveis em todos estes anos. Este trabalho está organizado da seguinte forma: na primeira seção, esta introdução faz um pequeno resumo de todos os três artigos. Nas seções dois, três e quatro, são apresentados os três artigos integralmente, incluindo seus respectivos anexos. Na quinta seção, são apresentadas as conclusões sobre o trabalho como um todo, assim como as limitações e os desafios enfrentados. Na sexta e última seção, são apresentadas as referências bibliográficas.

2 The Effects of Politics on Public Banks Lending and Profits

Abstract

We investigate the credit behavior of Brazilian banks in the period of 2003 to 2013. We examine if politics play a relevant role in public credit allocation and if this allocation affects government-owned banks profits. Our results reveal that politics influence public credit allocation. The higher the percentage of votes the government party receives in a city, the higher the increment in credit supply of government-owned banks in this city. The opposite occurs when we analyze the credit supply of private banks. We also find a significant and positive relationship between ROA and the raise of credit supply. However, increases in credit supply causes lower increases in the ROA of state-owned banks than in the ROA of private banks.

2.1 Introduction

In the second half of the decade of 2000, Brazilian federal state-owned banks promoted a huge expansion of the credit supply. Such expansion aimed primarily at softening the effects of the 2008 crisis in the Brazilian economy. It found support in the significant increases in GDP since 2004 and in the abundance of capital flows at the time. This huge quantity of resources allowed the federal government to increase the availability of loans to financial agents. Besides that, federal government promoted a relaxation of rediscount fees, reduction of compulsory deposits, expansion of credit for agribusiness and expansion of export sector financing.

However, the expansion of credit supply did not lessen even after the economic recovery. It lasted until almost the half of the following decade. At that time, the population was already excessively indebted and no longer so confident in the Brazilian economy. Moreover, default was at record levels. It led major federal state-owned banks to face problems with the quality of their lending with increasing frequency.

At the same time, accusations of corruption and political interference involving Brazilian federal government and its companies became increasingly common. Among these accused companies were the main federal state-owned banks. The previously praised credit expansion was then questioned in this new context of default problems and worse performance. Did politics influence public credit expansion and allocation?

This article examines the credit behavior of Brazilian banks during the period of 2003 to 2013. Our purpose is to investigate if federal state-owned banks follow political criteria when offering credit. As federal government holds at least the majority of federal state-owned banks shares, the first actively participates in strategic decisions of the lasts. Without solid governance practices there could be some conflicts of interests, like the use of public banks resources with electoral purposes. State-owned banks can offer credit not to the lenders with the best risk profiles, but to people living in places where government party aims to obtain more votes.

In the literature there are evidences of such distortions. We can find cases in which public banks expand their lending during elections years, like Dinç (2005). Also, cases in which public banks smooth requirements for borrowers in cities where government party is stronger, like Sapienza (2004). On the other hand, these problems not always happen. Coleman and Feler (2015) examine the effects of 2008 crisis on credit supply of Brazilian federal state-owned banks. Although credit supply increases in localities with large participation of these banks, they find no evidence that loans are allocated according to political criteria.

It is equally important to understand if this greater credit supply turns into greater profits. As lending is one of the main operations of a bank, and as banks aim primarily at profits, it should always happen. The studies that address the relationship between profits and lending show the existence of problems in the performance of state-owned banks that expand credit supply (Chen et al, 2016).

We adopt an approach more focused on medium and long term effects than looking specifically at elections years to investigate political influence. Moreover, we study the effects of lending in profits. Addressing such an important and understudied relationship in Brazil is the main differential of this research in relation to previous works.

Our results show that elections results influence the state-owned banks credit supply. The more votes the government party receives in a presidential election in a city, the higher is the increment of state-owned banks credit supply in this city. The opposite occurs with private banks. It happens to all types of credit we study (total lending, earmarked and non-earmarked credit).

Regarding profits, we find a significant and positive relationship between this and the raise of credit supply. However, we compare the increases in ROA of private and state-owned banks. We find that increases in credit supply causes lower increases in the ROA of state-owned banks than in the ROA of private banks. We argue that it is due to problems with the quality of state-owned banks lending.

2.2 Identification

We identify evidences of political influence in federal state-owned banks credit supply. It happens in both 2006 and 2010 presidential elections. This influence is more evident in 2006, but also occurs in 2010. We also identify that, among the banks that expand their credit supply, state-owned banks show worse ROA after expansion than private banks. We believe that the criteria state-owned banks adopt when lending are behind this difference in performance.

Our strategy starts with the elections results. We base our analysis on the percentage of votes that government party obtains in the second round of president elections in each city. As we have the same two parties competing in the last four second round president elections in Brazil, we use it to give more consistency to our results. If we adopt mayoral elections, we would have to deal with different and complex alliances. Sometimes two parties are allies in a city and opponents in another. Also, the number of candidates and the number of sufficient votes to elect a candidate differ widely from one city to another. So, in order to avoid possible distortions, we just focus on presidential elections in this work.

Thus we select the cities where government party earns 50% or more of second round presidential elections votes. We consider these cities the places where this party is strong. If there is any political influence in credit supply, these cities should receive higher amounts of credit. We call them target cities from now on. We call the others non-target or simply other cities.

We do not focus our analysis on data related to elections years, to avoid undesired distortions. We are more interested in capturing effects that lasted for longer periods. Thus, we generate three years averages for each variable, before and after each election. In other words, when we analyze 2006 election, we compare the 2003-2005 average of a variable with its 2007-2009 average. We only include in our analysis cross section units with both averages available. For example, if a bank branch opens in 2006, it is not included in 2006 elections analysis, because it does not have 2003-2005 data.

Table 1 shows the evolution of common trends in target cities and in non-target cities after 2006 elections. Table 2 shows the evolution of the same variables after 2010 elections. In both elections variables evolve similarly in each group of cities (target and non-target). We would expect credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets) to behave the same way.

Table 3 shows the evolution of credit indexes after 2006 elections. First of all, we find that state-owned banks always have a higher percentage of their total assets allocated in credit operations than private banks. It happens both in target and non-target cities, and with the three types of credit (Total Lending, Non-Earmarked Credit and Earmarked

Table 1 – Common Trends – 2006 Elections

		FDI		GDP per capita		Basileia	
		All data	%	All data	%	All data	%
Target cities in 2006 elections	2003-2005 average (before treatment)	0.61	5.1%	13.21	22.6%	17.30	-4.3%
	2007-2009 average (after treatment)	0.64		16.19		16.56	
Non-target cities in 2006 elections	2003-2005 average (before treatment)	0.71	3.9%	20.29	22.8%	17.73	-6.1%
	2007-2009 average (after treatment)	0.74		24.91		16.64	

This table compares the evolution of common trends (Firjan Development Index, per capita GDP and Banks' Basileia Index) in target and non target cities in 2006 elections. For each common trend we calculate an average of three years before and an average of three years after this election and compare these values. All common trends vary similarly in both groups of cities. Target cities are those where the government party has 50% or more votes in 2006 second round president elections. Non-target cities are those where the government party has less than 50% votes in 2006 second round president elections.

Table 2 – Common Trends – 2010 Elections

		FDI		GDP per capita		Basileia	
		All data	%	All data	%	All data	%
Target cities in 2010 elections	2007-2009 average (before treatment)	0.68	6.8%	20.20	23.6%	16.62	-7.5%
	2011-2013 average (after treatment)	0.73		24.97		15.37	
Non-target cities in 2010 elections	2007-2009 average (before treatment)	0.69	6.7%	21.90	25.1%	16.56	-8.5%
	2011-2013 average (after treatment)	0.74		27.39		15.16	

This table compares the evolution of common trends (Firjan Development Index, per capita GDP and Banks' Basileia Index) in target and non target cities in 2010 elections. For each common trend we calculate an average of three years before and an average of three years after this election and compare these values. All common trends vary similarly in both groups. Target cities are those where the government party has 50% or more votes in 2010 second round president elections. Non-target cities are those where the government party has less than 50% votes in 2010 second round president elections.

Total Lendings / Total Assets Index
Localities where the goverment party had 50% or more votes in 2006 second round president elections (dvot_pres_06 = 1)
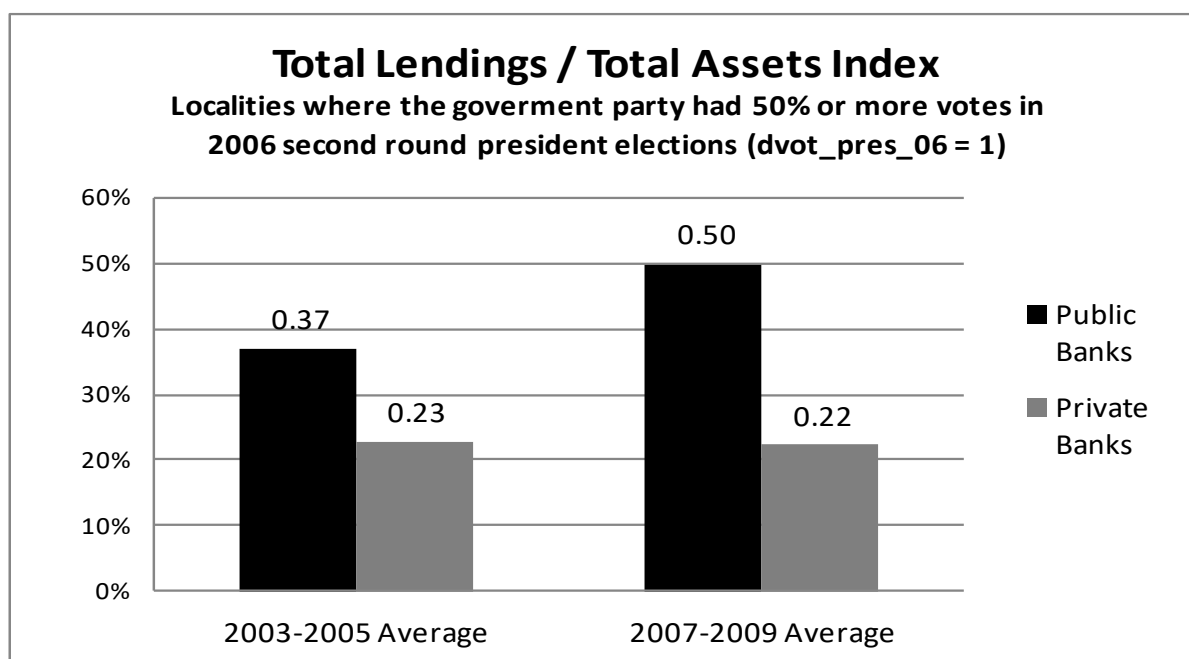
Figure 1 – Credit Index, Target Cities – 2006 Elections

Credit).

Table 3 – Credit Indexes, Target and Non-target Cities – 2006 Elections

		Total Lending / Total Assets			Non-Earmarked Credit / Total Assets			Earmarked Credit / Total Assets		
		2003-2005 Average	2007-2009 Average	%	2003-2005 Average	2007-2009 Average	%	2003-2005 Average	2007-2009 Average	%
State-Owned Banks	Target cities in 2006 elections	37%	50%	35%	15%	22%	42%	0.146	0.198	36%
	Non-target cities in 2006 elections	35%	46%	31%	10%	14%	37%	0.095	0.127	34%
Private Banks	Target cities in 2006 elections	23%	22%	-2%	18%	16%	-9%	0.171	0.167	-2%
	Non-target cities in 2006 elections	25%	26%	4%	17%	18%	4%	0.167	0.174	4%

This table compares the evolution of our three credit indexes (Total Lending/Total Assets, Non-Earmarked Credit/Total Assets and Earmarked Credit/Total Assets) in target and non target cities of 2006 elections, in state-owned and private banks. State-owned banks increase credit supply more in target cities than in non-target cities. The opposite occurs with private banks. Target cities are those where the government party has 50% or more votes in 2006 second round president elections. Non-target cities are those where the government party has less than 50% votes in 2006 second round president elections.

However, what we highlight is the existence of different strategies for state-owned and private banks in target cities (Figure 1). While in these cities private banks reduce their Total Lending/Total Assets index after 2006 elections by 2%, state-owned banks increase theirs by 35%. This difference is even greater when we examine non-earmarked credit: state-owned banks increase it by 42%, while private banks reduce it by 9%. It is hard to explain such disparity.

Private banks increase their credit supply in non-target cities after 2006 election. In other words, they retract credit supply in target cities and expand in non-target cities. It differs from the strategy that state-owned banks adopt. Although state-owned banks also expand credit supply in non-target cities, they expand less than in target cities.

Table 4 shows the same statistics with 2010 elections data. Again, the increase in state-owned banks non-earmarked credit supply is higher in target cities (12%) than in non-target cities (7%). On the other hand, private banks reduce non-earmarked credit supply in both target and non-target cities, but more intensely in target cities.

Table 4 – Credit Indexes, Target and Non-target Cities – 2010 Elections

		Total Lending / Total Assets			Non-Earmarked Credit / Total Assets			Earmarked Credit / Total Assets		
		2007-2009 Average	2011-2013 Average	%	2007-2009 Average	2011-2013 Average	%	2007-2009 Average	2011-2013 Average	%
State-Owned Banks	Target cities for 2010 elections	48%	52%	9%	18%	21%	12%	17%	21%	23%
	Non-target cities for 2010 elections	48%	53%	9%	18%	20%	7%	17%	20%	21%
Private Banks	Target cities for 2010 elections	25%	23%	-9%	18%	17%	-7%	16%	18%	11%
	Non-target cities for 2010 elections	25%	23%	-6%	17%	17%	-2%	16%	18%	10%

This table compares the evolution of our three credit indexes (Total Lending/Total Assets, Non-Earmarked Credit/Total Assets and Earmarked Credit/Total Assets) in target and non target cities of 2010 elections, in state-owned and private banks. State-owned banks increase credit supply more in target cities than in non-target cities. Private banks retract credit supply more in target cities. Target cities are those where the government party has 50% or more votes in 2006 second round president elections. Non-target cities are those where the government party has less than 50% votes in 2006 second round president elections.

Figure 2 reveals that the expansion of total lending in target cities in 2010 election is similar to 2006 election. State-owned banks increase lending in these cities (9%), while private banks lower it (-9%).

Table 5 shows the averages of HDI and per capita GDP before 2006 and 2010 elections. They provide additional evidences on how incoherent is the state-owned banks behavior. Non-target cities show higher pre-elections averages of both variables than target cities, in both 2006 and 2010. These cities seem to be safer places to offer credit. Indeed, private banks adopt this strategy. However, state-owned banks do the opposite and focus the expansion of their credit supply in non-target cities.

If there is any political influence in credit supply, it should be associated with a softened analysis of credit quality, what in its turn would lead to a reduction in profits. Otherwise, this political influence would not be a major concern. Expanding credit in target cities could be justified by the profits they generate.

Table 6 shows the evolution of ROA of banks that expand their credit supply after

Total Lendings / Total Assets Index
Localities where the goverment party had 50% or more votes in
2010 second round president elections (dvot_pres_10 = 1)
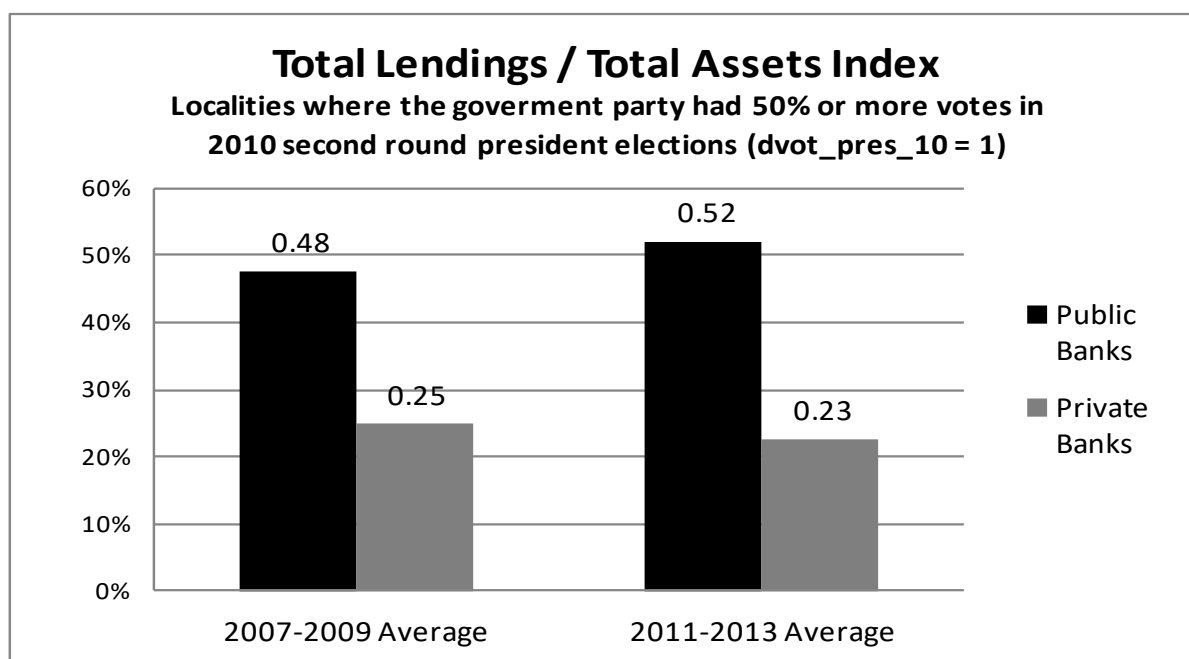
Figure 2 – Credit Index, Target Cities – 2010 Elections

Table 5 – Cities HDI and GDP, Target and Non-target Cities

		FDI	GDP per capita
2006	Target cities in 2006 elections	0.61	13.21
	Non-target cities in 2006 elections	0.71	20.29
2010	Target cities in 2010 elections	0.68	20.20
	Non-target cities in 2010 elections	0.69	21.90

This table compares pre-elections statistics (Firjan Development Index and per capita GDP) in target and non target cities in 2006 and 2010 elections. Target cities show in both elections worse FDI and per capita GDP. Target cities are cities where the government party has 50% or more votes in second round president elections. Non-target cities are cities where the government party has less than 50% votes in second round president elections.

2006 elections. We examine this evolution in 2 periods: the triennium immediately after election (2007-2009) and a longer triennium (2011-2013). We want to check if the results last for longer periods, as long term lending is a component of our credit variables.

Our first finding is that banks that expand their credit supply obtain returns on average higher than those who do not expand. However, among the banks that increase credit supply, state-owned banks ROA decrease in the long term, while private banks ROA increase. Our assumption of a less rigid analysis of credit quality could explain these differences in performances.

Table 7 displays the same statistics of the previous table restricting data to target

Table 6 – ROA, All Cities

		ROA			
		2003-2005 Average (period 1)	2007-2009 Average (period 2)	2011-2013 Average (period 3)	% (period 1 to 3)
State-owned Banks	Those who increase their lending from period 1 to 2	20%	21%	18%	-8%
	Those who do not increase their lending from period 1 to 2	22%	17%	14%	-35%
Private Banks	Those who increase their lending from period 1 to 2	25%	26%	26%	6%
	Those who do not increase their lending from period 1 to 2	39%	26%	22%	-42%

This table compares the evolution of ROA of state-owned and private banks. We separate those who increase credit supply from those who do not. We compare short term (2007-2009) and long term (2011-2013) three years averages of ROA. Among the banks that increase credit supply, ROA differ according to ownership. State-owned banks ROA decrease in the long term, while private banks ROA increase.

cities. As returns are not relevantly different, it does not provide relevant evidence of state-owned banks favoring target cities. However, private banks performance in these cities is much worse than its average performance. It make us question the reason why state-owned banks raise their lending in these places.

Table 7 – ROA, Target Cities

		ROA			
Cities where the goverment party has 50% or more of the votes in 2006 second round president elections		2003-2005 Average (period 1)	2007-2009 Average (period 2)	2011-2013 Average (period 3)	% (period 1 to 3)
State-owned Banks	Those who increase their lending from period 1 to 2	23%	25%	21%	-9%
	Those who do not increase their lending from period 1 to 2	22%	18%	17%	-25%
Private Banks	Those who increase their lending from period 1 to 2	29%	31%	26%	-10%
	Those who do not increase their lending from period 1 to 2	46%	32%	26%	-42%

This table compares the evolution of ROA in state-owned and private banks, between those who increase credit supply and those who do not, in cities where the government party has 50% or more of the votes in 2006 second round president elections. We compare short term (2007-2009) and long term (2011-2013) three years averages of ROA.

2.3 Literature Review

Political influence is a relatively new theme in banking literature. Table 8 lists some of the most relevant papers published. We highlight the results of Dinç (2005), that show that state-owned banks expand their credit supply in election years. Equally relevant are the results of Sapienza (2004), which reveal a manipulation of the rates of loans offered by state-owned banks in places where the government party is stronger. Önder and Özyıldırım (2013) find that the share of state-owned banks in the credit market is significantly higher in crisis periods and in local election years.

Specifically in Brazil, Coleman and Feler argue that, although credit supply increases after 2008 crisis in localities with large participation of federal state-owned banks, they do not allocate their loans according to political criteria. Carvalho (2014) find that firms aiming government bank lending expand employment in politically attractive regions in elections years, in exchange for favorable borrowing from government banks.

We find some studies examining the attitude of banks toward risk. Jia (2009) investigates the relationship between ownership and the prudential behavior of banks. He shows that lending by state-owned banks is less prudent than lending by other banks. According to the author, the accountability to shareholders gives the private banks a better incentive than state-owned banks to engage in prudent lending. Zhang et al. (2016) examines the impact of non-performing loans (NPLs) on banks behavior in China. Their results suggest that increases in the NPL ratio raises riskier lending, instead of diminish them. This increase in risk causes further deterioration of loans quality and financial system instability.

Other researches examine the relationship between credit quality and profits. Chen et al (2016) reveal problems in the performance of state-owned banks that expand credit supply. These problems do not occur with private banks. They also associate credit quality with the level of corruption in a country. In countries where this level is high, state-owned banks tend to perform worse when they lend more if compared to private banks. The same does not happen in countries with less corruption. Trujillo-Ponce (2013) finds a relationship between higher profits and a greater percentage of loans in total bank assets. However, higher profits are also related to lower levels of doubtful assets. The quality of credit seems to play an important role in his results.

Some authors state that politics not only influence the lending of state-owned banks but also its profits. Jackowicz, Kowalewski and Kozlowski (2013) show that state-owned banks report significantly smaller net interest income ratios during the years of parliamentary elections. Micco, Panizza and Yañez (2007) find that state-owned banks located in developing countries tend to have lower profitability and higher costs than their private counterparts. This differential in performance widens during election years.

Table 8 – Summary of main findings

Authors	Country	Period	Journal	Main results
Bonomo, M., Brito, R., Martins, B.	Brazil	2004-2012	Journal of International Money and Finance	Larger, older and less risky firms, the ones with better access to alternative sources of private funding, have benefited most from the government sponsored credit expansion.
Carvalho, D.	Brazil	1995-2006	Journal of Finance	Firms eligible for government bank lending expand employment in politically attractive regions near elections, in exchange for favorable borrowing from government banks.
Dinç, S.	43 emerging markets	1994-2000	Journal of Financial Economics	Government-owned banks increase their lending in election years relative to private banks.
Sapienza, P.	Italy	1991-1995	Journal of Financial Economics	The lending behavior of state-owned banks is affected by electoral results: the stronger the political party in the area where the firm is borrowing, the lower the interest rates charged.
Chen, H. et al.	56 countries	2007-2009	Journal of Financial Stability	For countries with high corruption, the increased lending by government banks in the crisis period is related to their underperformance relative to private banks, which suggests that they provide more loans to less efficient borrowers. This adverse effect does not happen to government banks in countries with low corruption.
Coleman, N., Feler, L.	Brazil	2008-2010	Journal of Monetary Economics	Localities in Brazil with a high share of government banks experienced a increase in lending following the onset of the financial crisis compared to areas with a low share of these banks. This higher lending does not appear to have been allocated politically.
Trujillo-Ponce, A.	Spain	1999-2009	Accounting and Finance	Higher bank profitability is associated with a large percentage of loans in total assets, a high proportion of customer deposits and a low doubtful assets ratio.
Micco, A., Panizza, U., Yañez, M.	179 countries	1995-2002	Journal of Banking & Finance	State-owned banks located in developing countries tend to have lower profitability and higher costs than their private counterparts. This differential in performance between public and private banks is driven by political considerations. On the other hand, there is no strong correlation between ownership and performance for banks located in industrial countries.
Jia, C.	China	1985-2004	Journal of Banking & Finance	Lending by state-owned banks has been less prudent than lending by joint-equity banks.
Iannotta, G., Nocera, G., Sironi, A.	Europe	2000-2009	Journal of Financial Intermediation	Government-owned banks have lower default risk but higher operating risk than private banks, indicating the presence of governmental protection that induces higher risk taking. Both operating risk and governmental protection tend to increase in election years.

They find no strong correlation between ownership and performance for banks located in industrial countries.

Iannotta, Nocera and Sironi (2013) show that state-owned banks have higher operating risk than private banks. According to the authors, it is due to the presence of governmental protection that induces higher risk taking. Both operating risk and governmental protection tend to increase in election years. Chen and Liu (2013) find that, during election years, private financial institutions earn higher ROA and loan growth than state-owned banks.

2.4 Methodology

Our methodology is based on a differences in differences approach. We apply it to our main variables to check how they differ from pre-treatment to post-treatment periods. This is be the best way to capture exogenous shocks effects in our dependent variables (total lending, earmarked and non-earmarked credit).

We compose our models using three explanatory variables, as DD model of Angrist & Pischke (2009). First we have the main independent variable (for example, the percentage of votes the government party obtains in an election). This variable is theoretically responsible for changes in the dependent variable. The second is a dummy to differentiate state-owned and private banks. And the third is an interaction between the first two. This interaction should reveal how state-owned banks observations differs from the others.

To answer our research questions it is necessary to format different treatments. Our first question is about political influence on credit supply. So we consider that treatment applies to state-owned banks in cities where government party obtains an expressive percentage of votes. In our three first models (2.1, 2.2 and 2.3), we test differences in the indexes of total lending, earmarked and non-earmarked credit as dependent variable. We also opt to expand the concept of target cities defined in the introduction and use other variables to measure political influence.

In our first model (2.1), the main independent variable is the difference between the percentages of votes that government party obtains in the last two second round presidential elections in a given city. This is our differences in differences model for credit operations in an Angrist & Pischke (2009) approach. It should reveal the increment in credit supply that increments in government party votes provoke. The interaction with the dummy of state-owned banks should reveal how these two variables are related in the specific case of state-owned banks observations.

$$dif\ credit_i = \beta_0 + \beta_1\ dif\ percvotes_i + \beta_2\ dummy\ govbank_i +$$
$$+ \beta_3\ dif\ percvotes_i * dummy\ govbank_i + \epsilon_i \tag{2.1}$$

Our second and third models modify the traditional DD approach. They offer another perspective as their main dependent variables refer to the last election results, not to the difference between the last two. These tests results should give more robustness to our first model results.

In our second model (2.2) we define the treatment analogously as we did in the identification section. The dependent variable is a dummy for cities where government party obtains 50% or more of the votes in second round presidential elections. The purpose is to test if our identification results are also statistically significant. A significant beta indicates that government party aims at cities where it has the majority of votes.

$$dif\ credit_i = \beta_0\ +\ \beta_1\ dummy\ votes_i + \beta_2\ dummy\ govbank_i +$$
$$+\ \beta_3\ dummy\ votes_i * dummy\ govbank_i +\ \epsilon_i$$

(2.2)

In our third model (2.3), the independent variable is the percentage of votes that government party obtains in the last second round presidential elections in a given city. Instead of testing the difference between the votes in the last two elections, like our first model, we test in this model only the result of the last election. As the dependent variable is the difference between the averages of credit supply before and after this election, this model should show how this election isolated influence the increase in credit supply.

$$dif\ credit_i = \beta_0\ +\ \beta_1\ percvotes_i +\ \beta_2\ dummy\ govbank_i +$$
$$+\ \beta_3\ percvotes_i * dummy\ govbank_i +\ \epsilon_i$$

(2.3)

Our second question is how increasing credit supply affects profits. To answer it we examine variations in our three credit indexes (Total Lending/ Total Assets, Non-Earmarked Credit/ Total Assets and Earmarked Credit/ Total Assets). In our first model of this second group (2.4), the main independent variable is the increment in credit supply after each election. This is our differences in differences model for profits in an Angrist & Pischke (2009) approach. It should reveal how the increment in credit supply affects a bank profits. We expect this relationship to be positive. A negative beta would indicate a problem with the quality of credit. The interaction between this main independent variable and the dummy of state-owned banks should reveal if there is a relationship between changes in credit supply and performance specifically in these banks.

$$dif\ ROA_i = \beta_0\ +\ \beta_1\ dif\ credit_i +\ \beta_2\ dummy\ govbank_i +$$
$$+\ \beta_3\ dif\ credit_i * dummy\ govbank_i +\ \epsilon_i$$

(2.4)

In our second model of this second group (2.5) the main variable is a dummy to indicate the banks that increased credit supply after a given election. The purpose is to provide a complement to the results of model (2.4).

$$dif\ ROA_i = \beta_0\ +\ \beta_1\ dummy\ credit\ expansion_i + \beta_2\ dummy\ govbank_i +$$
$$+\ \beta_3\ dummy\ credit\ expansion_i * dummy\ govbank_i + \epsilon_i$$

(2.5)

In 2006 elections, we study how ROA varies in two periods: in the triennium right after the election (2007 to 2009) and in the triennium after the following election (2011 to 2013). We search for long term effects of credit expansion in banks performances. To 2010 elections, due to limitations in our database, we only study ROA variation in the triennium right after this election (2011 to 2013).

Next we verify the consistency of our DD models results. We perform tests in simplified models in which only the main independent variables are present. We apply these simplified models only to state-owned banks and then only to private banks. We report the results of these tests in the annexes.

Brazil is a large country with great disparities. Comparisons between different cities (or different groups of cities) can be unfair and produce distorted conclusions. To prevent these problems we perform alternatives robustness tests of our results. We use an algorithm that minimizes the differences in the averages of pre-treatment characteristics (FDI, Basileia index and per capita GDP) of treated and non-treated groups. It produces samples of treated and non-treated cities with similar pre-treatment characteristics that can be more fairly compared. We call these samples our Matching Samples. In 2006 elections, we obtain these samples including only observations whose per capita GDP are between 4 and 277, whose Basileia index are between 12 and 50 and whose FDI are between 0.42 and 0.89. In 2010 elections, we obtain these samples including only observations whose per capita GDP are between 5 and 305, whose Basileia index are between 10 and 32 and whose FDI are between 0.44 and 0.87. We also report these results in the annexes.

We test specifically in target cities the effects of increases in credit supply on ROA. We do it by reapplying the tests with models 2.4 and 2.5 in these cities. We report these results in the annexes.

We perform additional tests to analyze other effects of increases in credit supply on returns. We calculate Z-Scores of returns, which are ROA averages of the last four years divided by ROA standard deviations in the same period. It shows us how much return a bank obtain for each unit of risk. The higher the ROA Z-Score, the better for a bank. The tests are almost the same as models 2.4 and 2.5, only with Z-Score replacing ROA.

Lastly, we reapply the tests in three groups of cities, classified according to their respective per capita GDP. The first group contains cities with the 25% lowest per capita GDP, the second cities with the 25% higher per capita GDP and the last group all remaining cities. We run these tests in both 2006 and 2010 elections. We report these results in the annexes.

We use secondary data in this work, available in open databases as EstBan from Central Bank, Cities GDP from IBGE, Ipeadata from IPEA and elections results from TSE. It covers the period from 2003 to 2013, although not all variables are available for

all these years. Table 9 show the control variables we use in this study.

Table 9 – List of Control Variables

Variable	Source	Output
FDI	Firjan	Firjan Development Index of a city
HDI	IPEA	Human Development Index of a city
GDP per capita	IBGE	City GDP/City population index
Basileia	BC	Basileia index
City Population	IBGE	Total of city residents

We consider as Total Lending the information in the column 160 of EstBan reports. Dividing these values by those in the column 399 (Total Assets), we generate the Total Lending/Total Assets indexes of each branch of each bank in each city. Analogously, we generate Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets indexes.

We calculate banks ROA as usual, dividing their profits by their respective Total Assets. We obtain profits simply subtracting the expenses (column 712) from the incomes (column 711) in EstBan reports. We generate the averages similarly to credit indexes, to trienniums before and after 2006 and 2010 elections.

We define a criteria to include banks in this study. In state-owned banks group we include only federal state-owned banks with retail portfolios in Brazil. In private banks group we include only private banks (national or foreign) with retail portfolios in Brazil. Therefore, we exclude BNDES (because it does not have a retail portfolio), as well as state banks.

Each cross-section unit i corresponds to the aggregate data of all agencies of a bank j in a city k. It is important to notice that different banks observations in a same city k have the same per capita GDP and the same votes associated to a given election. Analogously, same banks in different cities have the same Basileia Index in a given year.

2.5   Results

Our results reveal that elections are important to explain variations in our three credit indexes. All coefficients of variables related to 2006 elections, isolated, are significant and negative (Table 10). The same happens to almost all coefficients of variables related to 2010 elections (Table 11). However, the interactions between these variables and the dummy of state-owned banks produce significant and positive coefficients. It seems that the more votes the government party obtains in a city, the higher the increment in credit

supply of state-owned banks after the election. The opposite occurs with private banks credit supply.

Table 10 – Regressions Results, Credit Indexes, 2006 Elections

	Difference in Total Lending/ Total Assets averages from 2003-2005 to 2007-2009			Difference in Earmarked Credit/Total Assets averages from 2003-2005 to 2007-2009			Difference in Non-Earmarked Credit/Total Assets averages from 2003-2005 to 2007-2009		
	Mod (1)	Mod (2)	Mod (3)	Mod (1)	Mod (2)	Mod (3)	Mod (1)	Mod (2)	Mod (3)
Difference in percentage of votes for government party in 2002 and 2006 second round president elections	-.039*			-.031*			-.060*		
	(.007)			(.005)			(.005)		
Interaction of this difference in percentage of votes with dummy of state-owned banks	.104*			.084*			.126*		
	(.011)			(.007)			(.007)		
Dummy for cities where government party percentage of votes in 2006 second round president elections was 50% or more		-.014*			-.011*			-.022*	
		(.004)			(.002)			(.002)	
Interaction of this dummy with the dummy of state-owned banks		.034*			.029*			.048*	
		(.005)			(.003)			(.003)	
Government party percentage of votes in 2006 second round president elections			-.040*			-.028*			-.059*
			(.008)			(.005)			(.005)
Interaction of this percentage of votes with the dummy of state-owned banks			.097*			.085*			.134*
			(.012)			(.008)			(.008)
Dummy of state-owned banks	.127*	.101*	.070*	.045*	.024*	-.004	.066*	.031*	-.012**
	(.003)	(.004)	(.007)	(.002)	(.002)	(.004)	(.002)	(.002)	(.004)
n	7705	7883	7883	7547	7722	7772	7679	7857	7857
R²	0.22	0.21	0.21	0.085	0.08	0.08	0.15	0.14	0.15

Notes: This table shows regressions results of our models 1 to 3 applied to 2006 presidential elections. In each model we test as dependent variables differences between 2003-2005 and 2007-2009 averages of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets). Model 1 has as main independent variable the difference between percentages of votes for government party in 2002 and 2006 second round president elections. Model 2 has as main independent variable a dummy for cities where government party obtain 50% or more of votes in 2006 second round president election. Model 3 has as main independent variable government party percentage of votes in 2006 second round president election. All models include a dummy of state-owned banks and an interaction between this dummy and the main independent variable of each model. All main independent variables have significant and negative coefficients, but their interactions with the dummy of state-owned banks have significant and positive coefficients.

*p<0.005; **p<0.025; ***p<0.05

These results are the same when we restrict database to our matching samples and also when we test our simplified models. In these simplified models the relationship between credit supply and elections becomes clearer. When we test only state-owned banks data, the coefficients are significant and positive. When we test private banks, the coefficients are significant and negative. Again, the more votes government party obtains in a city, the more state-owned banks expand their credit offer. The opposite happens to private banks.

All variables selected to measure political motivation are relevant. Not only the percentage of votes in favor of government party in an election is statistically significant.

Table 11 – Regressions Results, Credit Indexes, 2010 Elections

	Difference in Total Lending/ Total Assets averages from 2007-2009 to 2011-2013			Difference in Earmarked Credit/Total Assets averages from 2007-2009 to 2011-2013			Difference in Non-Earmarked Credit/Total Assets averages from 2007-2009 to 2011-2013		
	Mod (1)	Mod (2)	Mod (3)	Mod (1)	Mod (2)	Mod (3)	Mod (1)	Mod (2)	Mod (3)
Difference in percentage of votes for government party in 2006 and 2010 second round president elections	-.013***			.011*			-.001		
	(.006)			(.004)			(.004)		
Interaction of this difference in percentage of votes with dummy of state-owned banks	.047*			-.033*			.003		
	(.009)			(.005)			(.006)		
Dummy for cities where government party percentage of votes in 2010 second round president elections was 50% or more		-.009**			-.002			-.007*	
		(.004)			(.002)			(.002)	
Interaction of this dummy with the dummy of state-owned banks		.009			.010*			.017*	
		(.005)			(.003)			(.003)	
Government party percentage of votes in 2010 second round president elections			-.027*			-.012**			-.020*
			(.009)			(.005)			(.006)
Interaction of this percentage of votes with the dummy of state-owned banks			.039*			.023*			.040*
			(.012)			(.007)			(.008)
Dummy of state-owned banks	.063*	.058*	.043*	.024*	.019*	.013*	.027*	.018*	.007
	(.003)	(.004)	(.007)	(.002)	(.002)	(.004)	(.002)	(.002)	(.004)
n	7900	7940	7940	7489	7526	7526	7848	7888	7888
R^2	0.07	0.07	0.07	0.04	0.03	0.03	0.03	0.04	0.04

Notes: This table shows regressions results of our models 1 to 3 applied to 2010 presidential elections. In each model we test as dependent variables differences between 2007-2009 and 2011-2013 averages of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets). Model 1 has as main independent variable the difference between percentages of votes for government party in 2006 and 2010 second round president elections. Model 2 has as main independent variable a dummy for cities where government party percentage of votes in 2010 second round president election is 50% or more. Model 3 has as main independent variable government party percentage of votes in 2010 second round president election. All models include a dummy of state-owned banks and an interaction between this dummy and the main independent variable of each model.

*$p<0.005$; **$p<0.025$; ***$p<0.05$

The difference between this percentage and the percentage in the previous election is also significant. As we suspect in our identification, the dummy for cities in which government party has 50% or more of votes in the last second round president election is significant. This result supports the existence of target cities as we defined previously.

The dummy of state-owned banks is always significant and positive. It is consistent with our identification that state-owned banks expand credit supply more than private banks. But the interactions between this dummy and our political variables are more relevant. These interactions reveal that the increment in credit supply of state-owned banks is even higher in cities where government party obtains more votes. It reinforces our conclusions about the existence of political oriented lending.

The following tables show the results of ROA tests. Tables 12 and 13 contain the

tests results of differences in ROA from before to after 2006 elections periods (first three columns) and in a longer period (last three columns). In Table 12 independent variables are differences in each of our three credit indexes before and after 2006 elections, a dummy of state-owned banks and the interaction between these last two variables. In Table 13 independent variables are a dummy for banks that increase their credit supply after 2006 elections, a dummy for state-owned banks and the interaction of these last two variables. Tables 14 and 15 contains the corresponding tests results of 2010 elections.

Our results show that all coefficients related to credit supply expansion are significant and positive in both elections. It means that increasing credit supply implies increasing ROA. However, the interaction between the variable of credit supply expansion and the dummy for state-owned banks is significant but negative. It means the increase in credit supply implies a lower increment in ROA for state-owned banks when compared to private banks. Our simplified models strengthen this conclusion. The values of the coefficients of credit supply expansion variables for private banks are higher than the ones for state-owned banks.

We test specifically if, among those that increase credit supply, the returns of state-owned banks and private banks differ. We generate alternative models with the dummy for state-owned banks as the only independent variable. To observe if the magnitude of the expansion is relevant, we repeat the tests only with banks that expand credit supply above the average. Table 16 shows these tests results. First three columns, on the left, refer to those that increase credit supply after 2006 elections. Last three columns, on the right, refer to those that increase above the average.

Again we find evidences that state-owned banks performance is inferior to the private banks performance. We examine those that expand non-earmarked credit and total lending above the average. When we restrict the sample to the target cities, the dummy for government banks become significant and negative also for banks that expand non-earmarked credit supply below the average.

2.6   Conclusions

Our results reveal the existence of political motivation in Brazilian federal state-owned banks lending. The more votes the government party obtains in presidential elections in a city, the more state-owned banks offer credit. The same does not happen with private banks. These results are consistent with previous research, like Dinç (2005) and Sapienza (2004).

We also find a significant and positive relationship between profits and increases in credit supply. However, private banks obtain higher ROA than state-owned banks when lending. Probably some criteria state-owned banks adopt when lending lead to problems

Table 12 – Regressions Results, ROA, 2006 Elections

	Difference in ROA averages from 2003-2005 to 2007-2009			Difference in ROA averages from 2003-2005 to 2011-2013		
	(a)	(b)	(c)	(a)	(b)	(c)
Difference in Total Lending/Total Assets ratio from 2003-2005 to 2007-2009	.805*			.742*		
	(.021)			(.026)		
Interaction of this difference in ROA with the dummy of state-owned banks	-.397*			-.332*		
	(.030)			(.035)		
Difference in Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009		.962*			.948*	
		(.023)			(.032)	
Interaction of this difference with the dummy of state-owned banks		-.241*			-.459*	
		(.041)			(.052)	
Difference in Non-Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009			1.162*			1.343*
			(0.026)			(.034)
Interaction of this difference with the dummy of state-owned banks			-.413*			-.695*
			(0.044)			(.052)
Dummy of state-owned banks	.010**	.026*	.018*	.036*	.067*	-.040*
	(.004)	(.003)	(.004)	(.005)	(.004)	(.004)
n	8354	8191	8332	7268	7117	7252
R^2	0.20	0.24	0.25	0.18	0.19	0.25

Notes: This table shows regressions results of our model 4 in 2006 elections. We examine the effects of increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets) on ROA in two different periods: one immediatly after 2006 election (2007-2009) and one longer (2011-2013). So first we test as dependent variables differences between 2003-2005 and 2007-2009 averages of ROA and then differences between 2003-2005 and 2011-2013 averages of ROA. Submodel (a) has as main independent variable difference in Total Lending/Total Assets index from 2003-2005 to 2007-2009. Submodel (b) has as main independent variable difference in Earmarked Credit/Total Assets index from 2003-2005 to 2007-2009. Submodel (c) has as main independent variable difference in Non-Earmarked Credit/Total Assets index from 2003-2005 to 2007-2009. All submodels include a dummy of state-owned banks and an interaction between this dummy and the main independent variable of each submodel. All main independent variables have significant and positive coefficients, but their interactions with the dummy of state-owned banks have significant and negative coefficients. Increases in ROA are smaller in state-owned banks than in private banks.

*p<0.005; **p<0.025; ***p<0.05

Table 13 – Regressions Results, ROA, 2006 Elections

	Difference in ROA averages from 2003-2005 to 2007-2009			Difference in ROA averages from 2003-2005 to 2011-2013		
	(a)	(b)	(c)	(a)	(b)	(c)
Dummy for banks that increased their Total Lending/Total Assets ratio from 2003-2005 to 2007-2009	.140*			.130*		
	(.005)			(.006)		
Interaction of this dummy with the dummy of state-owned banks	-.077*			-.071*		
	(.009)			(.010)		
Dummy for banks that increased their Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009		.118*			.108*	
		(.004)			(.005)	
Interaction of this dummy with the dummy of state-owned banks		-.039*			-.038*	
		(.007)			(.009)	
Dummy for banks that increased their Non-Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009			.138*			.139*
			(.004)			(.006)
Interaction of this dummy with the dummy of state-owned banks			-.038*			-.020
			(.009)			(.010)
Dummy of state-owned banks	.073*	.049*	.037*	.096*	.083*	.041*
	(.008)	(.006)	(.008)	(.010)	(.007)	(.009)
n	8354	8191	8332	7268	7717	7252
R^2	0.12	0.15	0.15	0.11	0.14	0.15

Notes: This table shows regressions results of our model 5 in 2006 elections. We examine the effects of increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets) on ROA in two different periods: one immediatly after 2006 election (2007-2009) and one longer (2011-2013). So first we test as dependent variables differences between 2003-2005 and 2007-2009 averages of ROA and then differences between 2003-2005 and 2011-2013 averages of ROA. Submodel (a) has as main independent variable a dummy for banks that increased their Total Lending/Total Assets ratio from 2003-2005 to 2007-2009. Submodel (b) has as main independent variable a dummy for banks that increased their Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009. Submodel (c) has as main independent variable a dummy for banks that increased their Non-Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009. All submodels include a dummy for state-owned banks and an interaction between this dummy and the main independent variable of each submodel. All main independent variables have significant and positive coefficients, but their interactions with the dummy for state-owned banks have significant and negative coefficient. Increases in ROA are smaller in public banks than in private banks.

*p<0.005; **p<0.025; ***p<0.05

Table 14 – Regressions Results, ROA, 2010 Elections

	Difference in ROA averages from 2007-2009 to 2011-2013		
	(a)	(b)	(c)
Difference in Total Lending/Total Assets ratio from 2007-2009 to 2011-2013	.644*		
	(.015)		
Interaction of this difference with the dummy of state-owned banks	-.273*		
	(.021)		
Difference in Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013		.754*	
		(.021)	
2[1]Interaction of this difference with the dummy of state-owned banks		-.427*	
		(.031)	
Difference in Non-Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013			.862*
			(0.018)
Interaction of this difference with the dummy of state-owned banks			-.102*
			(0.031)
Dummy of state-owned banks	.007*	.017*	.014*
	(.003)	(.002)	(.002)
n	8487	8061	8448
R^2	0.24	0.16	0.29

Notes: This table shows regressions results of our model 4 in 2010 elections. We examine the effects of increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets) on ROA. So we test as dependent variables differences between 2007-2009 and 2011-2013 averages of ROA. Submodel (a) has as main independent variable difference in Total Lending/Total Assets index from 2007-2009 and 2011-2013. Submodel (b) has as main independent variable difference in Earmarked Credit/Total Assets index from 2007-2009 and 2011-2013. Submodel (c) has as main independent variable difference in Non-Earmarked Credit/Total Assets index from 2007-2009 and 2011-2013. All submodels include a dummy of state-owned banks and an interaction between this dummy and the main independent variable of each submodel. All main independent variables have significant and positive coefficients, but their interactions with the dummy of state-owned banks have significant and negative coefficients. Increases in ROA are smaller in state-owned banks than in private banks.

*p<0.005; **p<0.025; ***p<0.05

Table 15 – Regressions Results, ROA, 2010 Elections

	Difference in ROA averages from 2007-2009 to 2011-2013		
	(a)	(b)	(c)
Dummy for banks that increase their Total Lending/Total Assets index from 2007-2009 to 2011-2013	.091*		
	(.004)		
Interaction of this dummy with the dummy of state-owned banks	-.048*		
	(.005)		
Dummy for banks that increase their Earmarked Credit/Total Assets index from 2007-2009 to 2011-2013		.067*	
		(.003)	
Interaction of this dummy with the dummy of state-owned banks		-.026*	
		(.005)	
Dummy for banks that increase their Non-Earmarked Credit/Total Assets index from 2007-2009 to 2011-2013			.093*
			(.003)
Interaction of this dummy with the dummy of state-owned banks			-.022*
			(.005)
Dummy of state-owned banks	.049*	.027*	.034*
	(.004)	(.004)	(.004)
n	8487	8061	8448
R^2	0.10	0.08	0.14

Notes: This table shows regressions results of our model 5 in 2010 elections. We examine the effects of increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets) on ROA. So we test as dependent variables differences between 2007-2009 and 2011-2013 averages of ROA. Submodel (a) has as main independent variable a dummy for banks that increase their Total Lending/Total Assets index from 2007-2009 to 2011-2013. Submodel (b) has as main independent variable a dummy for banks that increase their Earmarked Credit/Total Assets index from 2007-2009 to 2011-2013. Submodel (c) has as main independent variable a dummy for banks that increase their Non-Earmarked Credit/Total Assets index from 2007-2009 to 2011-2013. All submodels include a dummy of state-owned banks and an interaction between this dummy and the main independent variable of each submodel. All main independent variables have significant and positive coefficients, but their interactions with the dummy of state-owned banks have significant and negative coefficients. Increases in ROA are smaller in public banks than in private banks.

Table 16 – Regressions Results, ROA

Difference in ROA averages from 2007-2009 to 2003-2005

	Banks that increase Total Lending/Total Assets ratio	Banks that increase Total Lending/Total Assets ratio more than the average	Banks that increase Earmarked Credit/ Total Assets ratio	Banks that increase Earmarked Credit/ Total Assets ratio more than the average	Banks that increase Non-Earmarked Credit/Total Assets ratio	Banks that increase Non-Earmarked Credit/ Total Assets ratio more than the average
Dummy of state-owned banks	-.002	-.020*	.009*	.005	-.002	-.017*
	(.004)	(.007)	(.003)	(.006)	(.004)	(.006)
n	5631	3545	5446	4212	5509	4078
R^2	0.00	0.00	0.00	0.00	0.00	0.00

Notes: This table shows regressions results of our simplified models. We examine if state-owned banks ROA are significantly different from the ROA of he whole sample. Dependent variables are differences between 2003-2005 and 2007-2009 averages of ROA and independent variables are dummies of state-owned banks. First column shows results for banks that increase their Total Lending/Total Assets index. Second column shows results for banks that increase this ratio above the whole sample average increase. Third and fourth columns show results for increases in Earmarked Credit/Total Assets index. Fifth and sixth show results for increases in Non-Earmarked/Total Assets index. State-owned banks that increase Total Lending/Total Assets and Non-Earmarked/Total Assets indexes more than average show worse ROA, while those who increase Earmarked Credit/Total Assets show a better performance.

*$p<0.005$; **$p<0.025$; ***$p<0.05$

Table 17 – Regressions Results, ROA

Difference in ROA averages from 2007-2009 to 2011-2013

	Banks that increase Total Lending/Total Assets ratio	Banks that increase Total Lending/Total Assets ratio more than the average	Banks that increase Earmarked Credit/ Total Assets ratio	Banks that increase Earmarked Credit/ Total Assets ratio more than the average	Banks that increase Non-Earmarked Credit/Total Assets ratio	Banks that increase Non-Earmarked Credit/ Total Assets ratio more than the average
Dummy of state-owned banks	.000	.001	.011*	-.007	.029*	.009***
	(.003)	(.002)	(.002)	(.006)	(.006)	(.005)
n	4433	5502	4929	3842	4255	4557
R^2	0.00	0.00	0.00	0.00	0.01	0.00

Notes: This table shows regressions results of our simplified models. We examine if state-owned banks ROA are significantly different from ROA of the whole sample. Dependent variables are differences between 2007-2009 and 2011-2013 averages of ROA and independent variables are dummies of state-owned banks. First column shows results for banks that increase their Total Lending/Total Assets indexes. Second column for banks that increase this index above the whole sample average increase. Third and fourth columns shows results for increases in Earmarked Credit/Total Assets index. Fifth and sixth for increases in Non-Earmarked/Total Assets ratio.

*$p<0.005$; **$p<0.025$; ***$p<0.05$

with its quality.

The main limitations we face in this study are due to the restricted availability of some data. For example, Brazilian cities HDI is only available in 2000. Banks database is also incomplete: important information like branches equity are not available in the vast majority of cases. We also have to deal with some unreliable data, mainly those related to banks profits. It makes us question if data provided by some banks are trustable and audited.

Our conclusions could be stronger if information like average fees that each bank branch charges when lending were available. Equally important would be an Income Statement of each bank branch. It would be possible to analyze its profits and its components in a more detailed way. Consequently, it would be easier to identify evidences of low quality lending.

2.7 Annexes

2.7.1 Regressions Results, Credit Indexes, 2006 Elections – Matching Sample

	Difference in Total Lending/ Total Assets averages from 2003-2005 to 2007-2009			Difference in Earmarked Credit/Total Assets averages from 2003-2005 to 2007-2009			Difference in Non-Earmarked Credit/Total Assets averages from 2003-2005 to 2007-2009		
	Mod (1)	Mod (2)	Mod (3)	Mod (1)	Mod (2)	Mod (3)	Mod (1)	Mod (2)	Mod (3)
Difference in percentage of votes for government party in 2002 and 2006 second round president elections	-.026**			-.035*			-.063*		
	(.011)			(.007)			(.006)		
Interaction of this difference with the dummy of state-owned banks	.042**			.022***			.052*		
	(.019)			(.011)			(.011)		
Dummy for cities where government party percentage of votes in 2006 second round president elections was 50% or more		-.006			-.007**			-.014*	
		(.004)			(.003)			(.003)	
Interaction of this dummy with the dummy of state-owned banks		.009			.008***			.020*	
		(.007)			-(.004)			(.004)	
Government party percentage of votes in 2006 second round president elections			-.032*			-.032*			-.062*
			(.012)			(.007)			(.007)
Interaction of this percentage with the dummy of state-owned banks			.041***			.035*			.082*
			(.020)			(.012)			(.012)
Dummy of state-owned banks	.116*	.106*	.091*	.034*	.028*	.015**	.051*	.035*	.006
	(.004)	(.004)	(.010)	(.002)	(.003)	(.006)	(.002)	(.003)	(.006)
n	4545	4631	4631	4468	4552	4552	4543	4629	4629
R²	0.19	0.19	0.19	0.06	0.05	0.05	0.11	0.09	0.10

Notes: This table shows regressions results of our models 1 to 3. In each model we test as dependent variables differences between 2003-2005 and 2007-2009 averages of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets). Model (1) has as main independent variable the difference between percentages of votes for government party in 2002 and 2006 second round president elections. Model (2) has as main independent variable a dummy cities where government party percentage of votes in 2006 second round president election was 50% or more. Model (3) has as main independent variable government party percentage of votes in 2006 second round president election. All models include a dummy of state-owned banks and an interaction between this dummy and the main independent variable of each model. All main independent variables have significant and negative coefficients, but their interactions with the dummy of state-owned banks have significant and positive coefficients. We obtain matching sample selecting only observations whose per capita GDP are between 4 and 277, whose Basileia index are between 12 and 50 and whose FDI are between 0.42 and 0.89.

*p<0.005; **p<0.025; ***p<0.05

2.7.2 Regressions Results, Credit Indexes, 2010 Elections – Matching Sample

	Difference in Total Lending/ Total Assets averages from 2007-2009 to 2011-2013 (			Difference in Earmarked Credit/Total Assets averages from 2007-2009 to 2011-2013			Difference in Non-Earmarked Credit/Total Assets averages from 2007-2009 to 2011-2013		
	Mod (1)	Mod (2)	Mod (3)	Mod (1)	Mod (2)	Mod (3)	Mod (1)	Mod (2)	Mod (3)
Difference in percentage of votes for government party in 2006 and 2010 second round president elections	-.013			.009***			-.002		
	(.008)			(.005)			(.005)		
Interaction of this difference with the dummy of state-owned banks	.034*			-.007			.017***		
	(.012)			(.007)			(.008)		
Dummy for cities where government party percentage of votes in 2010 second round president elections was 50% or more		-.004			-.007**			-.004	
		(.005)			(.003)			(.003)	
Interaction of this dummy with the dummy of state-owned banks		.004			.009**			.008***	
		(.007)			(.004)			(.004)	
Government party percentage of votes in 2010 second round president elections			-.014			-.016**			-0.01
			(.010)			(.006)			(.006)
Interaction of this percentage of votes with the dummy of state-owned banks			.033***			.011			.013
			(.016)			(.009)			(.010)
Dummy of state-owned banks	.077*	.077*	.062*	.013*	.008*	.008	.022*	.018*	.016*
	(.003)	(.005)	(.009)	(.002)	(.003)	(.005)	(.002)	(.003)	(.005)
n	4675	4694	4694	4417	4433	4433	4666	4685	4685
R^2	0.10	0.10	0.10	0.01	0.01	0.01	0.03	0.03	0.03

Notes: This table shows regressions results of our models 1 to 3. In each model we test as dependent variables differences between 2007-2009 and 2011-2013 averages of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets). Model (1) has as main independent variable the difference between percentages of votes for government party in 2010 and 2006 second round president elections. Model (2) has as main independent variable a dummy cities where government party percentage of votes in 2006 second round president election is 50% or more. Model (3) has as main independent variable government party percentage of votes in 2010 second round president election. All models include a dummy for state-owned banks and an interaction between this dummy and the main independent variable of each model. We obtain matching sample selecting only observations whose per capita GDP are between 5 and 305, whose Basileia index are between 10 and 32 and whose FDI are between 0.44 and 0.87.

*p<0.005; **p<0.025; ***p<0.05

2.7.3 Regressions Results, Total Lending/Total Assets Index, 2006 Elections – Simplified Models

	Difference in Total Lending/ Total Assets averages from 2003-2005 to 2007-2009											
	All data						**Matching Sample**					
	Model (1)		Model (2)		Model (3)		Model (1)		Model (2)		Model (3)	
	Only public banks	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*
Difference in percentage of votes for government party in 2002 and 2006 second round president elections	.065*	-.038*					.016	-.026**				
	(.008)	(.007)					(.016)	(.010)				
Dummy for cities where government party percentage of votes in 2006 second round president elections was 50% or more			.019*	-.014*					.002	-.006		
			(.004)	(.003)					(.005)	(.004)		
Government party percentage of votes in 2006 second round president elections					.057*	-.039*					.009	-.031*
					(.009)	(.007)					(.016)	(.011)
n	3493	4212	3568	4315	3568	4315	1831	2714	1864	2767	1864	2767
R^2	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00

Notes: This table shows regressions results of our simplified models, in which we examine if Total Lending/ Total Assets ratios are significantly different between public and private banks due to our 2006 elections variables. In each model we test as dependent variables differences between 2003-2005 and 2007-2009 averages of Total Lending/Total Assets. Model (1) has as independent variable the difference between percentages of votes for government party in 2002 and 2006 second round president elections. Model (2) has as independent variable a dummy for cities where government party percentage of votes in 2006 second round president election is 50% or more. Model (3) has as independent variable government party percentage of votes in 2006 second round president election. Our results show that Total Lending/Total Assets ratio of public banks is higher in cities where government party percentage of votes in 2006 second round president election is higher, and the opposite occurs with private banks. We obtain matching sample selecting only observations whose per capita GDP are between 4 and 277, whose Basileia index are between 12 and 50 and whose FDI are between 0.42 and 0.89.

*$p<0.005$; **$p<0.025$; ***$p<0.05$

2.7.4 Regressions Results, Total Lending/Total Assets Index, 2010 Elections – Simplified Models

Difference in Total Lending/ Total Assets averages from 2007-2009 to 2011-2013 (

	All data						Matching Sample					
	Model (1)		Model (2)		Model (3)		Model (1)		Model (2)		Model (3)	
	Only public banks	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*
Difference in percentage of votes for government party in 2006 and 2010 second round president elections	.034*	-.013**					.021***	-.013				
	(.006)	(.006)					(.009)	(.008)				
Dummy for cities where government party percentage of votes in 2010 second round president elections is 50% or more			.000	-.009**					-.000	-.004		
			(.003)	(.003)					(.005)	(.004)		
Government party percentage of votes in 2010 second round president elections					.011	-.027*					.019	-.014
					(.009)	(.008)					(.011)	(.009)
n	3818	4082	3840	4100	3840	4100	2089	2586	2097	2597	2097	2597
R^2	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: This table shows regressions results of our simplified models, in which we examine if Total Lending/ Total Assets ratios are significantly different between public and private banks due to our 2010 elections variables. In each model we test as dependent variables differences between 2007-2009 and 2011-2013 averages of Total Lending/Total Assets. Model (1) has as independent variable the difference between percentages of votes for government party in 2006 and 2010 second round president elections. Model (2) has as independent variable a dummy for cities where government party percentage of votes in 2010 second round president election is 50% or more. Model (3) has as independent variable government party percentage of votes in 2010 second round president election. Our results show that Total Lending/Total Assets ratio of state-owned banks is higher the greater the difference between percentage of votes for government party in 2006 and 2010 second round president election is. The opposite occurs with private banks. We obtain matching sample selecting only observations whose per capita GDP are between 5 and 305, whose Basileia index are between 10 and 32 and whose FDI are between 0.44 and 0.87.

*p<0.005; **p<0.025; ***p<0.05

2.7.5 Regressions Results, Earmarked Credit/Total Assets Index, 2006 Elections – Simplified Models

Difference in Earmarked Credit/Total Assets averages from 2003-2005 to 2007-2009

	All data						Matching Sample					
	Model (1)		Model (2)		Model (3)		Model (1)		Model (2)		Model (3)	
	Only public banks	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*
Difference in percentage of votes for government party in 2002 and 2006 second round president elections	.052*	-.031*					-.012***	-.034*				
	(.004)	(.005)					(.007)	(.007)				
Dummy for cities where government party percentage of votes in 2006 second round president elections was 50% or more			.019*	-.010*					.001	-.007**		
			(.002)	(.002)					(.002)	(.003)		
Government party percentage of votes in 2006 second round president elections					.057*	-.027*					.003	-.032*
					(.004)	(.005)					(.006)	(.008)
n	3402	4145	3474	4248	3474	4248	1708	2688	1811	2741	1811	2741
R²	0.04	0.01	0.03	0.00	0.04	0.01	0.00	0.01	0.00	0.00	0.00	0.00

Notes: This table shows regressions results of our simplified models, in which we examine if Earmarked Credit/ Total Assets ratios are significantly different between state-owned and private banks due to our 2006 elections variables. In each model we test as dependent variables differences between 2003-2005 and 2007-2009 averages of Earmarked Credit/Total Assets. Model (1) has as independent variable the difference between percentages of votes for government party in 2002 and 2006 second round president elections. Model (2) has as independent variable a dummy for cities where government party percentage of votes in 2006 second round president election is 50% or more. Model (3) has as independent variable government party percentage of votes in 2006 second round president election. Our results show that Earmarked Credit/Total Assets ratio of public banks is higher in cities where government party percentage of votes in 2006 second round president election is higher, and the opposite occurs with private banks. We obtain matching sample selecting only observations whose per capita GDP are between 4 and 277, whose Basileia index are between 12 and 50 and whose FDI are between 0.42 and 0.89.

*p<0.005; **p<0.025; ***p<0.05

2.7.6 Regressions Results, Earmarked Credit/Total Assets Index, 2010 Elections – Simplified Models

Difference in Earmarked Credit/Total Assets averages from 2007-2009 to 2011-2013

	All data						Matching Sample					
	Model (1)		Model (2)		Model (3)		Model (1)		Model (2)		Model (3)	
	Only public banks	Only private banks	Only public banks	Only private banks	Only public banks	Only private banks	Only public banks	Only private banks	Only public banks	Only private banks	Only public banks	Only private banks
Difference in percentage of votes for government party in 2006 and 2010 second round president elections	-.021*	.011*					.002	.009				
	(.003)	(.002)					(.005)	(.005)				
Dummy for cities where government party percentage of votes in 2010 second round president elections is 50% or more			.007*	-.002					.002	-.006**		
			(.002)	(.002)					(.002)	(.002)		
Government party percentage of votes in 2010 second round president elections					.010***	-.012**					-.004	-.015**
					(.005)	(.002)					(.006)	(.006)
n	3685	3804	3704	3822	3704	3822	1985	2432	1990	2443	1990	2443
R²	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: This table shows regressions results of our simplified models, in which we examine if Earmarked Credit/ Total Assets ratios are significantly different between state-owned and private banks due to our 2010 elections variables. In each model we test as dependent variables differences between 2007-2009 and 2011-2013 averages of Earmarked Credit/Total Assets. Model (1) has as independent variable the difference between percentages of votes for government party in 2006 and 2010 second round president elections. Model (2) has as independent variable a dummy for cities where government party percentage of votes in 2010 second round president election is 50% or more. Model (3) has as independent variable government party percentage of votes in 2010 second round president election. We obtain matching sample selecting only observations whose per capita GDP are between 5 and 305, whose Basileia index are between 10 and 32 and whose FDI are between 0.44 and 0.87.

*p<0.005; **p<0.025; ***p<0.05

2.7.7 Regressions Results, Non-Earmarked Credit/Total Assets Index, 2006 Elections – Simplified Models

<div align="center">Difference in Non-Earmarked Credit/Total Assets averages from 2003-2005 to 2007-2009</div>

	All data						Matching Sample					
	Model (1)		Model (2)		Model (3)		Model (1)		Model (2)		Model (3)	
	Only public banks	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*
Difference in percentage of votes for government party in 2002 and 2006 second round president elections	.066*	-.060*					-.010	-.062*				
	(.005)	(.005)					(.006)	(.007)				
Dummy for cities where government party percentage of votes in 2006 second round president elections is 50% or more *(dvot_pres_06)*			.026*	-.022*					.005**	-.014*		
			(.002)	(.002)					(.002)	(.003)		
Government party percentage of votes in 2006 second round president elections					.076*	-.058*					.019*	-.062*
					(.005)	(.006)					(.006)	(.008)
n	3493	4186	3568	4289	3568	4289	1831	2712	1864	2765	1864	2765
R²	0.05	0.03	0.04	0.02	0.06	0.03	0.00	0.03	0.00	0.01	0.00	0.02

Notes: This table shows regressions results of our simplified models, in which we examine if Non-Earmarked Credit/ Total Assets ratios are significantly different between state-owned and private banks due to our 2006 elections variables. In each model we test as dependent variables differences between 2003-2005 and 2007-2009 averages of Non-Earmarked Credit/Total Assets. Model (1) has as independent variable the difference between percentages of votes for government party in 2002 and 2006 second round president elections. Model (2) has as independent variable a dummy for cities where government party percentage of votes in 2006 second round president election is 50% or more. Model (3) has as independent variable government party percentage of votes in 2006 second round president election. Our results show that Non-Earmarked Credit/Total Assets ratio of public banks is higher in cities where government party percentage of votes in 2006 second round president election is higher, and the opposite occurs with private banks. We obtain matching sample selecting only observations whose per capita GDP are between 4 and 277, whose Basileia index are between 12 and 50 and whose FDI are between 0.42 and 0.89.

*p<0.005; **p<0.025; ***p<0.05

2.7.8 Regressions Results, Non-Earmarked Credit/Total Assets Index, 2010 Elections – Simplified Models

	Difference in Non-Earmarked Credit/Total Assets averages from 2007-2009 to 2011-2013											
	All data						**Matching Sample**					
	Model (1)		Model (2)		Model (3)		Model (1)		Model (2)		Model (3)	
	Only public banks	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*	*Only public banks*	*Only private banks*
Difference in percentage of votes for government party in 2006 and 2010 second round president elections	.003	-.001					.015*	-.002				
	(.003)	(.005)					(.005)	(.006)				
Dummy for cities where government party percentage of votes in 2010 second round president elections is 50% or more			.009*	-.007*					.004	-.004		
			(.002)	(.002)					(.002)	(.002)		
Government party percentage of votes in 2010 second round president elections					.020*	-.020*					.003	-.009
					(.005)	(.002)					(.005)	(.007)
n	3818	4030	3840	4048	3840	4048	2089	2577	2097	2588	2097	2588
R^2	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00

Notes: This table shows regressions results of our simplified models, in which we examine if Non-Earmarked Credit/ Total Assets ratios are significantly different between state-owned and private banks due to our 2010 elections variables. In each model we test as dependent variables differences between 2007-2009 and 2011-2013 averages of Non-Earmarked Credit/Total Assets. Model (1) has as independent variable the difference between percentages of votes for government party in 2006 and 2010 second round president elections. Model (2) has as independent variable a dummy for cities where government party percentage of votes in 2010 second round president election is 50% or more. Model (3) has as independent variable government party percentage of votes in 2010 second round president election. Our results show that Non-Earmarked Credit/Total Assets ratio of public banks is higher in cities where government party percentage of votes in 2010 second round president election is higher. We obtain matching sample selecting only observations whose per capita GDP are between 5 and 305, whose Basileia index are between 10 and 32 and whose FDI are between 0.44 and 0.87.

*p<0.005; **p<0.025; ***p<0.05

2.7.9   Regressions Results, ROA, 2006 Elections – Simplified Models

	Difference in ROA averages from 2003-2005 to 2007-2009					
	(a)		(b)		(c)	
	Only publics	*Only privates*	*Only publics*	*Only privates*	*Only publics*	*Only privates*
Dummy for banks that increased their Total Lending/Total Assets ratio from 2003-2005 to 2007-2009	.064*	.140*				
	(.007)	(.005)				
Dummy for banks that increased their Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009			.079*	.119*		
			(.004)	(.005)		
Dummy for banks that increased their Non-Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009					.099*	.138*
					(.007)	(.005)
n	3784	4570	3685	4506	3784	4548
R^2	0.02	0.13	0.09	0.13	0.05	0.16

Notes: This table shows regressions results of our simplified models, in which we examine if ROA are significantly different between state-owned and private banks due to increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets). All models have as dependent variables differences between 2003-2005 and 2007-2009 averages of ROA. Submodel (a) has as main independent variable a dummy for banks that increased their Total Lending/Total Assets ratio from 2003-2005 to 2007-2009. Submodel (b) has as main independent variable a dummy for banks that increased their Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009. Submodel (c) has as main independent variable a dummy for banks that increased their Non-Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009. Our results show that all coefficients are significant and positive, but the increase in our three credit indexes mean greater differences in ROA for private banks than for public banks.

*p<0.005; **p<0.025; ***p<0.05

Difference in ROA averages from 2003-2005 to 2007-2009

	(a)		(b)		(c)	
	Only publics	*Only privates*	*Only publics*	*Only privates*	*Only publics*	*Only privates*
Difference in Total Lending/Total Assets ratio from 2003-2005 to 2007-2009	.408*	.805*				
	(.018)	(.023)				
Difference in Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009			.721*	.962*		
			(.024)	(.027)		
Difference in Non-Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009					.748*	1.162*
					(.034)	(.027)
n	3784	4570	3685	4506	3784	4548
R^2	0.12	0.21	0.19	0.22	0.11	0.30

Notes: This table shows regressions results of our simplified models, in which we examine if ROA are significantly different between state-owned and private banks due to increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets). All models have as dependent variables differences between 2003-2005 and 2007-2009 averages of ROA. Submodel (a) has as main independent variable difference in Total Lending/Total Assets ratio from 2003-2005 to 2007-2009. Submodel (b) has as main independent variable difference in Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009. Submodel (c) has as main independent variable difference in Non-Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009. Our results show that all coefficients are significant and positive, but the increase in our three credit indexes meant greater differences in ROA for private banks than for state-owned banks.

*p<0.005; **p<0.025; ***p<0.05

2.7.10   Regressions Results, ROA, 2010 Elections – Simplified Models

| | Difference in ROA averages from 2007-2009 to 2011-2013 | | | | | |
| | (a) | | (b) | | (c) | |
	Only publics	Only privates	Only publics	Only privates	Only publics	Only privates
Dummy for banks that increased their Total Lending/Total Assets ratio from 2007-2009 to 2011-2013 (d	.043*	.091*				
	(.003)	(.004)				
Dummy for banks that increased their Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013			.041*	.067*		
			(.003)	(.003)		
Dummy for banks that increased their Non-Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013					.070*	.093*
					(.003)	(.004)
n	4154	4333	4008	4053	4154	4294
R^2	0.04	0.10	0.03	0.09	0.10	0.13

Notes: This table shows regressions results of our simplified models, in which we examine if ROA is significantly different between state-owned and private banks due to increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets). All models have as dependent variables differences between 2007-2009 and 2011-2013 averages of ROA. Submodel (a) has as main independent variable a dummy for banks that increased their Total Lending/Total Assets ratio from 2007-2009 to 2011-2013. Submodel (b) has as main independent variable a dummy for banks that increased their Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013. Submodel (c) has as main independent variable a dummy for banks that increased their Non-Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013. Our results show that all coefficients are significant and positive, but the increase in our three credit indexes meant greater differences in ROA for private banks than for state-owned banks.

*p<0.005; **p<0.025; ***p<0.05

	Difference in ROA averages from 2007-2009 to 2011-2013					
	(a)		(b)		(c)	
	Only publics	*Only privates*	*Only publics*	*Only privates*	*Only publics*	*Only privates*
Difference in Total Lending/Total Assets ratio from 2007-2009 to 2011-2013 (	.370*	.643*				
	(.012)	(.017)				
Difference in Earmarked Credit/ Total Assets ratio from 2007-2009 to 2011-2013			.326*	.753*		
			(.021)	(.022)		
Difference in Non-Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013					.760*	.862*
					(.024)	(.019)
n	4154	4333	4008	4053	4154	4294
R^2	0.17	0.25	0.06	0.21	0.21	0.31

Notes: This table shows regressions results of our simplified models, in which we examine if ROA are significantly different between state-owned and private banks due to increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets). All models have as dependent variables differences between 2007-2009 and 2011-2013 averages of ROA. Submodel (a) has as main independent variable difference in Total Lending/Total Assets ratio from 2007-2009 and 2011-2013. Submodel (b) has as main independent variable difference in Earmarked Credit/Total Assets ratio from 2007-2009 and 2011-2013. Submodel (c) has as main independent variable difference in Non-Earmarked Credit/Total Assets ratio from 2007-2009 and 2011-2013. Our results show that all coefficients are significant and positive, but the increase in our three credit indexes meant greater differences in ROA for private banks than for state-owned banks.

*p<0.005; **p<0.025; ***p<0.05

2.7.11   Regressions Results, ROA, 2006 and 2010 Elections, Target Cities – Alternative Models

Difference in ROA averages from 2007-2009 to 2003-2005

	Banks that increased Total Lending/Total Assets ratio	Banks that increased Total Lending/Total Assets ratio more than the average	Banks that increased Earmarked Credit/ Total Assets ratio	Banks that increased Earmarked Credit/ Total Assets ratio more than the average	Banks that increased Non-Earmarked Credit/Total Assets ratio	Banks that increased Non-Earmarked Credit/ Total Assets ratio more than the average
2[2]Dummy of government-owned banks	.002	-.008	.007	.013	-.012***	-.025*
	(.004)	(.011)	(.005)	(.009)	(.006)	(.005)
n	2492	1667	2406	1916	2461	1860
R^2	0.00	0.01	0.00	0.00	0.00	0.00

Notes: This table shows regressions results of our simplified models, in which we examine if state-owned banks ROA are significantly different from the ones of he whole sample, applied only to target cities in 2006 elections (cities where government party percentage of votes in 2006 second round president election was 50% or more). Dependent variables are differences between 2003-2005 and 2007-2009 averages of ROA and independent variables are dummies of state-owned banks. First column shows results for banks that increase their Total Lending/Total Assets ratio and second column for banks that increase this ratio above the whole sample average increase. Third and fourth columns shows results for increases in Earmarked Credit/Total Assets ratio and fifth and sixth for increases in Non-Earmarked/Total Assets ratio. Government-owned banks that increase Non-Earmarked/Total Assets ratio in 2006 target cities show worse ROA when compared to the whole sample.

*p<0.005; **p<0.025; ***p<0.05

Difference in ROA averages from 2007-2009 to 2011-2013

	Banks that increased Total Lending/Total Assets ratio	Banks that increased Total Lending/Total Assets ratio more than the average	Banks that increased Earmarked Credit/ Total Assets ratio	Banks that increased Earmarked Credit/ Total Assets ratio more than the average	Banks that increased Non-Earmarked Credit/Total Assets ratio	Banks that increased Non-Earmarked Credit/ Total Assets ratio more than the average
Dummy of state-owned banks	.001	-.013	.001	.032*	.008***	.002
	(.005)	(.009)	(.003)	(.010)	(.004)	(.008)
n	2221	1926	2729	2158	2481	2305
R^2	0.00	0.00	0.00	0.00	0.00	0.00

Notes: This table shows regressions results of our simplified models, in which we examine if public banks ROA are significantly different from the ones of he whole sample, applied only to target cities in 2010 elections (cities where government party percentage of votes in 2010 second round president election was 50% or more). Dependent variables are differences between 2007-2009 and 2011-2013 averages of ROA and independent variables are dummies of state-owned banks. First column shows results for banks that increase their Total Lending/Total Assets ratio and second column for banks that increase this ratio above the whole sample average increase. Third and fourth columns shows results for increases in Earmarked Credit/Total Assets ratio and fifth and sixth for increases in Non-Earmarked/Total Assets ratio.

*p<0.005; **p<0.025; ***p<0.05

2.7.12   Regressions Results, Credit Indexes, Levels of Per Capita GDP, 2006 Elections

		Difference in Total Lending/ Total Assets averages from 2003-2005 to 2007-2009			Difference in Earmarked Credit/Total Assets averages from 2003-2005 to 2007-2009			Difference in Non-Earmarked Credit/Total Assets averages from 2003-2005 to 2007-2009		
Cities with per capita GDP lower than R$5,400 in 2003-2005	Difference in percentage of votes for government party in 2002 and 2006 second round president elections	.052			0.57			.053		
		(.049)			(.030)			(.030)		
	Interaction of this difference with the dummy of state-owned banks	.027			-.016			-.004		
		(.056)			(.034)			(.035)		
Cities with per capita GDP between R$5,400 and R$15,400 in 2003-2005	Difference in percentage of votes for government party in 2002 and 2006 second round president elections		-.036*			-.035*			-.066*	
			(.012)			(.007)			(.008)	
	Interaction of this difference with the dummy of state-owned banks		.094*			.061*			.107*	
			(.019)			(.011)			(.012)	
Cities with per capita GDP higher than R$15,400 in 2003-2005	Difference in percentage of votes for government party in 2002 and 2006 second round president elections			-.048*			-.030*			-.055*
				(.011)			(.007)			(.007)
	Interaction of this difference with the dummy of state-owned banks			.066*			.050*			.059*
				(.022)			(.014)			(.014)
	Dummy of state-owned banks	.152*	.124*	.120*	.069*	.045*	.034	.099	.068*	.044*
		(.015)	(.004)	(.007)	(.009)	(.002)	(.004)	(.009)	(.002)	(.004)
	n	896	3634	3175	881	3577	3089	896	3631	3152
	R^2	0.24	0.22	0.16	0.14	0.09	0.03	0.24	0.18	0.05

Notes: This table shows regressions results of our model 1 applied to three different groups of cities, classified according to their respective per capita GDP. In each case we test as dependent variables differences between 2003-2005 and 2007-2009 averages of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets). The main independent variable is the difference between percentages of votes for government party in 2002 and 2006 second round president elections. All models include a dummy of state-owned banks and an interaction between this dummy and the main independent variable. All main independent variables have significant and negative coefficients, but their interactions with the dummy of state-owned banks have significant and positive coefficients. Only in the group of cities with per capita GDP lower than R$5,400 the coefficients are not significant.

*$p<0.005$; **$p<0.025$; ***$p<0.05$

2.7.13 Regressions Results, Credit Indexes, Levels of Per Capita GDP, 2010 Elections

		Difference in Total Lending/Total Assets averages from 2007-2009 to 2011-2013 (			Difference in Earmarked Credit/Total Assets averages from 2007-2009 to 2011-2013			Difference in Non-Earmarked Credit/Total Assets averages from 2007-2009 to 2011-2013		
		Mod (1)	Mod (2)	Mod (3)	Mod (1)	Mod (2)	Mod (3)	Mod (1)	Mod (2)	Mod (3)
Cities with per capita GDP lower than R$6,800 in 2007-2009	Difference in percentage of votes for government party in 2006 and 2010 second round president elections	-.046			-.002			-.039		
		(.033)			(.022)			(.023)		
	Interaction of this difference with the dummy of state-owned banks	.030			.005			.054***		
		(.038)			(.025)			(.026)		
Cities with per capita GDP between R$6,800 and R$18,900 in 2007-2009	Difference in percentage of votes for government party in 2006 and 2010 second round president elections		-.034*			.003			-.014***	
			(.011)			(.006)			(.007)	
	Interaction of this difference with the dummy of state-owned banks		.058*			-.013			.028*	
			(.015)			(.008)			(.009)	
Cities with per capita GDP higher than R$18,900 in 2007-2009	Difference in percentage of votes for government party in 2006 and 2010 second round president elections			.003			.010***			.005
				(.008)			(.005)			(.005)
	Interaction of this difference with the dummy of state-owned banks			.025***			-.004			.010
				(.012)			(.008)			(.008)
	Dummy of state-owned banks	.033	.064	.074*	.073*	.023*	.009	.064*	.026*	.019
		(.011)	(.004)	(.004)	(.008)	(.002)	(.002)	(.008)	(.002)	(.002)
	n	935	3192	3773	913	3017	3559	935	3187	3726
	R^2	0.02	0.07	0.10	0.17	0.03	0.00	0.09	0.03	0.02

Notes: This table shows regressions results of our model 1 applied to three different groups of cities, classified according to their respective per capita GDP. In each case we test as dependent variables differences between 2007-2009 and 2011-2013 averages of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets). The main independent variable is the difference between percentages of votes for government party in 2006 and 2010 second round president elections. All models include a dummy of state-owned banks and an interaction between this dummy and the main independent variable. These results are weaker than the ones of 2006 elections, but we can find the same relationship in general as when we apply the model for all data.

*p<0.005; **p<0.025; ***p<0.05

2.7.14 Regressions Results, Z-Score, 2006 Elections

	Difference in z-score averages from 2003-2005 to 2007-2009		
	(a)	(b)	(c)
Dummy for banks that increase their Total Lending/Total Assets ratio from 2003-2005 to 2007-2009	1.42		
	(1.03)		
Interaction of this dummy with the dummy of state-owned banks	2.29		
	(1.99)		
Dummy for banks that increased their Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009		1.26	
		(1.04)	
Interaction of this dummy with the dummy of state-owned banks		1.71	
		(1.88)	
Dummy for banks that increased their Non-Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009			1.49
			(1.03)
Interaction of this dummy with the dummy of state-owned banks			6.81*
			(2.13)
Dummy of state-owned banks	-1.53	-0.87	-5.74*
	(1.75)	(1.63)	(1.89)
n	8215	8188	8197
R^2	0.00	0.00	0.00

Notes: This table shows regressions results of our z-scores models, in which we examine the effects of increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets) on Z-Score after 2006 elections. We test as dependent variables differences between 2003-2005 and 2007-2009 averages of Z-Score. Submodel (a) has as main independent variable a dummy for banks that increased their Total Lending/Total Assets ratio from 2003-2005 to 2007-2009. Submodel (b) has as main independent variable a dummy for banks that increased their Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009. Submodel (c) has as main independent variable a dummy for banks that increased their Non-Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009. All submodels include a dummy of state-owned banks and an interaction between this dummy and the main independent variable of each submodel. Almost all coefficients are not significant, showing there is no relationship between Z-Score and increases in our three credit indexes.

*p<0.005; **p<0.025; ***p<0.05

2.7.15   Regressions Results, Z-Score, 2006 Elections

	Difference in z-score averages from 2003-2005 to 2007-2009		
	(a)	(b)	(c)
Difference in Total Lending/Total Assets ratio from 2003-2005 to 2007-2009	4.48		
	(4.79)		
Interaction of this difference with the dummy of state-owned banks	-12.19		
	(6.85)		
Difference in Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009		5.52	
		(6.52)	
Interaction of this difference with the dummy of state-owned banks		-7.45	
		(11.72)	
Difference in Non-Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009			6.61
			(6.61)
Interaction of this difference with the dummy of state-owned banks			-2.12
			(11.71)
Dummy of state-owned banks	1.91***	1.07	0.72
	(0.97)	(0.87)	(0.93)
n	8215	8188	8197
R^2	0.00	0.00	0.00

Notes: This table shows regressions results of our z-scores models, in which we examine the effects of increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets) on Z-Score after 2006 elections. We test as dependent variables differences between 2003-2005 and 2007-2009 averages of Z-Score. Submodel (a) has as main independent variable difference in Total Lending/Total Assets ratio from 2003-2005 to 2007-2009. Submodel (b) has as main independent variable difference in Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009. Submodel (c) has as main independent variable difference in Non-Earmarked Credit/Total Assets ratio from 2003-2005 to 2007-2009. All submodels include a dummy of state-owned banks and an interaction between this dummy and the main independent variable of each submodel. Almost all coefficients are not significant, showing there is no relationship between Z-Score and increases in our three credit indexes.

*$p<0.005$; **$p<0.025$; ***$p<0.05$

2.7.16 Regressions Results, Z-Score, 2010 Elections

	Difference in z-score averages from 2007-2009 to 2011-2013		
	(a)	(b)	(c)
Dummy for banks that increased their Total Lending/Total Assets ratio from 2007-2009 to 2011-2013	2.11*		
	(0.43)		
Interaction of this dummy with the dummy of state-owned banks	-0.93		
	(0.62)		
Dummy for banks that increased their Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013		0.46	
		(0.44)	
Interaction of this dummy with the dummy of state-owned banks		1.13	
		(0.69)	
Dummy for banks that increased their Non-Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013			1.01**
			(0.43)
Interaction of this dummy with the dummy of state-owned banks			1.01
			(0.63)
Dummy of state-owned banks	-0.74	-1.96*	-1.81*
	(0.45)	(0.58)	(0.49)
n	8056	8012	8032
R^2	0.00	0.00	0.00

Notes: This table shows regressions results of our z-scores models, in which we examine the effects of increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets) on Z-Score after 2010 elections. We test as dependent variables differences between 2007-2009 and 2011-2013 averages of Z-Score. Submodel (a) has as main independent variable a dummy for banks that increased their Total Lending/Total Assets ratio from 2007-2009 to 2011-2013. Submodel (b) has as main independent variable a dummy for banks that increased their Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013. Submodel (c) has as main independent variable a dummy for banks that increased their Non-Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013. All submodels include a dummy of state-owned banks and an interaction between this dummy and the main independent variable of each submodel. Only few coefficients are significant, and they show that of state-owned banks returns increase less than their risks responding to increases in their three credit indexes.

*p<0.005; **p<0.025; ***p<0.05

2.7.17 Regressions Results, Z-Score, 2010 Elections

	Difference in z-score averages from 2007-2009 to 2011-2013		
	(a)	(b)	(c)
Difference in Total Lending/Total Assets ratio from 2007-2009 to 2011-2013	10.79*		
	(2.41)		
Interaction of this difference with the dummy of state-owned banks	-4.51		
	(3.14)		
Difference in Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013		4.47	
		(3.21)	
Interaction of this difference with the dummy of state-owned banks		13.62*	
		(4.55)	
Difference in Non-Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013			9.39*
			(3.28)
Interaction of this difference with the dummy of state-owned banks			12.85*
			(4.96)
Dummy of state-owned banks	-1.25*	-1.58*	-1.31*
	(0.31)	(0.33)	(0.31)
n	8056	8012	8032
R^2	0.00	0.00	0.00

Notes: This table shows regressions results of our z-scores models, in which we examine the effects of increases in each of our three credit indexes (Total Lending/Total Assets, Earmarked Credit/Total Assets and Non-Earmarked Credit/Total Assets) on Z-Score after 2010 elections. We test as dependent variables differences between 2007-2009 and 2011-2013 averages of Z-Score. Submodel (a) has as main independent variable difference in Total Lending/Total Assets ratio from 2007-2009 to 2011-2013. Submodel (b) has as main independent variable difference in Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013. Submodel (c) has as main independent variable difference in Non-Earmarked Credit/Total Assets ratio from 2007-2009 to 2011-2013. All submodels include a dummy of state-owned banks and an interaction between this dummy and the main independent variable of each submodel. Only few coefficients are significant, and they show that public banks returns increase less than their risks responding to increases in their three credit indexes.

*p<0.005; **p<0.025; ***p<0.05

3 The Effects of Public Credit on Cities Development and Growth

Abstract

We investigate the effects of public credit on the development and growth of Brazilian cities after 2008 crisis. Our results show that public credit influence the development of Brazilian cities. Cities where public loans volume is higher than private loans volume show a greater evolution in both FDI and HDI in the post-crisis period. However, the increase in the market share of state-owned banks in the credit market is harmful to development. The evolution of both FDI and HDI is worse in cities that become more dependent of public credit after 2008 crisis. These results also apply to Brazilian macro and micro regions. On the other hand, we can not find a significant relationship between public credit and per capita GDP in Brazilian cities. Only in Brazilian macro and micro regions we observe a positive effect of increases in the market share of public credit on per capita GDP.

3.1 Introduction

In this work we investigate the effects of public credit on the development and growth of Brazilian cities. After 2008 crisis, Brazilian state-owned banks acted to counter the effects of the national recession. Supported by the federal government, these banks provided more credit to compensate the reduction in the credit supply of private banks. However, the increase in the supply of public credit far exceeded the reduction of private credit. It did not end with the recovery of Brazilian economy and lasted until the following decade.

This huge expansion had social and economic effects in the Brazilian cities. But these effects are not yet fully known. According to DeNegri et al (2011), "Although the importance of the public sector in the Brazilian financial system is broadly debated, not much is said on the effectiveness of these policy instruments in improving the conditions of final beneficiaries." Even more controversial is the role that state-owned Banks play (or should play) in cities economies.

In the middle of this public credit supply expansion, numerous cases of corruption and political interference in Brazilian federal institutions appeared. Federal state-owned banks are among these institutions. It makes us question the criteria these banks adopt when they allocate this growing credit supply. Also, we question the effects these lending produce. We suspect that distorted criteria can affect development and wealth of cities.

State-owned banks can lend to unproductive borrowers only for political reasons, and not for the borrowers with the best profile.

We find a lot of evidences in literature about a relationship between credit and economic growth, as Driscoll (2004). However, we do not find many reports about a relationship between credit and development. Some studies show that public ownership is harmful to growth, as La Porta, Lopez-de-Silanes and Shleifer (2002). Others reveal that it only happens if a country has low financial development and low institutional quality, as Körner and Schnabel (2011).

In our models we use differences between averages of development and growth variables of Brazilian cities before and after 2008 crisis. We use Firjan Development Index (FDI) and Human Development Index (HDI) to measure development. We use per capita GDP to measure growth. Our intention is to examine how these variables evolve after crisis. To this end we use the percentages of public and private credit in the total credit operations in a city. We do not use the credit amounts to avoid problems with endogeneity. We use differences in averages of Firjan Fiscal Management Index (FFMI) as control variables. They are good proxies for the cities ability to promote their development.

Our results show that public credit influences development. Cities where public loans volume is higher than private loans show a greater evolution in both FDI and HDI after 2008 crisis. However, increases in the market share of public credit are harmful to development. The evolution of both FDI and HDI in cities where it happens is worse than in cities where it does not happen. These results are the same to Brazilian macro and micro regions.

On the other hand, can not find a significant relationship between public credit and per capita GDP in Brazilian cities. Only in Brazilian macro and micro regions we observe a positive effect of increases in the market share of public credit on per capita GDP. These results are weaker than what we find in previous researches.

3.2   Identification

We identify evidences that public credit is relevant to explain differences in Brazilian cities development and growth. Cities where public loans are larger than private loans show a greater evolution in both FDI and per capita GDP after crisis. But the increase of the share of state-owned banks in the credit market after 2008 crisis is harmful to development and growth. Cities where this share increases show a smaller evolution in both FDI and per capita GDP.

Table 18 shows the amount of credit operations from 2002 to 2014 in Brazil. State-owned banks values refer only to federal state-owned banks with a retail portfolio in Brazil.
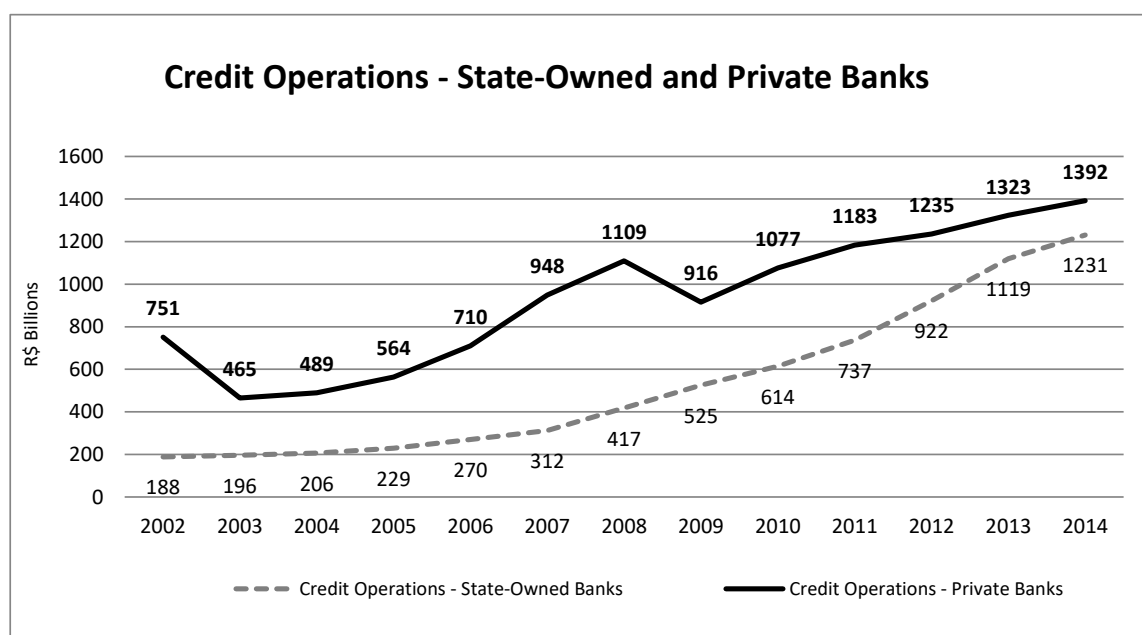
Figure 3 – Credit Operations, State-Owned and Private Banks, Brazil

Thus, we exclude BNDES and state banks data. After 2008 crisis state-owned banks raise sharply their credit supply, while private banks soften theirs. Figure 3 shows more clearly these opposing tendencies. As a consequence, public credit become increasingly important over the years as a source of cities investments. This importance increases especially after 2008 crisis. Figure 4 shows the growing percentage of Brazilian cities where public loans are larger than private loans.

Table 18 – Credit Operations, State-Owned and Private Banks, Brazil

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total of Credit Operations	939	661	696	793	981	1260	1527	1441	1691	1921	2158	2442	2623
Credit Operations - State-Owned Banks	188	196	206	229	270	312	417	525	614	737	922	1119	1231
% of Total	*20%*	*30%*	*30%*	*29%*	*28%*	*25%*	*27%*	*36%*	*36%*	*38%*	*43%*	*46%*	*47%*
Credit Operations - Private Banks	751	465	489	564	710	948	1109	916	1077	1183	1235	1323	1392
% of Total	*80%*	*70%*	*70%*	*71%*	*72%*	*75%*	*73%*	*64%*	*64%*	*62%*	*57%*	*54%*	*53%*

This table compares the evolution of credit operations from 2002 to 2014 in Brazil. These numbers reffer to the cities where all statistics used in this work are available. Values in R$ billions. State-owned banks numbers reffer only to federal ones with a retail portfolio. All data from EstBan. Public and private credit operations increase through the years, but the increase in public is higher, going from 20% of total operations in 2002 to 47% in 2014.

We then examine the development and growth of Brazilian cities over the same period. We adopt Firjan Development Index (FDI) as the parameter to measure development and per capita GDP to measure growth. We analyse separately cities where public credit is more relevant and where private credit is. We adopt two distinct measures of relevance. At first, we consider the cities where public credit is more relevant as those where public loans are greater than private loans. Next, we consider the cities where public credit is more relevant as those where there is an increase of the share of state-owned banks in the
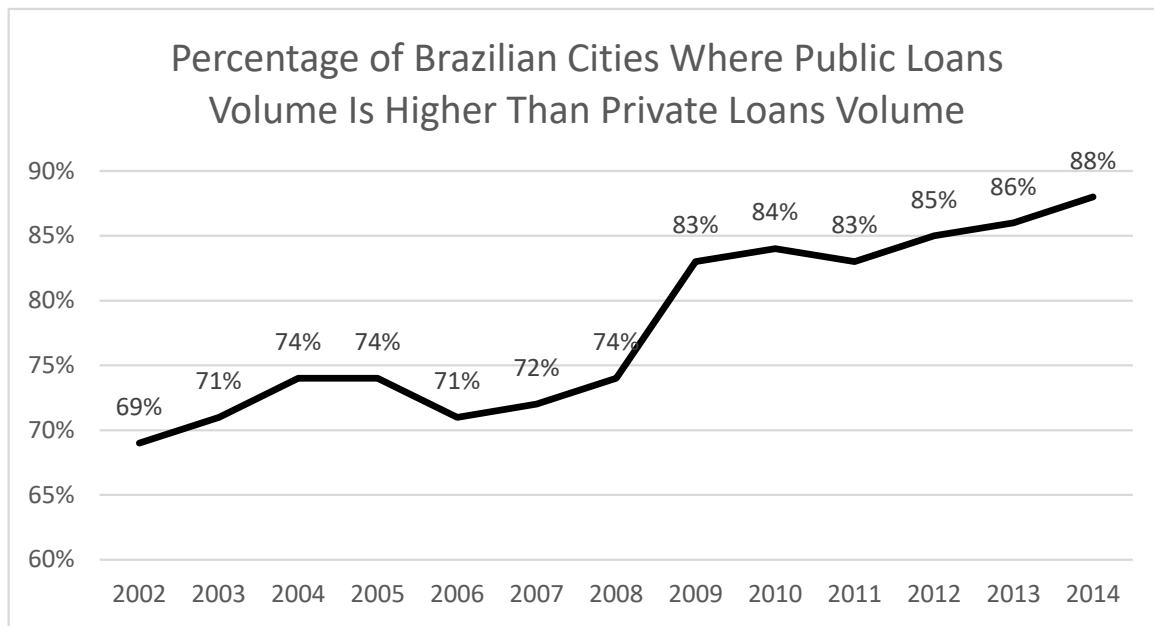
Figure 4 – Public Banks, Brazilian Cities

credit market.

Table 19 shows the evolution of FDI and per capita GDP in cities where public credit is more relevant. We compare these values with FDI and per capita GDP of all Brazilian cities. Last column show the difference in percentage between 2014 and 2005 values of FDI series and between 2014 and 2002 values of per capita GDP series. FDI and per capita GDP of cities that become more dependent of public credit do not evolve as the average for all Brazilian cities. On the other hand, FDI and per capita GDP of cities where public loans are greater than private loans evolve similarly to all Brazilian cities.

Table 20 shows the same statistics to cities where private credit is more relevant. The results are basically the opposite. The evolution of FDI of cities that become more dependent of private credit is greater than the average of all Brazilian cities. Per capita GDP evolution is the same. On the other hand, they both evolve less in cities where private loans are greater than public loans.

According to these data, public credit do not seem to harm cities development and growth. In fact, the evolution of FDI and per capita GDP is greater in cities where the volume of public loans is higher than private loans. However, the increase in the dependency of public credit after 2008 crisis seems to be negative. It can be an indicative of a bad allocation of public credit during and after the crisis period. If so, the investments generated by state-owned banks do not materialize in improvements in wealth and development.

To investigate that, we generate averages of each variable values in pre-crisis and post-crisis periods. We adopt 6 years averages, so we compare averages of 2002-2007 with 2009-2014 periods. We exclude data of 2008, the year of the crisis, in order to avoid some

Table 19 – FDI and Per Capita GDP Yearly Evolution, State-Owned Banks

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Δ%
Firjan Development Index (FDI)														
Average for all Brazilian cities	-	-	-	0,56	0,58	0,60	0,60	0,63	0,64	0,65	0,66	0,67	0,67	119%
Average for cities in which public loans volume is larger than private loans volume	-	-	-	0,58	0,60	0,61	0,62	0,64	0,66	0,67	0,68	0,69	0,68	118%
Average for cities where the share of state-owned banks in the credit market increases after crisis	-	-	-	0,65	0,67	0,68	0,68	0,70	0,71	0,72	0,73	0,74	0,73	112%
Per capita GDP														
Average for all Brazilian cities	10,6	11,8	12,0	11,8	12,5	13,4	14,5	14,6	16,0	17,3	17,8	18,6	18,7	158%
Average for cities in which public loans volume is larger than private loans volume	11,9	13,2	13,6	13,3	14,0	14,9	16,3	16,2	17,9	19,4	20,2	20,8	21,1	158%
Average for cities where the share of state-owned banks in the credit market increases after crisis	15,6	16,8	17,2	17,4	18,4	19,4	20,7	20,7	22,9	24,2	25,1	25,6	26,0	149%

This table compares the evolution of Firjan Development Index (FDI) and per capita GDP from 2002 to 2014. First we show the data of all brazilian cities. Then, the data from cities in which public loans volume is larger than private loans volume. Lastly, the data from cities where the share of state-owned banks in the credit market increases after crisis. The last group values evolution is worse than in all cities. Data from Firjan and IBGE. FDI is not available from 2002 to 2004.

Table 20 – FDI and Per Capita GDP Yearly Evolution, Private Banks

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Δ%
Firjan Development Index (FDI)														
Average for all Brazilian cities	-	-	-	0,56	0,58	0,60	0,60	0,63	0,64	0,65	0,66	0,67	0,67	119%
Average for cities in which private loans volume is larger than public loans volume	-	-	-	0,59	0,60	0,62	0,62	0,64	0,65	0,66	0,67	0,68	0,68	115%
Average for cities where the share of private banks in the credit market increases after crisis	-	-	-	0,55	0,56	0,59	0,60	0,62	0,63	0,64	0,65	0,67	0,66	121%
Per capita GDP														
Average for all Brazilian cities	10,6	11,8	12,0	11,8	12,5	13,4	14,5	14,6	16,0	17,3	17,8	18,6	18,7	158%
Average for cities in which private loans volume is larger than public loans volume	11,7	12,4	12,9	13,1	14,2	14,8	15,4	16,0	17,3	18,5	19,0	19,2	19,3	148%
Average for cities where the share of private banks in the credit market increases after crisis	10,5	11,7	12,1	11,9	12,3	13,1	14,5	14,5	15,7	17,2	18,0	18,5	18,7	158%

This table compares the evolution of Firjan Development Index (FDI) and per capita GDP from 2002 to 2014. First we show the data of all brazilian cities. Then, the data from cities in which private loans volume is larger than public loans volume. Lastly, the data from cities where the share of private banks in the credit market increases after crisis. The last group values evolution is higher than in all cities. Data from Firjan and IBGE. FDI is not available from 2002 to 2004.

undesired distortions. We also generate matching samples for each case, in which we compare only cities with similar pre-crisis characteristics. We explain how we generate these matching samples further in methodology section.

Table 21 shows common trends of cities where the volume of public loans is higher than private loans. Then, we compare these values to those of cities where the opposite happens. Table 22 shows common trends of cities that become more dependent of public credit. Again, we compare these values to those of cities where the opposite happens. In both cases the evolution of the variables is similar in treatment and control groups.

Table 21 – Common Trends

		All data				Matching Sample [1]			
		FFMI		Population		FFMI		Population	
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Cities in which public loans volume is larger than private loans volume	2002-2007 average	0,50		40746		0,47		36357	
			-1%		8%		-1%		7%
	2009-2014 average	0,49		44053		0,47		38932	
Cities in which private loans volume is larger than public loans volume	2002-2007 average	0,52		76736		0,48		31717	
			-1%		7%		0%		6%
	2009-2014 average	0,51		81801		0,48		33688	

This table compares the evolution of commom trends (Firjan Fiscal Management Index (FFMI) and Population) in each group of cities. We calculate averages for 2002-2007 and 2009-2014 periods (before and after 2008 crisis) and compare both. Both variables evolve similarly in each group. Data collected from Firjan and IBGE. FFMI is not available from 2002 to 2005. (1) Matching sample is obtained restricting data to cities which average FMDI for 2002-2007 period is lower than 0.7.

We then examine the evolution of Firjan Development Index (FDI) and per capita GDP. Table 23 shows the evolution of both variables in cities where the volume of public loans is higher than private loans. These cities show a greater evolution in both FDI and per capita GDP than cities where private loans are higher. These results are similar when we restrict our data to matching samples. A greater share of public credit seems to be beneficial to the development and growth of Brazilian cities.

However, when we consider our second relevance criterion we obtain distinct results. Cities where the share of state-owned banks in the credit market do not increase show a greater evolution in both FDI and per capita GDP. Table 24 show these results. They remain the same in our matching samples. Apparently, the increase in the importance of public credit in a city impairs its development and growth.

Tables 25 and 26 refers to the same kind of analysis. However, we substitute

Table 22 – Common Trends

		All data				Matching Sample [1]			
		FFMI		Population		FFMI		Population	
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Cities where the share of state-owned banks in the credit market increases after crisis	2002-2007 average	0,55		92407		0,49		21770	
			-1%		7%		0%		7%
	2009-2014 average	0,54		99241		0,49		23221	
Cities where the share of state-owned banks in the credit market does not increase after crisis	2002-2007 average	0,48		20181		0,45		17035	
			-1%		8%		0%		5%
	2009-2014 average	0,47		21720		0,45		17946	

This table compares the evolution of commom trends (Firjan Fiscal Management Index (FFMI) and Population) in each group of cities. We calculate averages for 2002-2007 and 2009-2014 periods (before and after 2008 crisis) and compare both. Both variables evolve similarly in each group. Data collected from Firjan and IBGE. FFMI is not available from 2002 to 2005. (1) Matching sample is obtained restricting data to cities which average FMDI for 2002-2007 period is lower than 0.68 and its 2002-2007 average population is lower than 50.000 .

Table 23 – FDI and GDP per capita, first relevance criterion

		All data				Matching Sample [1]			
		FDI		GDP per capita		FDI		GDP per capita	
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Cities in which public loans volume is larger than private loans volume	2002-2007 average	0,60		13,47		0,55		10,72	
			12%		43%		15%		47%
	2009-2014 average	0,67		19,30		0,63		15,76	
Cities in which private loans volume is larger than public loans volume	2002-2007 average	0,65		16,01		0,57		10,81	
			8%		37%		13%		44%
	2009-2014 average	0,70		22,00		0,64		15,61	

This table compares Firjan Development Index (FDI) and per capita GDP of brazilian cities in which public loans volume is larger than private loans volume with the remaining brazilian cities. We calculate averages for 2002-2007 and 2009-2014 periods (before and after 2008 crisis) and compare both. Data collected from Firjan and IBGE. FDI is not available from 2002 to 2004. (1) Matching sample is obtained restricting data to cities which average FDI for 2002-2007 period is lower than 0.7.

Table 24 – FDI and GDP per capita, second relevance criterion

| | | All data | | | | Matching Sample [1] | | | |
| | | FDI | | GDP per capita | | FDI | | GDP per capita | |
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Cities where the share of state-owned banks in the credit market increases after crisis	2002-2007 average	0,67		17,46		0,56		11,86	
			9%		38%		14%		44%
	2009-2014 average	0,72		24,08		0,64		17,06	
Cities where the share of state-owned banks in the credit market does not increase after crisis	2002-2007 average	0,57		11,77		0,53		9,46	
			13%		44%		16%		46%
	2009-2014 average	0,64		16,99		0,61		13,78	

This table compares Firjan Development Index (FDI) and per capita GDP of brazilian cities where the share of state-owned banks in the credit market increases after crisis with the remaining brazilian cities. We calculate averages for 2002-2007 and 2009-2014 periods (before and after 2008 crisis) and compare both. Data collected from Firjan and IBGE. FDI is not available from 2002 to 2004. (1) Matching sample is obtained restricting data to cities which average FDI for 2002-2007 period is lower than 0.68 and its 2002-2007 average population is lower than 50.000 .

state-owned for private banks in our two criteria of relevance. The results are consistent with our previous findings. They are the opposite of Tables 23 and 24. FDI and per capita GDP evolve more in cities where the volume of private credit is lower than that of public credit. However, cities that show a increase in the participation of private credit evolve more in both indexes.

Table 25 – FDI and GDP per capita, first relevance criterion, private banks

| | | All data | | | | Matching Sample [1] | | | |
| | | FDI | | GDP per capita | | FDI | | GDP per capita | |
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Cities in which public loans volume is larger than private loans volume	2002-2007 average	0,60		13,17		0,60		13,17	
			10%		38%		10%		38%
	2009-2014 average	0,66		18,22		0,66		18,22	
Cities in which private loans volume is larger than public loans volume	2002-2007 average	0,61		14,38		0,61		14,38	
			11%		41%		11%		41%
	2009-2014 average	0,68		20,34		0,68		20,34	

This table compares Firjan Development Index (FDI) and per capita GDP of brazilian cities in which public loans volume is larger than private loans volume with the remaining brazilian cities. We calculate averages for 2002-2007 and 2009-2014 periods (before and after 2008 crisis) and compare both. Data collected from Firjan and IBGE. FDI is not available from 2002 to 2004. (1) Matching sample is obtained with all data.

Lastly, we show that the causality in the relationship between public credit and lower development is not reverse. Figure 5 shows the average percentage of public credit in

Table 26 – FDI and GDP per capita, second relevance criterion, private banks

| | | All data | | | | Matching Sample [1] | | | |
| | | FDI | | GDP per capita | | FDI | | GDP per capita | |
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Cities where the share of state-owned banks in the credit market increases after crisis	2002-2007 average	0,56		11,96		0,52		9,65	
			13%		43%		17%		41%
	2009-2014 average	0,64		17,10		0,61		13,65	
Cities where the share of state-owned banks in the credit market does not increase after crisis	2002-2007 average	0,63		15,02		0,54		10,29	
			10%		40%		15%		49%
	2009-2014 average	0,69		21,10		0,62		15,29	

This table compares Firjan Development Index (FDI) and per capita GDP of brazilian cities where the share of state-owned banks in the credit market increases after crisis with the remaining brazilian cities. We calculate averages for 2002-2007 and 2009-2014 periods (before and after 2008 crisis) and compare both. Data collected from Firjan and IBGE. FDI is not available from 2002 to 2004. (1) Matching sample is obtained restricting data to cities which average FDI for 2002-2007 period is lower than 0.68 and its 2002-2007 average population is lower than 50.000 .

Figure 5 – Credit Operations, State-Owned Banks, Brazil

cities with lower development. We define cities with lower development as those classified in the lower quartile of Firjan Development Index (FDI). There is no significant change in this number from 2005 to 2014. If lower development causes higher public credit dependence, there should be an increase in the percentage of loans of state-owned banks. But it does not happen. It seems that public credit relevance increases equally in both rich and poor cities.

3.3　Literature Review

There are many articles discussing the relationship between credit and growth, and which one causes the other. Surprisingly, not many works study the effects of credit on development. Table 27 summarizes the main results we find.

Many authors study how credit supply affects economic growth. Driscoll (2004) tests whether changes in bank loan supply affect output in USA states. He finds that shocks to money demand have large and statistically significant effects on the supply of bank loans. However, loans have small effects on output, often negative and statistically insignificant. In contrast, Rondorf (2012) finds evidences that fluctuations in loans lead to a response in output in the euro area. García-Escribano and Han (2015) find a significant impact of credit growth on real GDP growth in emerging market economies, including Brazil.

La Porta, Lopez-de-Silanes and Shleifer (2002) study some characteristics of state-owned banks. They find that government ownership of banks is large and pervasive around the world. Such ownership is particularly significant in countries with low levels of per capita income, poor protection of property rights, underdeveloped financial systems, and interventionist and inefficient governments. Also, government ownership of banks is associated with lower subsequent growth of per capita income and lower growth of productivity.

Körner and Schnabel (2011) show that La Porta, Lopez-de-Silanes and Shleifer (2002) results depend on the country financial development and political institutions. They find that public ownership is harmful only if a country has low financial development and low institutional quality. The negative impact of public ownership on growth fades quickly as the financial and political system develops. In highly developed countries, they find no negative effects. In some cases they find positive effects.

In Turkey, state-owned banks have an implicit role of reducing disparity. They allocate loans in underdeveloped regions that are ignored by private banks. Önder and Özyıldırım (2010) study the impact of credits provided by these banks on provincial growth. They find a paradoxical effect of state-owned banks on regional development. State-owned banks lending contribute significantly to the growth of more developed provinces. However, they fail to encourage the well-being of less developed provinces. On the other hand, credits provided by private banks positively impact the per capita real GDP in both developed and less developed provinces.

We then examine the relationship between public credit and development. Coleman and Feler (2015) analyzes the role of Brazilians government banks in mitigating a national recession after 2008 crisis. These banks provide more credit to offset the decline in lending by private banks. The authors find that cities with a high share of government banks

Table 27 – Summary of main findings

Authors	Country	Period	Journal	Main results
La Porta, R., Lopez-de-Silanes, F., Shleifer, A.	92 countries	1960-2000	Journal of Finance	Government ownership of banks is significant in countries with low levels of per capita income, underdeveloped financial systems, interventionist and inefficient governments. Also, government ownership of banks is associated with lower subsequent growth of per capita income and with lower growth of productivity.
Coleman, N., Feler, L.	Brazil	2008-2010	Journal of Monetary Economics	Localities in Brazil with a high share of government banks experience an increase in lending following the financial crisis. These cities also experience an increase of approximately 2.3% in GDP and 1.8% in labor hours and income.
Korner, T., Schnabel, I.	78 countries	1970-2007	Economics of Transition	The relationship between public ownership of banks and GDP growth depends on a country financial development and political institutions. Public ownership is harmful only if a country has low financial development and low institutional quality.
Sapienza, P.	Italy	1991-1995	Journal of Financial Economics	State-owned banks charge lower interest rates than do privately owned banks to similar or identical firms. They also mostly favor firms located in depressed areas and large firms.
Chen, H. et al.	56 countries	2007-2009	Journal of Financial Stability	State-owned banks have higher loan growth rates than private banks during the crisis. In countries with low corruption, the increased lending by government banks is associated with more favorable GDP and employment growth in the crisis period.
García-Escribano, M., Han, F.	31 emerging markets	2002-2012	IMF Working Paper	There is a significant impact of credit growth on real GDP growth in emerging market economies.
Driscoll, J.	USA	1965-1998	Journal of Monetary Economics	Loans have small (often negative and statistically insignificant) effects on GDP in the USA.
Micco, A., Panizza, U., Yañez, M.	179 countries	1995-2002	Economics Letters	Lending by state-owned banks is much less responsive to macroeconomic shocks than the lending of private banks.
Rondorf, U.	10 european countries	1999-2008	Journal of Int. Fin. Markets	In contrast to the United States, there is evidence that fluctuations in loans lead to a response in output in the euro area.
Ahlin, C., Jiang, N.			Journal of Develop. Economics	Micro-credit can either raise or lower long-run GDP. It typically lowers long-run inequality and poverty. A case exists, however, in which it both lowers output per capita and raises poverty in the long run.
Cull, R., Peria, M. S. M.	Eastern Europe and Latin America	2004-2009	Journal of Banking and Science	Government-owned banks do not act counter-cyclically during the 2008–2009 crisis in Eastern Europe, while in Latin America there is a significant growth of government-owned banks loans. On the other hand, private banks in Eastern Europe and Latin America contract their loan growth rates in the same period.
Önder, Z., Özyıldırım, S.	Turkey	1991-2000	Cambridge Journal of Economics	State-owned banks lending contribute significantly to the growth of more developed provinces, but fail in less developed provinces. On the other hand, credits provided by private banks positively impact the per capita real GDP in both developed and less developed provinces.

experience an increase in lending compared to areas with a low share of these banks. They also obtain an increase of approximately 2.3% in GDP and 1.8% in labor hours and income.

Chen et al. (2016) use a sample of 56 countries to investigate the lending behavior of government banks during the crisis of 2008. They find that the level of corruption of the country plays a crucial role in this context. In countries with low corruption, the increase in lending by government banks lead to higher GDP and employment growth in the crisis period. In contrast, in countries with high corruption, the increase in lending by government banks creates no beneficial effects on either GDP growth or employment. Government banks have higher loan growth rates than private banks during the crisis.

We also examine the behaviour of state-owned banks during crisis periods. Cull and Peria (2013) find that government-owned banks in Eastern Europe do not act counter-cyclically during the 2008 crisis. The opposite is true in Latin America. There is a significant growth of government-owned banks corporate and consumer loans during the crisis. On the other hand, domestic private banks in Eastern Europe and Latin America contract their loan growth rates in the same period. Mico and Panizza (2011) show that lending by state-owned banks is much less responsive to macroeconomic shocks than the lending of private banks. According to the authors, it is due to an explicit objective of stabilizing credit.

Finally, we search for signals that state-owned banks not always adopt an optimal and profit-maximizing strategy when lending. Sapienza (2004) shows that state-owned banks mostly favor firms located in depressed areas and large firms. They also charge lower interest rates than do private banks to similar or identical firms. Also, politics affect the lending behavior of state-owned banks. The stronger the political party is in the area where the firm borrows, the lower the interest rates the firm pays.

3.4   Methodology

Our methodology is based on a differences in differences approach. We apply that to our main variables to check how they differ from pre-crisis period (2002-2007) to post-crisis (2009-2014). Table 28 describes all variables used in this work.

Oliveira, Schiozer and Barros (2014) show that the 2008 crisis was an event essentially exogenous to the Brazilian financial system. It changed the behaviour of Brazilian state-owned banks, mainly in the credit market. So we use this exogenous event to format our models and to answer our research question.

We use secondary data in this work. We obtain it in open databases as EstBan from Central Bank, Cities GDP from IBGE, Ipeadata from IPEA and Firjan. It covers

Table 28 – List of Variables

Variable	Source	Output
FDI	Firjan	Firjan Development Index of a city
HDI	IPEA	Human Development Index of a city
GDP per capita	IBGE	City GDP/City population index
FFMI	Firjan	Firjan Fiscal Management Index of a city
City Population	IBGE	Total of residents in a city
Credit	BC	Total of lending, in R$

the period from 2002 to 2014. We choose this period because it enables the division in two periods of same length, before and after crisis. We also choose this period because of the availability of the data.

We define a criteria to include banks in this study. In private banks group we include only private banks (national or foreign) with retail portfolios in Brazil. In state-owned banks group we include only federal state-owned banks with retail portfolios in Brazil. Therefore, we exclude BNDES and state banks.

We format our models to verify how public credit share influence the evolution of our development indexes in Brazilian cities. Our first three models (3.1 to 3.3) have just one main independent variable. Our last three models (3.4 to 3.6) are composed models with two main independent variables and also a variable of interaction between them.

The dependent variables of all models are differences between averages of our development and growth variables from 2002-2007 period to 2009-2014 period (before and after 2008 crisis). We exclude data related to the year of the crisis (2008) to avoid some undesired distortions. Our development variables are Firjan Development Index (FDI) and Human Development Index (HDI) of Brazilian cities. HDI is available only for the years 2000 and 2010. So the difference in this case is between the HDI values from 2010 to 2000, not between averages as FDI. Our growth variable is the per capita GDP of Brazilian cities.

Our independent variables are differentials of our research. We can not just adopt the amounts of public and private credit operations. If we do so, we would have to deal with some problems well documented in economic theory. Endogeneity would be a major concern to our results. Instead, we adopt percentages of public and private credit in relation to total credit operations in a city. They are exogenous variables. A priori there should be no difference between public and private resources to growth and development. They are all money. If there is a difference between them, then we have a relevant result.

In our first model (3.1) the independent variable is the difference in public

credit/total credit index before and after crisis in a city. To this end we calculate averages in 2002-2007 and 2009-2014 of this index. This is our differences in differences model in an Angrist & Pischke (2009) approach. It should reveal the increment in development and growth that increases in the market share of public credit provoke.

$$dif\ development_i = \beta_0 \ + \ \beta_1\ dif\ public\ credit/total\ credit_i \ + \ \epsilon_i$$
$$dif\ growth_i = \beta_0 \ + \ \beta_1\ dif\ public\ credit/total\ credit_i \ + \ \epsilon_i$$

(3.1)

Our second and third models modify the traditional DD approach. They offer different perspectives as their main dependent variables are dummies, not differences. These dummies refer to the relevance criteria we use in our identification. These tests results should give more robustness to our first model results.

The independent variable of the second model (3.2) is a dummy to measure the first criterion of relevance we use in our identification. This dummy selects the cities where the market share of state-owned banks increase after 2008 crisis in the credit market. Our goal is to observe if there is a difference in the development and growth in cities where there is an increase in the availability of public resources.

$$dif\ development_i = \beta_0 \ + \ \beta_1\ dummy\ increase\ public\ credit_i \ + \ \epsilon_i$$
$$dif\ growth_i = \beta_0 \ + \ \beta_1\ dummy\ increase\ public\ credit_i \ + \ \epsilon_i$$

(3.2)

The independent variable of the third model (3.3) is a dummy to measure the second our criterion of relevance. This dummy refers to the cities where the volume in Reais of state-owned banks loans is higher than the volume of private banks loans. It should reveal if the development of the cities where public credit plays a more relevant role differs from the development of the cities where private credit does. A significant beta favors that public and private financial resources are differently allocated.

$$dif\ development_i = \beta_0 \ + \ \beta_1\ dummy\ 50perc\ public\ credit_i \ + \ \epsilon_i$$
$$dif\ growth_i = \beta_0 \ + \ \beta_1\ dummy\ 50perc\ public\ credit_i \ + \ \epsilon_i$$

(3.3)

The forth model (3.4) has three independent variables. Besides the independent variables of models 3.1 and 3.2, it includes an interaction between these two variables. The purpose is to test if differences in public credit/total credit index have a different impact in cities where the market share of state-owned banks increase after 2008 crisis. A positive and significant beta favors the conclusions that public credit influences development and

growth differently than private credit.

$$
\begin{aligned}
dif\ development_i = \beta_0 \ &+ \ \beta_1\ dif\ public\ credit/total\ credit_i \ + \\
&+ \ \beta_2\ dummy\ increase\ public\ credit_i \ + \\
&+ \ \beta_3\ interaction_i \ + \ \epsilon_i \\
dif\ growth_i = \beta_0 \ &+ \ \beta_1\ dif\ public\ credit/total\ credit_i \ + \\
&+ \ \beta_2\ dummy\ increase\ public\ credit_i \ + \\
&+ \ \beta_3\ interaction_i \ + \ \epsilon_i
\end{aligned}
\tag{3.4}
$$

In the fifth model (3.5) we include the independent variables of models 3.1 and 3.3 and the interaction between these two variables. The purpose is to test if the differences in public credit/total credit index affect distinctly cities that depends more on public credit. Again, a positive and significant beta indicates that public credit influences development and growth differently than private credit.

$$
\begin{aligned}
dif\ development_i = \beta_0 \ &+ \ \beta_1\ dif\ public\ credit/total\ credit_i \ + \\
&+ \ \beta_2\ dummy\ 50perc\ public\ credit_i \ + \\
&+ \ \beta_3\ interaction_i \ + \ \epsilon_i \\
dif\ growth_i = \beta_0 \ &+ \ \beta_1\ dif\ public\ credit/total\ credit_i \ + \\
&+ \ \beta_2\ dummy\ 50perc\ public\ credit_i \ + \\
&+ \ \beta_3\ interaction_i \ + \ \epsilon_i
\end{aligned}
\tag{3.5}
$$

Finally, the sixth model (3.6) includes the independent variables of models 3.2 and 3.3 and the interaction between these two variables. All these three variables are dummies. We test if the increase in the market share of state-owned banks impact differently cities where public credit is more relevant than private credit.

$$
\begin{aligned}
dif\ development_i = \beta_0 \ &+ \ \beta_1\ dummy\ increase\ public\ credit_i \ + \\
&+ \ \beta_2\ dummy\ 50perc\ public\ credit_i \ + \\
&+ \ \beta_3\ interaction_i \ + \ \epsilon_i \\
dif\ growth_i = \beta_0 \ &+ \ \beta_1\ dummy\ increase\ public\ credit_i \ + \\
&+ \ \beta_2\ dummy\ 50perc\ public\ credit_i \ + \\
&+ \ \beta_3\ interaction_i \ + \ \epsilon_i
\end{aligned}
\tag{3.6}
$$

We add to all models two control variables. The first is the difference in averages of city population from 2009-2014 to 2002-2007. The second is the difference in averages of Firjan Fiscal Management Index (FFMI) of a city from 2009-2014 to 2006-2007. Only when the development variable is per capita GDP we do not use difference in population as a control. A priori, we would expect a significant and negative relation between development

and population growth, as it is well established in economic theory (Solow model, for example).

On the other hand, we expect Firjan Fiscal Management Index (FFMI) to influence positively a city development. FFMI measures the efficiency of the public institutions of a city. This index is a good proxy for cities ability to promote their development for themselves. Therefore, the addition of FFMI as a control variable is a valuable tool to evaluate the importance of credit in development and growth.

We also consider that maybe the relationship between our dependent and independent variables are not linear. To test it, we square our independent variables and substitute them in our models.

Brazil is a large country with great disparities. Comparisons between different cities (or different groups of cities) can be unfair and produce distorted conclusions. To prevent these problems we perform alternatives robustness tests of our results. We use an algorithm that minimizes the differences in the averages of pre-treatment characteristics (FDI, HDI and per capita GDP) of treated and non-treated groups. It produces samples of treated and non-treated cities with similar pre-treatment characteristics that can be more fairly compared. We call these samples our Matching Samples. We describe the range of values of each variable in each of the matching samples. We report the results of these tests in our annexes.

We perform additional tests substituting Firjan Development Index (FDI) for each one of its three sub-indexes (Firjan Development Index – Income, Firjan Development Index – Education and Firjan Development Index – Health). The purpose is to verify if public credit influences each sub-index in the same way it influences the main index. We report these results in our annexes.

We also reapply the tests considering only earmarked credit instead of total lending. Earmarked credit is the sum of agricultural and real estate financing in EstBan reports. We obtain it in columns 163, 164, 165, 166, 167 and 169 of these reports. If credit can affect cities development, we would expect earmarked credit to be more relevant than non-earmarked credit to this end. We report these results in our annexes.

Lastly, we repeat the tests in Brazilian macro and micro regions. It is possible that sometimes an individual or firm opt to borrow not in the city where he lives, but in a nearby city. It can be due to any reason (more favorable conditions, larger credit availability, personal relationships). We expect these tests to produce similar results as the results of Brazilian cities.

3.5   Results

Our results show that public credit influence the development'and the growth of Brazilian cities. In our tests the coefficients of cities where the volume of public loans is higher than private loans are significant and positive. It means a greater evolution of both FDI and HDI in these cities than in other cities. However, cities where public credit share increases after 2008 crisis show a worse evolution of both FDI and HDI than other cities. These results are the same to Brazilian macro and micro regions.

On the other hand, the results of tests with per capita GDP are not conclusive. Only when we apply our tests to macro and micro regions we have positive and significant coefficients for increases in public credit share. We do not obtain the same results when applying our models in Brazilian cities.

Table 29 shows the regressions results with Firjan Development Index (FDI). They are consistent with our identification. The coefficient of differences in public credit/total credit index is significant at 99,5% level of confidence and negative. The coefficient of the dummy of cities where this index increase after 2008 crisis is also significant and negative. The coefficient of the dummy for cities where public loans volume is higher than private loans volume is significant at 99,5% level of confidence and positive. When we restrict the database of those tests to our matching samples the results remains the same.

FDI sub-indexes generate very similar results to the main FDI index. Only the Income sub index (FDI-I) resembles more to per capita GDP than to the main FDI index. Both Education and Health sub-indexes (FDI-E and FDI-H) coefficients have similar signals and levels of significance as FDI.

As expected, HDI as the development variable produces similar results as FDI. Table 30 shows the regressions results. The coefficients of both variables and its respective levels of confidence are very similar. The interactions with the dummies reveal some interesting facts. The harm the increase in public credit share cause to development is greater in cities where public credit is the majority. The results are robust to the restriction of the data to our matching samples.

Table 53 refers to the tests results with per capita GDP. They are less conclusive than the results of FDI and HDI. Only the coefficients of the dummy of cities that show increases in public credit market share are significant at 97,5% level of confidence. However, they become not significant in our matching sample. These results differ from what we observe in our identification.

Tables 32, 33 and 34 show FDI and HDI regressions results when we test private banks instead of state-owned banks. They are consistent with our identification. These results are the opposite to those obtained with state-owned banks. The coefficients of cities in which private loans volume is higher than public loans are significant and negative.

Table 29 – Regressions Results, Firjan Development Index (FDI), State-owned Banks

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	-0.04*			0.06	-0.01*	
	(0.00)			(0.03)	(0.00)	
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.02*		-0.01*		-0.01*
		(0.00)		(0.00)		(0.00)
Dummy of cities in which public loans volume is larger than private loans volume			0.02*		0.02*	0.02*
			(0.00)		(0.00)	(0.00)
Dummy of interaction between the first and the second variables				-0.08**		
				(0.03)		
Dummy of interaction between the first and the third variables					-0.09*	
					(0.01)	
Dummy of interaction between the second and the third variables						-0.01**
						(0.00)
Difference in city population averages from 2009-2014 to 2002-2007	-0.01**	-0.00	-0.01***	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
n	3156	3156	3156	3156	3156	3156
R^2	0.04	0.04	0.04	0.05	0.07	0.07

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

However, the increase in the market share of private credit has significant and positive coefficients. On the other hand, again we can not conclude much when per capita GDP is the independent variable.

Our robustness tests results are consistent with the main results we obtain. When we use squared independent variables, we obtain very similar results than the results with linear variables. Only when we test private banks we obtain different results. Additionally, when we use earmarked credit in our models instead of total lending, the results are fundamentally the same. It strengthens our conclusions about the relationship between our credit and dependent variables.

Lastly, we apply our models to Brazilian macro and micro regions. In some cases there are problems with collinearity between some variables. It happens beacause in all macro regions where public credit is the majority its market share increase after 2008 crisis. When these problems happen, we omit the respective results in the following tables.

Table 30 – Regressions Results, HDI, State-owned Banks

	Difference in 2010 and 2000 city HDI					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	-0.03*			0.08*	-0.01**	
	(0.00)			(0.02)	(0.00)	
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.02*		-0.02*		-0.02*
		(0.00)		(0.00)		(0.00)
Dummy of cities in which public loans volume is larger than private loans volume			0.01*		0.01*	0.01*
			(0.00)		(0.00)	(0.00)
Dummy of interaction between the first and the second variables				-0.08*		
				(0.02)		
Dummy of interaction between the first and the third variables					-0.12*	
					(0.01)	
Dummy of interaction between the second and the third variables						-0.01*
						(0.00)
Difference in city population averages from 2009-2014 to 2002-2007	-0.01*	-0.00	-0.01*	-0.00	-0.01*	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.01***	-0.01**	-0.01***	-0.01**	-0.02**	-0.01**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
n	3164	3164	3164	3164	3164	3164
R^2	0.04	0.11	0.03	0.11	0.08	0.12

Notes: All models have as dependent variables the difference in city HDI values of 2010 and 2000. The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE. HDI for Brazilian cities are available only for years 2000 and 2010.
Level of significance: *p<0.005; **p<0.025; ***p<0.05.

First we test Firjan Development Index (FDI) and HDI as dependent variables. Tables 35 and 36 refers to Firjan Development Index (FDI) in macro and micro regions, respectively. Tables 37 and 38 refers to HDI in macro and micro regions, respectively. All results are consistent with those we obtain with Brazilian cities data.

The differences in public banks credit/total credit index before and after crisis produces coefficients that are significant at 99,5% level of confidence and negative. The coefficients of the dummies of cities where this index increase after crisis are also significant at 99,5% level of confidence and negative. On the other hand, cities where public loans volume is higher than private loans volume show positive and significant coefficients at 99,5% level of confidence. These results fortify our conclusions about the relationship between development and public credit in Brazilian cities.

Tables 39 and 40 refers to per capita GDP tests results in macro and micro regions, respectively. They are different from the results in Brazilian cities. Differences in per capita GDP in Brazilian regions respond positively to differences in increases in public credit share. We do not observe that when we study cities data. It is interesting that the increase

Table 31 – Regressions Results, per capita GDP, State-owned Banks

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	1.14 (1.13)			-12.48 (9.66)	0.70 (1.42)	
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		1.36** (0.50)		1.69** (0.61)		2.56** (0.94)
Dummy of cities in which public loans volume is larger than private loans volume			-0.15 (0.55)		-0.08 (0.69)	0.98 (0.80)
Dummy of interaction between the first and the second variables				11.80 (9.76)		
Dummy of interaction between the first and the third variables					5.55 (4.14)	
Dummy of interaction between the second and the third variables						-1.61 (1.12)
Difference in FFMI from 2009-2014 to 2006-2007	3.98 (2.52)	4.04 (2.51)	4.00 (2.51)	3.96 (2.51)	4.07 (2.52)	4.12 (2.51)
n	3165	3165	3165	3165	3165	3165
R^2	0.00	0.00	0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

in public credit influence positively the wealth growth in Brazilian regions. The effect is opposed when compared to development.

3.6   Conclusion

Our results reveal that public credit influence the development of Brazilian cities. FDI and HDI evolve more in cities where the volume of public credit is greater than the volume of private credit. However, in cities where the market share of state-owned banks in the credit market increase after 2008 crisis both FDI and HDI show a lower evolution. We obtain the same results in Brazilian macro and micro regions. On the other hand, the results we obtain with per capita GDP are not conclusive. Only in macro and micro regions we observe a positive effect of increases in public credit on per capita GDP. There are no relevant results with per capita GDP in Brazilian cities.

The most important limitations we face in this study are due to the restricted availability of some data. For example, the defaults rates of the banks in each city or region are not available yearly. We also have concerns about the reliability of some information in

Table 32 – Regressions Results, Firjan Development Index (FDI), Private Banks

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	0.04* (0.00)			0.03* (0.00)	0.04* (0.00)	
Dummy of cities where the share of private banks in the credit market increases after crisis		0.02* (0.00)		0.02* (0.00)		0.02* (0.00)
Dummy of cities in which private loans volume is larger than public loans volume			-0.01* (0.00)		-0.02* (0.00)	-0.01 (0.01)
Dummy of interaction between the first and the second variables				-0.16* (0.03)		
Dummy of interaction between the first and the third variables					-0.09* (0.01)	
Dummy of interaction between the second and the third variables						-0.05 (0.04)
Difference in city population averages from 2009-2014 to 2002-2007	-0.01** (0.00)	-0.01*** (0.00)	-0.01** (0.00)	-0.01*** (0.00)	-0.01** (0.00)	-0.01** (0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
n	3156	3156	3156	3156	3156	3156
R^2	0.04	0.03	0.01	0.06	0.06	0.03

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

banks balance sheets. Improvements on the availability of detailed credit data are crucial to improve the quality of Brazilian banking researches. A more rigorous audit of banks data is also important to this end.

On the other hand, it is equally important to improve the availability and quality of data related to Brazilian cities. Information like Gini index would help to strengthen our conclusions. Detailing the methodologies adopted by indexes like FDI, FFMI and HDI would also be important. It allows researchers to select the indexes that best fit their interests. Further developments on researches like ours depend on the availability of these data.

Table 33 – Regressions Results, HDI, Private Banks

| | Difference in 2010 and 2000 city HDI | | | | | |
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	0.03* (0.00)			0.02* (0.00)	0.03* (0.00)	
Dummy of cities where the share of private banks in the credit market increases after crisis		0.02* (0.00)		0.02* (0.00)		0.02* (0.00)
Dummy of cities in which private loans volume is larger than public loans volume			0.00 (0.00)		-0.01*** (0.00)	0.01* (0.00)
Dummy of interaction between the first and the second variables				-0.16* (0.03)		
Dummy of interaction between the first and the third variables					-0.07* (0.01)	
Dummy of interaction between the second and the third variables						-0.05 (0.04)
Difference in city population averages from 2009-2014 to 2002-2007	-0.01* (0.00)	-0.01* (0.00)	-0.01* (0.00)	-0.01* (0.00)	-0.01* (0.00)	-0.01* (0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.01*** (0.01)	-0.01** (0.01)	-0.01*** (0.01)	-0.01*** (0.01)	-0.01*** (0.01)	-0.01** (0.01)
n	3164	3164	3164	3164	3164	3164
R^2	0.04	0.05	0.01	0.07	0.05	0.06

Notes: All models have as dependent variables the difference in city HDI values of 2010 and 2000. The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE. HDI for Brazilian cities are available only for years 2000 and 2010.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

Table 34 – Regressions Results, per capita GDP, Private Banks

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	-1.11 (1.13)			-0.76 (1.22)	-0.72 (1.16)	
Dummy of cities where the share of private banks in the credit market increases after crisis		-0.92 (0.56)		-1.33*** (0.66)		-1.18*** (0.58)
Dummy of cities in which private loans volume is larger than public loans volume			-0.88 (0.69)		-1.19 (0.76)	-1.26 (0.72)
Dummy of interaction between the first and the second variables				18.28 (10.80)		
Dummy of interaction between the first and the third variables					-6.31 (5.48)	
Dummy of interaction between the second and the third variables						1.94 (14.03)
Difference in FFMI from 2009-2014 to 2006-2007	-1.48 (1.12)	-1.49 (1.12)	-1.47 (1.12)	-1.48 (1.12)	-1.39 (1.12)	-1.44 (1.12)
n	3165	3165	3165	3165	3165	3165
R^2	0.00	0.00	0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Table 35 – Regressions Results, FDI, State-owned Banks, Macro Regions

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007		
	Model (1)	Model (2)	Model (4)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	-0.14*		0.08
	(0.02)		(0.12)
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.02*	-0.01
		(0.00)	(0.01)
Dummy of interaction			-0.22
			(0.13)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.15**	-0.14**	-0.13**
	(0.05)	(0.01)	(0.05)
n	136	136	136
R^2	0.27	0.16	0.29

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 and 2 have just one independent variables. Model 4 is a composed model that includes an interaction variable. Results for models 3, 5 and 6 are omitted due to problems with collinearity. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Table 36 – Regressions Results, FDI, State-owned Banks, Micro Regions

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007			
	Model (1)	Model (2)	Model (3)	Model (4)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	-0.10*			0.05
	(0.01)			(0.06)
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.02*		-0.01**
		(0.00)		(0.00)
Dummy of cities in which public loans volume is larger than private loans volume			-0.03	
			(0.03)	
Dummy of interaction between the first and the second variables				-0.15**
				(0.06)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	-0.01***	-0.01*	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.08*	-0.08*	-0.09*	-0.07*
	(0.02)	(0.02)	(0.02)	(0.02)
n	538	538	538	538
R^2	0.17	0.10	0.04	0.19

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1, 2 and 3 have just one independent variables. Model 4 is a composed model that includes an interaction variable. Results for models 5 and 6 are omitted due to problems with collinearity. Data collected from BC, Firjan and IBGE.
 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Table 37 – Regressions Results, HDI, State-owned Banks, Macro Regions

	Difference in 2010 and 2000 city HDI		
	Model (1)	Model (2)	Model (4)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	-0.17*		-0.07
	(0.02)		(0.13)
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.02**	0.00
		(0.01)	(0.01)
Dummy of interaction			-0.13
			(0.14)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.22*	-0.22*	-0.22*
	(0.06)	(0.06)	(0.06)
n	136	136	136
R^2	0.35	0.16	0.36

Notes: All models have as dependent variables the difference in city HDI values of 2010 and 2000. The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 and 2 have just one independent variables. Model 4 is a composed model that includes an interaction variable. Results for models 3, 5 and 6 are omitted due to problems with collinearity. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Table 38 – Regressions Results, HDI, State-owned Banks, Micro Regions

	Difference in 2010 and 2000 city HDI			
	Model (1)	Model (2)	Model (3)	Model (4)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	-0.11*			0.15**
	(0.01)			(0.06)
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.02*		-0.02*
		(0.00)		(0.00)
Dummy of cities in which public loans volume is larger than private loans volume			-0.07***	
			(0.03)	
Dummy of interaction between the first and the second variables				-0.25*
				(0.06)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	-0.00	-0.01*	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.10*	-0.10*	-0.12*	-0.09*
	(0.02)	(0.02)	(0.03)	(0.02)
n	540	540	540	540
R^2	0.18	0.14	0.05	0.22

Notes: All models have as dependent variables the difference in city HDI values of 2010 and 2000. The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1, 2 and 3 have just one independent variables. Model 4 is a composed model that includes an interaction variable. Results for models 5 and 6 are omitted due to problems with collinearity. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Table 39 – Regressions Results, Per Capita GDP, State-owned Banks, Macro Regions

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007		
	Model (1)	Model (2)	Model (4)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	14.49*		-42.55***
	(3.54)		(19.56)
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		1.21	0.66
		(0.86)	(1.13)
Dummy of interaction			62.91*
			(20.04)
Difference in FFMI from 2009-2014 to 2006-2007	19.54**	19.36***	16.59***
	(8.58)	(9.06)	(8.40)
n	136	136	136
R^2	0.14	0.05	0.21

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 and 2 have just one independent variables. Model 4 is a composed model that includes an interaction variable. Results for models 3, 5 and 6 are omitted due to problems with collinearity. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Table 40 – Regressions Results, Per Capita GDP, State-owned Banks, Micro Regions

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007			
	Model (1)	Model (2)	Model (3)	Model (4)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	7.24*** (3.31)			-36.22*** (17.77)
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		2.01** (0.76)		2.19** (0.96)
Dummy of cities in which public loans volume is larger than private loans volume			4.19 (8.53)	
Dummy of interaction between the first and the second variables				41.93** (18.22)
Difference in FFMI from 2009-2014 to 2006-2007	12.26 (6.94)	11.22 (6.94)	12.26 (6.94)	11.04 (6.93)
n	540	540	540	540
R^2	0.02	0.02	0.01	0.03

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1, 2 and 3 have just one independent variables. Model 4 is a composed model that includes an interaction variable. Results for models 5 and 6 are omitted due to problems with collinearity. Data collected from BC, Firjan and IBGE.
 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

3.7 Annexes

3.7.1 Regressions Results, FDI, State-Owned Banks, Matching Samples

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	-0.02* (0.00)			0.10** (0.04)	-0.01 (0.01)	
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.01* (0.00)		-0.01*** (0.00)		0.00 (0.01)
Dummy of cities in which public loans volume is larger than private loans volume			0.01* (0.00)		0.01* (0.00)	0.01* (0.00)
Dummy of interaction between the first and the second variables				-0.11* (0.04)		
Dummy of interaction between the first and the third variables					-0.04** (0.02)	
Dummy of interaction between the second and the third variables						-0.01*** (0.00)
Difference in city population averages from 2009-2014 to 2002-2007	-0.00 (0.00)	-0.01*** (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.01* (0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.00 (0.01)	0.01 (0.01)	-0.01 (0.01)	-0.00 (0.01)	-0.01 (0.01)	-0.01 (0.01)
n	2283	1802	2283	1802	2283	1802
R^2	0.01	0.01	0.01	0.02	0.02	0.02

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Matching sample are obtained restricting data to cities which average FDI for 2002-2007 period is lower than 0.70 (models 1, 3 and 5) and average FDI for 2002-2007 period is lower than 0.68 and its 2002-2007 average population is lower than 50.000 (models 2, 4 and 6).

3.7.2 Regressions Results, FDI-I, State-Owned and Private Banks

	Difference in Firjan Development Index - Income (FDI-I) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	0.00			-0.13**	0.01	
	(0.00)			(0.05)	(0.01)	
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		0.01*		0.10*		0.01
		(0.00)		(0.00)		(0.00)
Dummy of cities in which public loans volume is larger than private loans volume			0.00		0.00	0.00
			(0.00)		(0.00)	(0.00)
Dummy of interaction between the first and the second variables				0.12		
				(0.05)		
Dummy of interaction between the first and the third variables					0.01	
					(0.02)	
Dummy of interaction between the second and the third variables						0.00
						(0.01)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	0.02	0.02	0.02	0.02	0.02	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
n	3156	3156	3156	3156	3156	3156
R^2	0.00	0.00	0.00	0.01	0.00	0.00

Notes: All models have as dependent variables the difference in Firjan Development Index - Income (FDI-I) averages from 2009-2014 to 2005-2007 (FDI-I is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

	Difference in Firjan Development Index - Income (FDI-I) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	0.00 (0.00)			0.00 (0.01)	0.00 (0.01)	
Dummy of cities where the share of private banks in the credit market increases after crisis		0.00 (0.00)		-0.01 (0.00)		0.00 (0.00)
Dummy of cities in which private loans volume is larger than public loans volume			-0.01 (0.00)		-0.01 (0.00)	-0.01*** (0.00)
Dummy of interaction between the first and the second variables				0.14** (0.05)		
Dummy of interaction between the first and the third variables					0.00 (0.02)	
Dummy of interaction between the second and the third variables						0.03 (0.07)
Difference in city population averages from 2009-2014 to 2002-2007	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Difference in FFMI from 2009-2014 to 2006-2007	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)
n	3156	3156	3156	3156	3156	3156
R^2	0.00	0.00	0.00	0.01	0.00	0.00

Notes: All models have as dependent variables the difference in Firjan Development Index - Income (FDI-I) averages from 2009-2014 to 2005-2007 (FDI-I is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

3.7.3 Regressions Results, FDI-E, State-Owned and Private Banks

	Difference in Firjan Development Index - Education (FDI-E) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	-0.05*			0.12*	-0.03*	
	(0.00)			(0.04)	(0.00)	
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.02*		-0.02*		-0.01*
		(0.00)		(0.00)		(0.00)
Dummy of cities in which public loans volume is larger than private loans volume			0.02*		0.01*	0.02*
			(0.00)		(0.00)	(0.00)
Dummy of interaction between the first and the second variables				-0.15*		
				(0.03)		
Dummy of interaction between the first and the third variables					-0.09*	
					(0.01)	
Dummy of interaction between the second and the third variables						-0.01
						(0.00)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.02**	-0.02**	-0.02**	-0.02**	-0.02**	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
n	3162	3162	3162	3162	3162	3162
R^2	0.04	0.04	0.03	0.06	0.06	0.06

Notes: All models have as dependent variables the difference in Firjan DevelopmentIndex - Education (FDI-E) averages from 2009-2014 to 2005-2007 (FDI-E is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

	Difference in Firjan Development Index - Education (FDI-E) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	0.05* (0.00)			0.04* (0.00)	0.05* (0.00)	
Dummy of cities where the share of private banks in the credit market increases after crisis		0.02* (0.00)		0.02* (0.00)		0.02* (0.00)
Dummy of cities in which private loans volume is larger than public loans volume			0.00 (0.00)		-0.01* (0.00)	0.00 (0.00)
Dummy of interaction between the first and the second variables				-0.24* (0.04)		
Dummy of interaction between the first and the third variables					-0.13* (0.02)	
Dummy of interaction between the second and the third variables						-0.08 (0.05)
Difference in city population averages from 2009-2014 to 2002-2007	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.02** (0.01)	-0.02** (0.01)	-0.02** (0.01)	-0.02** (0.01)	-0.02** (0.01)	-0.02** (0.01)
n	3162	3162	3162	3162	3162	3162
R^2	0.04	0.02	0.00	0.06	0.05	0.02

Notes: All models have as dependent variables the difference in Firjan DevelopmentIndex - Education (FDI-E) averages from 2009-2014 to 2005-2007 (FDI-E is not available from 2002 to 2004) . The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

3.7.4 Regressions Results, FDI-H, State-Owned and Private Banks

	Difference in Firjan Development Index - Health (FDI-H) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	-0.07*				0.18*	-0.02***
	(0.00)				(0.06)	(0.01)
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.04*		-0.03*		-0.02**
		(0.00)		(0.00)		(0.01)
Dummy of cities in which public loans volume is larger than private loans volume			0.03*		0.03*	0.04*
			(0.00)		(0.00)	(0.00)
Dummy of interaction between the first and the second variables				-0.21*		
				(0.06)		
Dummy of interaction between the first and the third variables					-0.17*	
					(0.03)	
Dummy of interaction between the second and the third variables						-0.02*
						(0.00)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.04**	-0.04*	-0.04**	-0.04**	-0.04**	-0.04**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
n	3162	3162	3162	3162	3162	3162
R^2	0.03	0.05	0.04	0.05	0.06	0.07

Notes: All models have as dependent variables the difference in Firjan Development Index - Health (FDI-H) averages from 2009-2014 to 2005-2007 (FDI-H is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

	Difference in Firjan Development Index - Health (FDI-H) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	0.07* (0.01)			0.06* (0.01)	0.08* (0.01)	
Dummy of cities where the share of private banks in the credit market increases after crisis		0.03* (0.00)		0.03* (0.00)		0.03* (0.00)
Dummy of cities in which private loans volume is larger than public loans volume			-0.01* (0.00)		0.03* (0.00)	-0.01 (0.00)
Dummy of interaction between the first and the second variables				-0.37* (0.07)		
Dummy of interaction between the first and the third variables					-0.17* (0.03)	
Dummy of interaction between the second and the third variables						-0.10 (0.08)
Difference in city population averages from 2009-2014 to 2002-2007	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.04** (0.02)	-0.04* (0.02)	-0.04** (0.02)	-0.04** (0.02)	-0.04** (0.02)	-0.04** (0.02)
n	3162	3162	3162	3162	3162	3162
R^2	0.03	0.03	0.01	0.05	0.04	0.03

Notes: All models have as dependent variables the difference in Firjan Development Index - Health (FDI-H) averages from 2009-2014 to 2005-2007 (FDI-H is not available from 2002 to 2004) . The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

3.7.5 Regressions Results, HDI, State-Owned Banks, Matching Samples

	Difference in 2010 and 2000 city HDI					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	-0.02*			0.09*	-0.01***	
	(0.00)			(0.03)	(0.00)	
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.01*		-0.02*		0.00
		(0.00)		(0.00)		(0.00)
Dummy of cities in which public loans volume is larger than private loans volume			0.01*		0.01**	0.01*
			(0.00)		(0.00)	(0.00)
Dummy of interaction between the first and the second variables				-0.09*		
				(0.03)		
Dummy of interaction between the first and the third variables					-0.09*	
					(0.01)	
Dummy of interaction between the second and the third variables						-0.02*
						(0.00)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	0.01*	0.00	0.01*	0.00	0.01*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.02*	-0.02**	-0.02*	-0.02**	-0.02*	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
n	2283	1802	2283	1802	2283	1802
R^2	0.02	0.04	0.01	0.05	0.03	0.05

Notes: All models have as dependent variables the difference in city HDI values of 2010 and 2000. The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE. HDI for Brazilian cities are available only for years 2000 and 2010.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Matching sample are obtained restricting data to cities which average FDI for 2002-2007 period is lower than 0.70 (models 1, 3 and 5) and average FDI for 2002-2007 period is lower than 0.68 and its 2002-2007 average population is lower than 50.000 (models 2, 4 and 6).

3.7.6 Regressions Results, Per Capita GDP, State-Owned Banks, Matching Samples

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in state-owned banks credit operations/total credit operations index averages from 2009-2014 to 2002-2007	0.96 (1.53)			1.05 (14.44)	1.54 (1.88)	
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		1.07 (0.84)		0.65 (1.05)		2.15 (1.48)
Dummy of cities in which public loans volume is larger than private loans volume			-0.28 (0.72)		0.64 (0.87)	0.49 (1.07)
Dummy of interaction between the first and the second variables				0.50 (14.641)		
Dummy of interaction between the first and the third variables					2.09 (6.11)	
Dummy of interaction between the second and the third variables						-1.66 (1.82)
Difference in FFMI from 2009-2014 to 2006-2007	3.85 (3.08)	2.64 (3.68)	3.93 (3.08)	2.67 (3.69)	3.94 (3.08)	2.70 (3.69)
n	2283	1802	2283	1802	2283	1802
R^2	0.00	0.00	0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

Matching sample are obtained restricting data to cities which average FDI for 2002-2007 period is lower than 0.70 (models 1, 3 and 5) and average FDI for 2002-2007 period is lower than 0.68 and its 2002-2007 average population is lower than 50.000 (models 2, 4 and 6).

3.7.7 Regressions Results, FDI, Private Banks, Matching Samples

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	0.02*			0.02*	0.02*	
	(0.00)			(0.01)	(0.00)	
Dummy of cities where the share of private banks in the credit market increases after crisis		0.01**		0.01*		0.01***
		(0.00)		(0.00)		(0.00)
Dummy of cities in which private loans volume is larger than public loans volume			-0.01**		-0.01*	-0.00
			(0.00)		(0.00)	(0.00)
Dummy of interaction between the first and the second variables				-0.15*		
				(0.04)		
Dummy of interaction between the first and the third variables					-0.08*	
					(0.02)	
Dummy of interaction between the second and the third variables						-0.05
						(0.04)
Difference in city population averages from 2009-2014 to 2002-2007	-0.01**	-0.01**	-0.01**	-0.01**	-0.01**	-0.01**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
n	1802	1802	1802	1802	1802	1802
R^2	0.01	0.01	0.01	0.02	0.02	0.01

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Matching sample are obtained restricting data to cities which average FDI for 2002-2007 period is lower than 0.70 (models 1, 3 and 5) and average FDI for 2002-2007 period is lower than 0.68 and its 2002-2007 average population is lower than 50.000 (models 2, 4 and 6).

3.7.8   Regressions Results, HDI, Private Banks, Matching Samples

	Difference in 2010 and 2000 city HDI					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	0.02* (0.00)			0.01* (0.00)	0.02* (0.00)	
Dummy of cities where the share of private banks in the credit market increases after crisis		0.01* (0.00)		0.01* (0.00)		0.01* (0.00)
Dummy of cities in which private loans volume is larger than public loans volume			0.00 (0.00)		-0.01** (0.00)	0.00 (0.00)
Dummy of interaction between the first and the second variables				-0.15* (0.03)		
Dummy of interaction between the first and the third variables					-0.06* (0.02)	
Dummy of interaction between the second and the third variables						-0.06 (0.03)
Difference in city population averages from 2009-2014 to 2002-2007	0.01* (0.00)	0.01** (0.00)	0.01* (0.00)	0.01** (0.00)	0.01** (0.00)	0.01** (0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.02* (0.01)	-0.02* (0.01)	-0.02* (0.01)	-0.02* (0.01)	-0.02* (0.01)	-0.02* (0.01)
n	1802	1802	1802	1802	1802	1802
R^2	0.02	0.02	0.01	0.02	0.03	0.02

Notes: All models have as dependent variables the difference in city HDI values of 2010 and 2000. The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE. HDI for Brazilian cities are available only for years 2000 and 2010.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Matching sample are obtained restricting data to cities which average FDI for 2002-2007 period is lower than 0.70 (models 1, 3 and 5) and average FDI for 2002-2007 period is lower than 0.68 and its 2002-2007 average population is lower than 50.000 (models 2, 4 and 6).

3.7.9 Regressions Results, Per Capita GDP, Private Banks, Matching Samples

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	-2.38 (1.85)			-1.94 (1.95)	-1.74 (1.92)	
Dummy of cities where the share of private banks in the credit market increases after crisis		-1.04 (0.78)		-1.00 (0.90)		-1.25 (0.83)
Dummy of cities in which private loans volume is larger than public loans volume			-0.27 (0.69)		-0.81 (1.04)	-0.78 (1.01)
Dummy of interaction between the first and the second variables				8.50 (16.02)		
Dummy of interaction between the first and the third variables					-9.42 (7.37)	
Dummy of interaction between the second and the third variables						2.94 (15.64)
Difference in FFMI from 2009-2014 to 2006-2007	-2.44 (1.65)	-2.49 (1.12)	-2.44 (1.65)	-2.50 (1.65)	-2.33 (1.65)	-2.44 (1.65)
n	1802	1802	1802	1802	1802	1802
R^2	0.00	0.00	0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Matching sample are obtained restricting data to cities which average FDI for 2002-2007 period is lower than 0.70 (models 1, 3 and 5) and average FDI for 2002-2007 period is lower than 0.68 and its 2002-2007 average population is lower than 50.000 (models 2, 4 and 6).

3.7.10   Regressions Results, FDI, Squared Independent Variables

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007		
	Model (1)	Model (4)	Model (5)
Squared difference in state-owned banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	-0.04*	-0.25***	-0.01*
	(0.00)	(0.13)	(0.00)
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.02*	
		(0.00)	
Dummy of cities in which public loans volume is larger than private loans volume			0.02*
			(0.00)
Dummy of interaction between the first and the second variables		0.23	
		(0.13)	
Dummy of interaction between the first and the third variables			-0.43*
			(0.05)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	0.01	0.01	0.03
	(0.05)	(0.05)	(0.05)
n	3156	3156	3156
R^2	0.02	0.05	0.06

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are the squared differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Model 1 has as independent variables squared difference in public banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007. Models 4 and 5 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.
Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007		
	Model (1)	Model (4)	Model (5)
Squared difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	-0.04*	-0.03*	-0.04*
	(0.00)	(0.00)	(0.00)
Dummy of cities where the share of private banks in the credit market increases after crisis		0.01*	
		(0.00)	
Dummy of cities in which private loans volume is larger than public loans volume			-0.01*
			(0.00)
Dummy of interaction between the first and the second variables		-0.32**	
		(0.13)	
Dummy of interaction between the first and the third variables			0.17*
			(0.05)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	0.01	0.01	0.01
	(0.05)	(0.05)	(0.05)
n	3156	3156	3156
R^2	0.02	0.04	0.03

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are the squared differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Model 1 has as independent variables squared difference in public banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007. Models 4 and 5 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.
 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

3.7.11 Regressions Results, HDI, Squared Independent Variables

	Difference in 2010 and 2000 city HDI		
	Model (1)	Model (4)	Model (5)
Squared difference in state-owned banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	-0.02*	-0.28*	0.00
	(0.00)	(0.10)	(0.00)
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.02*	
		(0.00)	
Dummy of cities in which public loans volume is larger than private loans volume			0.01*
			(0.00)
Dummy of interaction between the first and the second variables		0.29*	
		(0.10)	
Dummy of interaction between the first and the third variables			-0.48*
			(0.04)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	0.01	0.01	0.03
	(0.04)	(0.04)	(0.04)
n	3164	3164	3164
R^2	0.01	0.11	0.06

Notes: All models have as dependent variables the difference incity HDI values of 2010 and 2000. The control variables are the squared differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Model 1 has as independent variables squared difference in public banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007. Models 4 and 5 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.
 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

	Difference in 2010 and 2000 city HDI		
	Model (1)	Model (4)	Model (5)
Squared difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	-0.02* (0.00)	-0.01* (0.00)	-0.02* (0.00)
Dummy of cities where the share of private banks in the credit market increases after crisis		0.02* (0.00)	
Dummy of cities in which private loans volume is larger than public loans volume			0.00 (0.00)
Dummy of interaction between the first and the second variables		-0.34* (0.11)	
Dummy of interaction between the first and the third variables			0.13* (0.04)
Difference in city population averages from 2009-2014 to 2002-2007	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Difference in FFMI from 2009-2014 to 2006-2007	0.01 (0.04)	0.03 (0.05)	0.01 (0.04)
n	3164	3164	3164
R^2	0.01	0.05	0.01

Notes: All models have as dependent variables the difference incity HDI values of 2010 and 2000. The control variables are the squared differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Model 1 has as independent variables squared difference in public banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007. Models 4 and 5 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.
 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

3.7.12   Regressions Results, Per Capita GDP, Squared Independent Variables

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007		
	Model (1)	Model (4)	Model (5)
Squared difference in state-owned banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	-0.15 (1.38)	42.58 (41.15)	-0.53 (1.55)
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		1.62* (0.54)	
Dummy of cities in which public loans volume is larger than private loans volume			-0.34 (0.63)
Dummy of interaction between the first and the second variables		-44.33 (41.17)	
Dummy of interaction between the first and the third variables			20.63 (17.41)
Difference in FFMI from 2009-2014 to 2006-2007	9.66 (16.39)	9.41 (16.38)	9.19 (16.41)
n	3165	3165	3165
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are the squared differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Model 1 has as independent variables squared difference in public banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007. Models 4 and 5 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.
 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007		
	Model (1)	Model (4)	Model (5)
Squared difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	-0.15 (1.38)	-0.64 (1.41)	-0.52 (1.39)
Dummy of cities where the share of private banks in the credit market increases after crisis		-1.09 (0.58)	
Dummy of cities in which private loans volume is larger than public loans volume			-1.31 (0.74)
Dummy of interaction between the first and the second variables		46.62 (41.88)	
Dummy of interaction between the first and the third variables			19.77 (14.47)
Difference in FFMI from 2009-2014 to 2006-2007	9.66 (16.39)	8.76 (16.40)	10.18 (16.42)
n	3165	3165	3165
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are the squared differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Model 1 has as independent variables squared difference in public banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007. Models 4 and 5 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.
 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

3.7.13　Regressions Results, FDI, Earmarked Credit

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in public banks earmarked credit/ total earmarked credit ratio averages from 2009-2014 to 2002-2007	-0.04*			0.07*	0.00	
	(0.00)			(0.02)	(0.00)	
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.02*		-0.02*		0.00
		(0.00)		(0.00)		(0.00)
Dummy of cities in which public loans volume is larger than private loans volume			0.03*		0.03*	0.03*
			(0.00)		(0.00)	(0.00)
Dummy of interaction between the first and the second variables				-0.10*		
				(0.02)		
Dummy of interaction between the first and the third variables					-0.08*	
					(0.01)	
Dummy of interaction between the second and the third variables						-0.02*
						(0.00)
Difference in city population averages from 2009-2014 to 2002-2007	-0.01**	0.00	-0.01**	0.00	0.00**	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
n	2876	2876	2876	2876	2876	2876
R^2	0.04	0.05	0.06	0.06	0.07	0.09

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks earmarked credit/total earmarked credit ratio averages from 2009-2014 to 2002-2007	0.04*			0.04*	0.04*	
	(0.00)			(0.00)	(0.00)	
Dummy of cities where the share of private banks in the credit market increases after crisis		0.00		0.00		0.00
		(0.00)		(0.00)		(0.00)
Dummy of cities in which private loans volume is larger than public loans volume			-0.02*		-0.03*	-0.02*
			(0.00)		(0.00)	(0.00)
Dummy of interaction between the first and the second variables				-0.07**		
				(0.03)		
Dummy of interaction between the first and the third variables					-0.11*	
					(0.02)	
Dummy of interaction between the second and the third variables						
Difference in city population averages from 2009-2014 to 2002-2007	-0.01**	-0.01***	-0.01**	-0.01**	-0.01*	-0.01**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
n	2876	2876	2876	2876	2876	2876
R^2	0.04	0.00	0.02	0.05	0.07	0.02

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

3.7.14 Regressions Results, HDI, Earmarked Credit

	Difference in 2010 and 2000 city HDI					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in public banks earmarked credit/ total earmarked credit ratio averages from 2009-2014 to 2002-2007	-0.03*			0.09*	0.00	
	(0.00)			(0.02)	(0.00)	
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		-0.03*		-0.03*		0.00
		(0.00)		(0.00)		(0.00)
Dummy of cities in which public loans volume is larger than private loans volume			0.02*		0.02*	0.02*
			(0.00)		(0.00)	(0.00)
Dummy of interaction between the first and the second variables				-0.09*		
				(0.02)		
Dummy of interaction between the first and the third variables					-0.11*	
					(0.01)	
Dummy of interaction between the second and the third variables						-0.03*
						(0.00)
Difference in city population averages from 2009-2014 to 2002-2007	-0.01*	0.00	-0.01*	0.00	-0.01*	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
n	2880	2880	2880	2880	2880	2880
R^2	0.03	0.14	0.03	0.14	0.07	0.16

Notes: All models have as dependent variables the difference in city HDI values of 2010 and 2000. The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE. HDI for Brazilian cities are available only for years 2000 and 2010.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

	Difference in 2010 and 2000 city HDI					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks earmarked credit/total earmarked credit ratio averages from 2009-2014 to 2002-2007	0.03*			0.03*	0.03*	
	(0.00)			(0.00)	(0.00)	
Dummy of cities where the share of private banks in the credit market increases after crisis		-0.01**		-0.01*		-0.01*
		(0.00)		(0.00)		(0.00)
Dummy of cities in which private loans volume is larger than public loans volume			-0.01*		-0.02*	-0.01*
			(0.00)		(0.00)	(0.00)
Dummy of interaction between the first and the second variables				-0.03		
				(0.02)		
Dummy of interaction between the first and the third variables					-0.05**	
					(0.02)	
Dummy of interaction between the second and the third variables						
Difference in city population averages from 2009-2014 to 2002-2007	-0.01*	-0.01*	-0.01*	-0.01*	-0.01*	-0.01*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
n	2880	2880	2880	2880	2880	2880
R^2	0.03	0.01	0.01	0.04	0.04	0.02

Notes: All models have as dependent variables the difference in city HDI values of 2010 and 2000. The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE. HDI for Brazilian cities are available only for years 2000 and 2010.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

3.7.15   Regressions Results, Per Capita GDP, Earmarked Credit

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in public banks earmarked credit/ total earmarked credit ratio averages from 2009-2014 to 2002-2007	-0.85 (1.17)			-6.10 (7.42)	-1.01 (1.61)	
Dummy of cities where the share of state-owned banks in the credit market increases after crisis		1.49** (0.54)		2.43* (0.64)		0.27 (1.31)
Dummy of cities in which public loans volume is larger than private loans volume			0.78 (0.70)		-0.34 (0.93)	0.37 (1.07)
Dummy of interaction between the first and the second variables				2.50 (7.56)		
Dummy of interaction between the first and the third variables					6.90 (4.32)	
Dummy of interaction between the second and the third variables						1.84 (1.45)
Difference in city population averages from 2009-2014 to 2002-2007	3.77 (2.59)	3.68 (2.58)	3.78 (2.59)	3.79 (2.59)	3.98 (2.59)	3.81 (2.59)
Difference in FFMI from 2009-2014 to 2006-2007	2881 0.00	2881 0.00	2881 0.00	2881 0.00	2881 0.00	2881 0.01

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks earmarked credit/total earmarked credit ratio averages from 2009-2014 to 2002-2007	0.85 (1.16)			0.87 (1.22)	0.98 (1.18)	
Dummy of cities where the share of private banks in the credit market increases after crisis		-0.01 (0.60)		-0.21 (0.70)		-0.46 (0.61)
Dummy of cities in which private loans volume is larger than public loans volume			-0.39 (0.95)		-0.70 (1.04)	-0.40 (0.96)
Dummy of interaction between the first and the second variables				2.13 (8.43)		
Dummy of interaction between the first and the third variables					-5.07 (7.63)	
Dummy of interaction between the second and the third variables						
Difference in city population averages from 2009-2014 to 2002-2007	3.77 (2.60)	3.73 (2.60)	3.73 (2.60)	3.81 (2.60)	3.79 (2.60)	3.75 (2.60)
Difference in FFMI from 2009-2014 to 2006-2007	2881 0.00	2881 0.00	2881 0.00	2881 0.00	2881 0.00	2881 0.00

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

3.7.16   Regressions Results, FDI, Private Banks, Macro Regions

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007			
	Model (1)	Model (2)	Model (3)	Model (4)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	0.14* (0.02)			0.14* (0.02)
Dummy of cities where the share of private banks in the credit market increases after crisis		0.02* (0.00)		0.01 (0.01)
Dummy of cities in which private loans volume is larger than public loans volume			-0.01 (0.01)	
Dummy of interaction between the first and the second variables				-0.22 (0.13)
Difference in city population averages from 2009-2014 to 2002-2007	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.15** (0.05)	-0.14** (0.01)	-0.15** (0.05)	-0.13** (0.05)
n	136	136	136	136
R^2	0.27	0.16	0.06	0.29

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1, 2 and 3 have just one independent variables. Model 4 is a composed model that includes an interaction variable. Results for models 5 and 6 are omitted due to problems with collinearity. Data collected from BC, Firjan and IBGE.
Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

3.7.17 Regressions Results, FDI, Private Banks, Micro Regions

	Difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	0.10*			0.10*	-0.73	
	(0.01)			(0.01)	(0.42)	
Dummy of cities where the share of private banks in the credit market increases after crisis		0.02*		0.01**	-0.01*	0.01
		(0.00)		(0.00)	(0.00)	(0.01)
Dummy of cities in which private loans volume is larger than public loans volume			-0.02*			-0.02**
			(0.00)			(0.01)
Dummy of interaction between the first and the second variables				-0.15**		
				(0.06)		
Dummy of interaction between the first and the third variables					0.83***	
					(0.42)	
Dummy of interaction between the second and the third variables						0.01
						(0.01)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	-0.01**	-0.01**	-0.00	-0.00	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.08*	-0.08*	-0.06**	-0.07*	-0.07*	-0.07*
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
n	538	538	538	538	538	538
R^2	0.17	0.10	0.07	0.19	0.19	0.10

Notes: All models have as dependent variables the difference in Firjan Development Index (FDI) averages from 2009-2014 to 2005-2007 (FDI is not available from 2002 to 2004). The control variables are differences in region population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.
 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

3.7.18 Regressions Results, HDI, Private Banks, Macro Regions

	Difference in 2010 and 2000 city HDI			
	Model (1)	Model (2)	Model (3)	Model (4)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	0.17* (0.02)			0.20* (0.03)
Dummy of cities where the share of private banks in the credit market increases after crisis		-0.02** (0.01)		0.00 (0.01)
Dummy of cities in which private loans volume is larger than public loans volume			0.00 (0.02)	
Dummy of interaction between the first and the second variables				-0.13 (0.14)
Difference in city population averages from 2009-2014 to 2002-2007	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.22* (0.06)	-0.22* (0.06)	-0.24* (0.07)	-0.22* (0.06)
n	136	136	136	136
R^2	0.35	0.16	0.10	0.36

Notes: All models have as dependent variables the difference in city HDI values of 2010 and 2000. The control variables are differences in city population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1, 2 and 3 have just one independent variables. Model 4 is a composed model that includes an interaction variable. Results for models 5 and 6 are omitted due to problems with collinearity. Data collected from BC, Firjan and IBGE.
 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

3.7.19 Regressions Results, HDI, Private Banks, Micro Regions

	Difference in 2010 and 2000 city HDI					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	0.11*			0.10*	0.67	
	(0.01)			(0.01)	(0.44)	
Dummy of cities where the share of private banks in the credit market increases after crisis		0.02*		0.01*		0.00
		(0.00)		(0.00)		(0.00)
Dummy of cities in which private loans volume is larger than public loans volume			-0.03*		-0.02*	-0.03*
			(0.00)		(0.00)	(0.01)
Dummy of interaction between the first and the second variables				-0.24*		
				(0.06)		
Dummy of interaction between the first and the third variables					0.77	
					(0.44)	
Dummy of interaction between the second and the third variables						0.02
						(0.02)
Difference in city population averages from 2009-2014 to 2002-2007	0.00	-0.01***	-0.01***	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Difference in FFMI from 2009-2014 to 2006-2007	-0.10*	-0.10*	-0.07-*	-0.09*	-0.07-*	-0.08*
	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)
n	540	540	540	540	540	540
R^2	0.18	0.12	0.12	0.20	0.22	0.16

Notes: All models have as dependent variables the difference in city HDI values of 2010 and 2000. The control variables are differences in region population and in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE. HDI for Brazilian cities are available only for years 2000 and 2010.
 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

3.7.20   Regressions Results, Per Capita GDP, Private Banks, Macro Regions

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007			
	Model (1)	Model (2)	Model (3)	Model (4)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	-14.49* (3.54)			-20.35* (4.34)
Dummy of cities where the share of private banks in the credit market increases after crisis		-1.21 (0.86)		-0.66 (1.13)
Dummy of cities in which private loans volume is larger than public loans volume			3.34 (2.04)	
Dummy of interaction between the first and the second variables				62.91* (20.04)
Difference in FFMI from 2009-2014 to 2006-2007	19.54** (8.58)	19.36*** (9.06)	17.36 (9.18)	16.59*** (8.40)
n	136	136	136	136
R^2	0.14	0.05	0.06	0.21

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1, 2 and 3 have just one independent variables. Model 4 is a composed model that includes an interaction variable. Results for models 5 and 6 are omitted due to problems with collinearity. Data collected from BC, Firjan and IBGE.
 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

3.7.21 Regressions Results, Per Capita GDP, Private Banks, Micro Regions

	Difference in Per Capita GDP averages from 2009-2014 to 2002-2007					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Difference in private banks credit operations/total credit operations ratio averages from 2009-2014 to 2002-2007	-7.24***			-6.90	85.78	
	(3.31)			(3.96)	(127.85)	
Dummy of cities where the share of private banks in the credit market increases after crisis		-1.65***		-1.76		0.85
		(0.79)		(0.99)		(2.44)
Dummy of cities in which private loans volume is larger than public loans volume			3.05**		2.98**	3.99
			(1.15)		(1.28)	(2.16)
Dummy of interaction between the first and the second variables				41.07***		
				(18.56)		
Dummy of interaction between the first and the third variables					-91.38	
					(127.90)	
Dummy of interaction between the second and the third variables						-2.13
						(2.61)
Difference in FFMI from 2009-2014 to 2006-2007	12.26	11.69	8.28	11.48	8.83	8.94
	(6.94)	(6.96)	(7.13)	(6.93)	(7.14)	(7.17)
n	540	540	540	540	540	540
R^2	0.02	0.01	0.01	0.03	0.03	0.02

Notes: All models have as dependent variables the difference in per capita GDP averages from 2009-2014 to 2002-2007. The control variables are differences in Firjan Fiscal Management Index (FFMI) from 2009-2014 to 2002-2007 (FFMI is not available from 2002 to 2005). Models 1 to 3 have just one independent variables. Models 4 to 6 are composed models that include interaction variables. Data collected from BC, Firjan and IBGE.
Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4 Social Programs Benefits Allocation and Elections: An Evidence from Bolsa Família

Abstract

We investigate the use of Bolsa Família, a Brazilian social program designed to reduce poverty and social inequalities, for electoral purposes. Our results show that cities that elect a candidate from government party in 2012 mayoral elections where previous mayor is not affiliated to this party receive more benefits than cities that do not elect government party candidates. Similarly, cities with higher percentage of votes in favor of government party in 2006 presidential elections receive more benefits than cities with lower percentage. We also observe this result in 2010 presidential elections in Midwest and Northeast regions. Our results also show that Firjan Development Indexes (FDI and FDI-I) seem to be more relevant to explain Bolsa Família benefits distribution than per capita GDP. However, these variables are not even statistically significant in many cases. It strengthens our findings of manipulation in benefits distribution.

4.1 Introduction

In this work we investigate the use of Bolsa Família with electoral purposes. Brazilian federal government created this social program in 2004 to unify some similar initiatives existing at the time. Its purpose is to provide financial aid to Brazilian poor families, thereby reducing poverty and inequalities. According to federal government, Bolsa Família is successful in achieving its objectives. However, at the same time this program became bigger and more comprehensive, federal government began to face numerous cases of corruption and political interference in its institutions. Our purpose is to examine if politics influence Bolsa Família benefits allocation.

The process of selecting beneficiaries involves many public agents. Although federal government provides financial resources, the potential beneficiaries must register in municipal governments to apply for the benefit. According to the Ministry of Social Development, "the benefit is granted impersonally through a selection process conducted by Caixa Econômica Federal, a federal state-owned bank. It prevents the interference of politicians and minimizes the possible influences of the 'current ruler' on the program."

However there is no assurance that the process is conducted impersonally. In fact federal government controls Caixa, so it is possible that federal government indirectly influences the allocation of benefits. On the other hand, municipal governments participate in the initial stages of the process. It opens up the possibility that mayors also take part in the allocation of the benefits.

In the literature there is a relevant number of papers showing misallocations in social programs maintained by governments. Surprisingly, it occurs not only in underdeveloped countries, as Conover and Camacho (2011) study. There are also many reports in rich countries, like Sweden (Dahlberg and Johansson, 2002) and Canada (Marcelin, 2014), which are very often quoted as examples of good practices and public governance.

We propose a different methodology to examine if those distortions occurred in Brazil within our research period (2004 to 2014). Most of previous works, like Filho, Lucas and Pereira (2016), assume that if politicians use social programs to offer more benefits in exchange of votes they focus on elections years. Instead, we consider they can be more interested in obtaining long term loyal voters. If so, to achieve this they may focus on longer periods. Thus, we examine the years after elections, searching for durable and reward style effects at benefits allocation. At the same time, we test if relevant previous results apply to our database, like models from Cox and McCubbins (1986) and Dixit and Londregan (1996) for politicians' strategies.

Our results show the existence of some distortions in Bolsa Família benefits distribution. Cities that elect government party candidates in 2012 mayoral elections where this party is not in charge receive more social benefits than cities that do not elect government party candidates. Also, the more a city votes for government party in 2006 presidential elections, more Bolsa Família benefits it receives. We observe the same results in 2010 presidential elections in Midwest and Northeast regions. In Southeast, cities that reelect government party candidates for mayor in 2012 receive more benefits, not the cities where this party takes over as new mayor. These discrepancies seem to be strong evidences in favor of political interference in benefits allocation.

4.2   Identification

We identify evidences of manipulation in Bolsa Família benefits distribution. In 2012 mayoral elections, cities that elect a candidate from government party where this party is not in charge receive on average more benefits than cities that do not elect government party candidates. In 2006 and 2010 presidential elections, cities in which government party obtains higher percentages of votes receive more benefits than cities in which this party obtains lower percentages.

Our strategy starts with some descriptive statistics. We examine data related to

Bolsa Família program, poverty, employment and income distribution in Brazil (Table 41). The number of poor and extremely poor families decreases from 2004 to 2014, while Bolsa Família benefits increase during the same period. Figue 1 stresses how these opposed tendencies behave through time. When then add to this analysis the unemployment rate and the Gini index falling over years. On the other hand, nominal per capita income increases over the same period. It seems that the program is successful in diminishing the poverty and income inequalities.

Table 41 – Descriptive Statistics, Brazil

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Poor and Extremely poor (millions of families)	18,4	16,8	14,6	14,5	13,0	12,7	12,1	11,4	10,4	10,3	8,7
Poor and Extremely poor / population	10,4%	9,3%	8,1%	7,9%	7,1%	6,8%	6,5%	6,1%	5,5%	5,3%	4,4%
Bolsa Família benefits (millions of families)	6,4	8,5	10,7	10,8	10,3	12,1	12,5	13,1	13,6	13,7	13,6
Bolsa Família benefits / population	3,6%	4,7%	5,9%	5,9%	5,6%	6,5%	6,7%	7,0%	7,2%	7,0%	6,9%
Gini Index	0,57	0,57	0,56	0,56	0,55	0,54	0,54	0,53	0,53	0,53	0,52
Nominal Per Capita Income (R$)	692	733	801	822	863	886	914	942	1.016	1.048	1.152
Unemployment Rate	9,7%	10,2%	9,2%	8,9%	7,8%	9,0%	8,2%	7,3%	6,7%	7,1%	7,5%

This table compares the evolution of some statistics from 2004 to 2014. Numbers reffer to Brazil (the whole country). All data collected from IPEA. Bolsa Família benefits increase through the years, while the number of families living in poor and extremely poor conditions falls. In 2010 the first exceeds the last, and in 2014 the first is almost 60% higher than the last.

But we can not conclude that. First of all, Brazilian federal government consider who receives a Bolsa Família benefit as employed. So the unemployment rate does not reflect the reality of the labor market in Brazil. On the other hand, per capita income and Gini index are not sufficient measures of improvement in quality of life of poor families. If we distribute an amount of money to these families, even if randomly, we would increase the average of per capita income of this group. We could also reduce the inequality between the incomes. But it does not say anything about how fair or efficient was the allocation of those benefits.

We then analyse the number of families living in poor and extremely poor conditions and the number of Bolsa Família benefits granted through the years (Figure 6). The first thing that draws our attention is that from 2010 to 2014 the last exceeds the first. One possible reason is that it was necessary in order to keep families out of poor or extremely poor conditions. Nevertheless, we would not expect the difference to be as large as it is (56% more benefits than families that met the requirements in 2014) and increasing over the years.

All these analyses contain data of the whole country. It would be important to examine these descriptive statistics with data of Brazilian cities. Unfortunately, they are not available yearly (only Bolsa Família benefits). Instead, we examine data of Brazilian states, looking for some inconsistencies.

We calculate an index of Bolsa Família benefits/poor and extremely poor families for Brazilian states. We compare them in 2004 and 2014 (Table 42). Some states show significant changes in this index over the years. Amapá and Mato Grosso, for example, show an increase of above 1000% in their rates. Even if we presume the existence of some
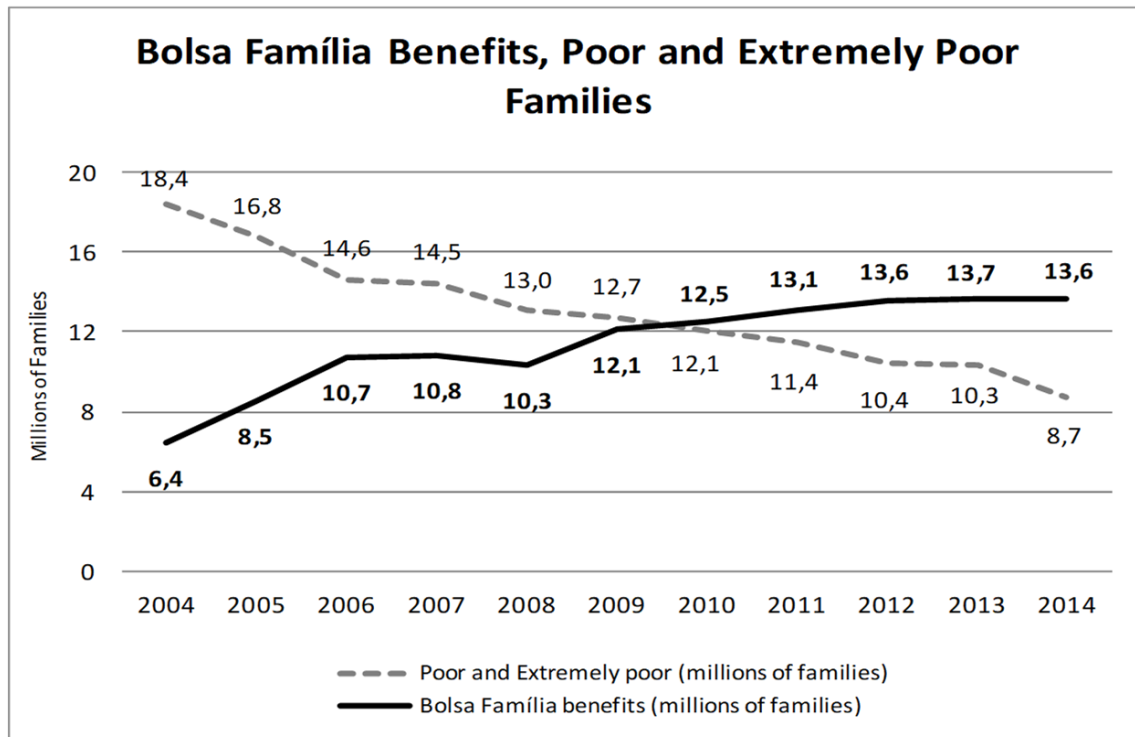
Figure 6 – Bolsa Família, Poor and Extremely Poor Families, Evolution in Time

operational problems with the allocation of benefits, it is very unlikely it can be responsible itself for these huge discrepancies. It is also not reasonable to expect such dramatic changes in life conditions within 10 years that can explain these changes in benefits distribution. Political interference can be the reason behind these changes.

If politics influence the distribution of Bolsa Família benefits, how does it happen? We identify two main models for politicians strategies. The first one, developed by Cox and McCubbins (1986), argues that politicians tend to over-invest in their closest supporters. The other is the swing voter theory, developed by Dixit and Londregan (1996). It states that parties target the groups that are most willing to switch their votes in response to economic favors. We discuss these models more deeply further in literature review section.

We examine two different events: the presidential elections and the mayoral elections. As we have the same two parties competing in the last four second round presidential elections in Brazil, we use it to give more consistency to our results. So we use the percentage of votes for government party in second round president elections in each city to study presidential elections results. On the other hand, we can not just use the percentages of votes for government party in mayoral elections. We would have to deal with different and complex alliances. Sometimes two same parties are allies in a city and opponents in another. So, in order to avoid possible distortions, we just use the final result of mayoral elections. In other words, if a government party or its affiliated parties candidate wins the

Table 42 – Bolsa Família Benefits, Poor and Extremely Poor Families, Population and Votes, Brazilian States, 2004 to 2014

	BF Benefits / Poor and Extremely Poor Families		
	2004	**2014**	**Δ%**
AC	31%	131%	316%
AL	33%	122%	264%
AM	27%	152%	453%
AP	15%	207%	1258%
BA	35%	147%	318%
CE	41%	137%	236%
DF	24%	178%	658%
ES	55%	230%	317%
GO	40%	314%	679%
MA	31%	139%	351%
MG	61%	230%	278%
MS	23%	410%	1698%
MT	52%	319%	514%
PA	29%	154%	434%
PB	40%	162%	302%
PE	31%	147%	372%
PI	37%	172%	365%
PR	42%	187%	340%
RJ	19%	185%	887%
RN	35%	135%	282%
RO	33%	125%	275%
RR	20%	198%	865%
RS	39%	156%	295%
SC	47%	136%	191%
SE	40%	176%	344%
SP	27%	129%	378%
TO	32%	137%	330%

Notes: First two columns show the rate of Bolsa Família (BF) benefits / total of poor and extremely poor families in 2004 and in 2014 in each Brazilian state. Third column show their respective evolution from 2004 to 2014 in %, in which is possible to see the disparities between states.

mayoral election in a city or not.

We use the difference in votes for the government party in the last two elections as a proxy for swing votes, in case of president elections. For mayoral elections, we consider the changing of status the best proxy we can generate. It means to observe where a candidate from government party becomes the new mayor or where he is not reelected. On the other hand, if the results of Cox and McCubbins (1986) apply, we must identify political influence in cities with high percentage of votes for government party (president elections) or where government party is reelected for mayor (mayoral elections).

We do not focus our analysis on data related to elections years, to avoid undesired distortions. We are more interested in capturing effects that lasted for longer periods. Thus, we generate three years averages for each variable, before and after each election. In other words, when we study 2008 elections, we compare the 2005-2007 average of a variable to its 2009-2011 average. We also generate matching samples in each case. We do it to compare only cities with similar pre-elections common trends. We explain how we generate these matching samples further in methodology section.

Tables 43, 44 and 45 show common trends of Brazilian cities in each mayoral and presidential elections. These common trends are the Firjan Development Index (FDI) and per capita Gross Domestic Product (GDP). We observe that both variables evolve similarly in each group after elections. We would expect Bolsa Família benefits to behave the same way.

Table 43 – Common Trends, cities where the previous Mayor is not affiliated to Government Party

		All data								Matching Sample							
		2008 mayor elections				2012 mayor elections				2008 mayor elections (1)				2012 mayor elections (2)			
		FDI		GDP per capita		FDI		GDP per capita		FDI		GDP per capita		FDI		GDP per capita	
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Cities where the government party candidate is elected	3 years before elections	0,56		12,59		0,63		15,13		0,56		12,59		0,63		13,40	
			10%		27%		5%		18%		10%		27%		5%		21%
	3 years after elections	0,62		15,99		0,67		17,89		0,62		15,99		0,66		16,20	
Cities where the government party candidate is not elected	3 years before elections	0,58		12,45		0,64		16,29		0,58		12,45		0,63		13,81	
			10%		28%		5%		17%		10%		28%		5%		20%
	3 years after elections	0,64		15,89		0,67		19,02		0,64		15,89		0,67		16,59	

This table compares the evolution of commom trends (Firjan Development Index and per capita GDP) in each group of cities for each mayoral election. For each common trend we calculate an average of three years before an election and an average of three years after that. (1) Matching sample is obtained with all data. (2) Matching sample is obtained restricting data to cities which per capita GDP average from 2004-2005 is 32 or lower.

But it does not happen. Table 46 shows how Bolsa Família/population index evolves in each mayoral election in cities where government party is not in charge before elections. In 2008 this index is almost the same in cities that elect and that do not elect a government party candidate. But in 2012 there is a considerable difference. The increase in benefits in cities that elect a government party candidate is significantly higher than in cities that do not elect. Our proxy for swing votes is relevant. It shows a preference for places that elect

Table 44 – Common Trends, cities where the previous Mayor is affiliated to Government Party

		All data								Matching Sample							
		2008 mayor elections				2012 mayor elections				2008 mayor elections				2012 mayor elections			
		FDI		GDP per capita		FDI		GDP per capita		FDI		GDP per capita		FDI		GDP per capita	
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Cities where the government party candidate is reelected	3 years before elections	0,59		12,18		0,63		16,69		0,66		15,36		0,70		22,34	
			9%		34%		6%		16%		6%		33%		4%		15%
	3 years after elections	0,65		16,32		0,67		19,35		0,70		20,49		0,73		25,74	
Cities where the government party candidate is not reelected	3 years before elections	0,57		11,62		0,64		16,30		0,66		15,94		0,71		21,08	
			10%		31%		5%		13%		7%		30%		4%		12%
	3 years after elections	0,63		15,21		0,67		18,49		0,70		20,70		0,74		23,71	

This table compares the evolution of commom trends (Firjan Development Index and per capita GDP) in each group of cities for each mayoral election. For each common trend we calculate an average of three years before an election and an average of three years after that. Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.5 and 0.85 in both elections.

government party candidates in benefits distribution.

Table 45 – Common Trends, Target and Non-target Cities, 2006 and 2010 presidential elections

		All data								Matching Sample							
		2006 president elections				2010 president elections				2006 president elections(1)				2010 president elections(2)			
		FDI		GDP per capita		FDI		GDP per capita		FDI		GDP per capita		FDI		GDP per capita	
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Target cities for government party	3 years before elections	0,43		9,59		0,63		7,93		0,58		13,11		0,59		14,33	
			17%		41%		7%		66%		10%		15%		8%		22%
	3 years after elections	0,50		13,57		0,68		13,14		0,63		15,03		0,64		17,42	
Non-target cities for government party	3 years before elections	0,59		5,54		0,61		8,43		0,62		13,91		0,60		13,05	
			7%		36%		9%		47%		6%		22%		10%		34%
	3 years after elections	0,63		7,55		0,66		12,42		0,66		16,97		0,66		17,43	

This table compares the evolution of commom trends (Firjan Development Index and per capita GDP) in each group of cities for each presidential election. For each common trend we calculate an average of three years before an election and an average of three years after that. Target cities are the ones where where the goverment party had 80% or more of the votes in second round president elections. Non-target cities are are the ones where where the goverment party had less than 80% of the votes in second round president elections. (1) Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.53 and 0.61. (2) Matching sample is obtained restricting data to cities which 2000 HDI is higher than 0.54, per capita GDP average from 2004-2005 higher than 4.95 and Firjan Development Index in 2005 lower than 0.56.

Figure 7 shows the evolution of Bolsa Família benefits distribution where government party was not in charge before 2012 mayoral elections. Before this election there is no significant differences between cities that elect and do not elect government party candidates. But one year after this election cities that elect government party candidates receive much more benefits than other cities.

Table 47 shows the same index in cities with a government party mayor before elections. We can not find any significant result in both 2008 and 2012 elections. Probably it shows that Cox and McCubbins (1986) results are not relevant for mayoral elections.

But they seem to matter for presidential elections. Table 48 shows the increase in Bolsa Família benefits that target and non-target cities receive in both 2006 and 2010 elections. We define target cities as cities where the government party has 80% or more of the votes in a presidential election. Non-target cities are the remaining cities. In both

Table 46 – Bolsa Família benefits/population rate, cities where the previous Mayor is not affiliated to Government Party

		All data				Matching Sample			
		Bolsa Família benefits/population rate				Bolsa Família benefits/population rate			
		2008 mayor elections		2012 mayor elections		2008 mayor elections (1)		2012 mayor elections (2)	
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Cities where the government party candidate is elected	3 years before elections	8,14	15%	9,73	61%	8,14	15%	9,89	61%
	3 years after elections	9,40		15,70		9,40		15,93	
Cities where the government party candidate is not elected	3 years before elections	8,21	16%	9,41	40%	8,21	16%	9,62	40%
	3 years after elections	9,52		13,20		9,52		13,45	

This table shows the evolution of the rate Bolsa Família benefits/population in each group of cities for each mayoral election. We calculate an average of three years before an election and an average of three years after that and compare both. (1) Matching sample is obtained with all data. (2) Matching sample is obtained restricting data to cities which per capita GDP average from 2004-2005 is 32 or lower.

Table 47 – Bolsa Família benefits/population rate, cities where the previous Mayor is affiliated to Government Party

		All data				Matching Sample			
		Bolsa Família benefits/population rate				Bolsa Família benefits/population rate			
		2008 mayor elections		2012 mayor elections		2008 mayor elections		2012 mayor elections	
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Cities where the government party candidate is reelected	3 years before elections	7,18	15%	9,04	45%	5,51	7%	6,16	54%
	3 years after elections	8,26		13,09		5,87		9,49	
Cities where the government party candidate is not reelected	3 years before elections	8,44	15%	8,51	48%	5,97	7%	5,85	34%
	3 years after elections	9,73		12,56		6,39		7,82	

This table shows the evolution of the rate Bolsa Família benefits/population in each group of cities for each mayoral election. We calculate an average of three years before an election and an average of three years after that and compare both. Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.5 and 0.85 in both elections.

Bolsa Família Benefits, 2012 Mayoral Elections

This graphic shows the evolution of Bolsa Família benefits per capita from 2007 to 2013. Values represents percentages (benefits per capita x 100). We can see that in 2013, one year after 2012 mayoral elections, cities where a government party's candidate was elected received a lot more benefits per capita than cities where it didn't happen.
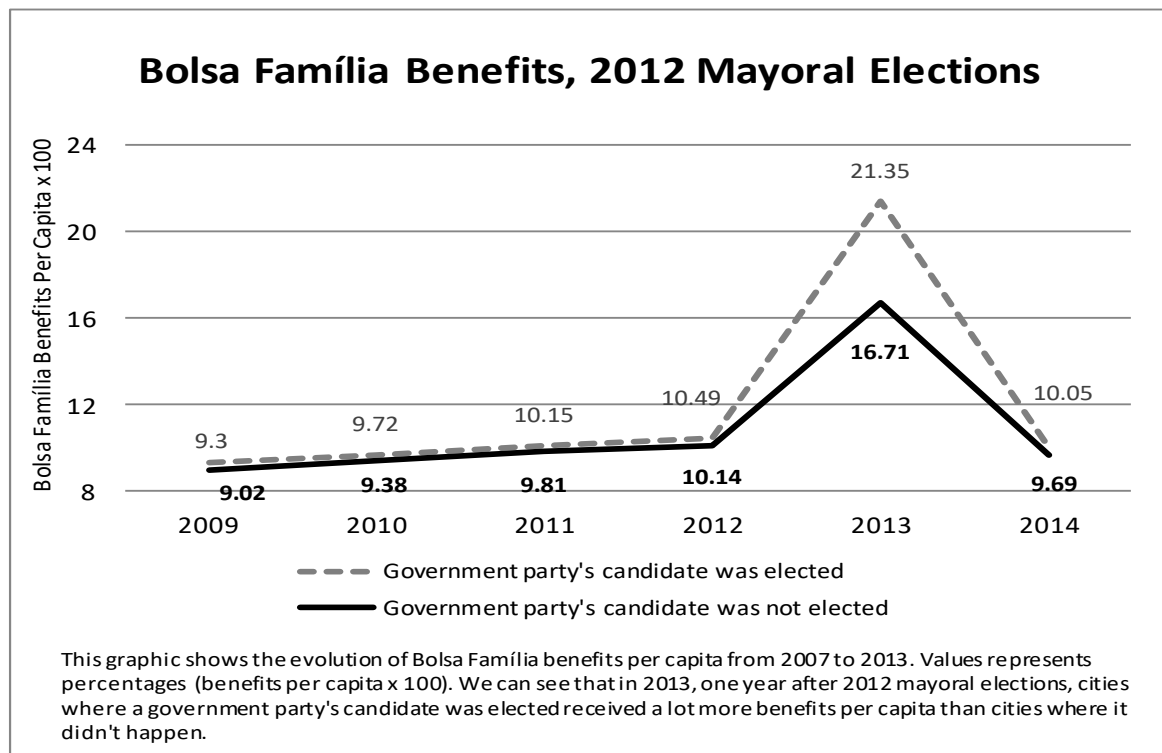
Figure 7 – Bolsa Família Benefits Per Capita, 2012 Mayoral Elections, Evolution in Time

elections the increase in benefits that target cities receive is higher than in non-target cities. It provides another evidence that politics play an important role in benefits allocation.

4.3 Literature Review

There is a significant number of papers discussing misallocations in government social programs. Most of them find political and electoral motivation behind these misallocations. Surprisingly, it happens not only in underdeveloped countries, where governments tend to be less transparent. It also happens in rich countries like Sweden and Canada, which are very often quoted as examples of good practices and public governance. Table 49 summarizes the main results we found.

If politicians use social programs to gain votes, who do they target among all voters? Two papers come up with different models for politicians strategies. The first one, developed by Cox and McCubbins (1986), argues that risk-averse candidates will tend to over-invest in their closest supporters. Their optimal strategy will be to promise redistribution first and foremost to their reelection constituency. Thereby they target to maintain existing political coalitions. They will only invest little, if at all, in opposition groups. They may invest somewhat more in swing groups. Doing so, they try to maximize their expected vote.

Table 48 – Bolsa Família benefits/population rate, Target and Non-target Cities, 2006 and 2010 president elections

		All data				Matching Sample			
		Bolsa Família benefits/population rate				Bolsa Família benefits/population rate			
		2006 president elections		2010 president elections		2006 president elections (1)		2010 president elections (2)	
		avg	Δ%	avg	Δ%	avg	Δ%	avg	Δ%
Target cities for government party	3 years before elections	9,59	41%	7,93	66%	6,12	35%	7,87	32%
	3 years after elections	13,57		13,14		8,28		10,35	
Non-target cities for government party	3 years before elections	5,54	36%	8,43	47%	4,95	30%	7,61	25%
	3 years after elections	7,55		12,42		6,44		9,52	

This table shows the evolution of the rate Bolsa Família benefits/population in each group of cities for each presidential election. We calculate an average of three years before an election and an average of three years after that and compare both. Target cities are the ones where the goverment party has 80% or more of the votes in second round president elections. Non-target cities are are the ones where where the goverment party had less than 80% of the votes in second round president elections. (1) Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.53 and 0.61. (2) Matching sample is obtained restricting data to cities which 2000 HDI is higher than 0.54, per capita GDP average from 2004-2005 higher than 4.95 and Firjan Development Index in 2005 lower than 0.56.

The second model belongs to Dixit and Londregan (1996). The authors state that if parties are equally effective in delivering transfers to any group, then we obtain a "swing voter" theory outcome. This theory affirms that parties target groups that are politically central. These groups are most willing to switch their votes in response to economic favors. If groups have party affinities, and each party is more effective in delivering favors to its own support group, then we can get the "machine politics" outcome. In this case, each party favors its core support group.

We then examine the evidences of the use of social programs for electoral purposes. Dahlberg and Johansson (2002) study the 1998 elections in Sweden. They find that the incumbent government uses a program intended to stimulate local ecological sustainable projects in order to win votes. In particular, the authors find strong support for the Dixit-Londregan model. It means that parties distribute transfers to regions where there are many swing voters. On the other hand, the authors do not find any support for Cox-McCubbins model.

Marcelin (2014) analyse the Canada equalization program. It should provide residents from less favored provinces, due to economic differences, with roughly similar levels of public service. The author find that provinces that exhibit dominant support for the national party often receive a greater share of federal transfers. On the other side, provinces that are largely unsupportive for the victorious party are more likely to see their share of federal transfers shrink.

Table 49 – Summary of main findings

Authors	Country	Period	Journal	Main results
Blattman, C., Emeriau, M., Fiala, N.	Uganda	2008	Review of Economics and Statistics	The recipients of YOP, a successful Ugandan government social program, are no more likely to support the ruling party in elections. Rather, they slightly increase party membership and voting in favor of the opposition parties.
Firpo, S. et al	Brazil	2006-2008	EconomiA	Individuals manipulate their income by voluntarily reducing their labor supply in order to become eligible to the Bolsa Família program.
Zucco Jr, C.	Brazil	2002-2010	American Journal of Political Science	Conditional cash transfers increases the performance of the incumbent party candidate in the short run but lack the capacity to induce substantial long-term voter realignments.
Conover, E., Camacho, A.	Colombia	1994-2003	American Economic Journal: Economic Policy	Government lowers poverty index scores in order to turn more people eligible for social programs. The amount of manipulation in a city is larger where mayoral elections are more competitive, and smaller in cities with less competitive elections, more community organizations and higher newspaper circulation.
Dahlberg, M., Johansson, E.	Sweden	1998	The American Political Science Review	Government uses a social program intended to support local ecological sustainable projects in order to win votes. There is strong support for the Dixit-Londregan model, in which parties distribute transfers to regions where there are many swing voters.
Cox, G., McCubbins, M.	USA	1986	Journal of Politics	Risk-averse candidates will tend to over-invest in their closest supporters. They will invest little (if at all) in opposition groups, somewhat more in swing groups, and focus on their support groups.
Dixit, A., Londregan, J.	USA	1996	Journal of Politics	If parties are equally effective in delivering transfers to any group, then the "swing voter" theory applies: they focus on the groups that are politically central and most willing to switch their votes in response to economic favors. If groups have party affinities, and each party is more effective in delivering favors to its own support group, then each party favors its core support group.
Marcelin, J.	Canada	1982-2012	Public Finance Review	Provinces that exhibit dominant support for the national party often receive a greater share of federal transfers. On the other side, provinces that are largely unsupportive for the victorious party are more likely to see their share of federal transfers shrink.
Weitz-Shapiro, R.	Argentina	2006	American Journal of Political Science	High levels of political competition are compatible with clientelism when poverty is also high. Only when high competition is coupled with low rates of poverty does clientelism decline.
Manacorda, M., Miguel, E., Vigorito, A.	Uruguay	2005-2007	American Economic Journal	Beneficiary households of an anti-poverty cash transfer program are 11 to 13 percentage points more likely to favor the government that implement it than the previous government. Political support effects persist after the program ends.

Sole-Olle and Sorribas-Navarro (2008) test the hypothesis that Spanish municipalities aligned with upper-tier grantor governments receive more grants than those unaligned. Their results suggest that partisan alignment has a sizeable positive effect on the amount of grants received by municipalities. Aligned municipalities receive over 40% more grants than unaligned municipalities.

De La O (2012) examine Progresa, the pioneering Mexican conditional cash transfer program. The author conclude that an early enrollment in the program lead to substantive increases in voter turnout. Pop-Eleches and Pop-Eleches (2012) study a Romanian government program that distributes coupons worth 200 Euros to poor families to the purchase of a computer. They find that program beneficiaries are significantly more likely to support this governing coalition.

In Argentina, Weitz-Shapiro (2012) finds that high levels of political competition are compatible with clientelism when poverty is also high. Only when high competition is coupled with low rates of poverty does clientelism decline. Manacorda, Miguel and Vigorito (2011) study the Uruguayan PANES, a large anti-poverty cash transfer program. They find that beneficiary households are 11 to 13 percentage points more likely to favor the government that implemented it than other parties. Political support effects persist even after the program ends.

As a counterpoint, Blattman, Emeriau and Fiala (2017) argue that social policies may not always lead to support for the political party that introduced the policy. They show as example the Youth Opportunities Program (YOP). This is an Ugandan government program developed to encourage groups of young people to submit proposals to start enterprises. Despite the success achieved by the program, YOP recipients are no more likely to support the ruling party in elections. Rather, recipients slightly increase party membership, campaigning, and voting in favor of the opposition parties.

Zucco Jr (2013) also shows that Brazilian conditional cash transfers lack the capacity to induce substantial long-term voter realignments. However, they increase the performance of the incumbent party candidate.

Lastly, we find evidences of eligibility manipulation for social programs. Firpo et al (2014) show that individuals voluntarily reduce their labor supply in order to become eligible to the Bolsa Família program. Similarly, Conover and Camacho (2009) find that some households have their eligibility scores lowered in order to become eligible for social welfare programs in Colombia. They identify a discontinuity at the eligibility threshold, which is larger where mayoral elections are more competitive and smaller in municipalities with less competitive elections, more community organizations and higher newspaper circulation. Both results reinforce the perception that the beneficiaries are not exactly the people the social program aims to reach.

4.4   Methodology

Our methodology is based on a differences in differences approach. We use this approach to analyse how our main variables differ from pre-treatment to post-treatment periods.

To answer our research question we examine two different events: presidential elections and mayoral elections. In presidential elections we use the percentage of votes for government party in second round president elections in each city. As we have the same two parties competing in the last four second round president elections in Brazil, we use this data to give more consistency to our results.

On the other side, we can not just use the percentages of votes for government party in mayoral elections. We would have to deal with different and complex alliances. Sometimes two parties are allies in a city and opponents in another. Also, the number of candidates and the number of sufficient votes to elect a candidate differ widely from one city to another. So, in order to avoid possible distortions, we just use the final result of these elections to study mayoral elections. In other words, if a government party or its affiliated parties candidate wins the mayoral election in a city or not.

As Dixit and Londregan (1996) state, if parties are equally effective in delivering transfers to any group, then the swing voter theory applies. We use as a proxy for swing votes, in case of president elections, the difference in votes for the government party between two elections. For mayoral elections, we consider the changing of status the best proxy we could generate. By changing of status we mean a candidate from government party becoming the mayor where the previous mayor is affiliated to other parties. Also we consider a candidate from government party not reelected as a change of status.

Similarly, we test our database with respect to Cox and McCubbins (1986) model. This model states that risk-averse candidates will tend to over-invest in their closest supporters. Assuming that risk aversion applies for Brazilian politicians, we must identify political influence in cities with high percentage of votes for government party (president elections) or where the previous mayor is affiliated to government party (mayoral elections).

So we format our models distinctly to verify how political variables influence the allocation of Bolsa Família benefits. The first group of models refers to mayoral elections. For each mayoral election we study in this work (2008 and 2012), we verify if both the elected and the previous mayor are affiliated or not to government party. It generates four models, described below, with dummies as independent variables.

The first model (4.1) has as independent variable a dummy for cities where previous mayor is not affiliated to government party or its allies but the candidate from government party is elected (*dummy mayor gov elected*). If this beta is significant and positive, then government party rewards cities that elects its candidates with more Bolsa Família benefits.

In other words, government party would target the places where it takes over as mayor.

$$dif\ BF\ benefits_i = \beta_0\ +\ \beta_1\ dummy\ mayor\ gov\ elected_i +\ \epsilon_i \qquad (4.1)$$

The second model (4.2) is a robustness test to first model. The independent variable is a dummy for cities where previous mayor is not affiliated to government party or its allies and the candidate from government party is not elected (*dummy mayor gov not elected*). We could not observe first and second model with its respective betas being both significant and with the same signal, because they indicate opposite effects. If this second model beta is significant and positive, then government party rewards cities where it does not take over as mayor. It would be an unexpected result by all means.

$$dif\ BF\ benefits_i = \beta_0\ +\ \beta_1\ dummy\ mayor\ gov\ not\ elected_i +\ \epsilon_i \qquad (4.2)$$

The third model (4.3) has as independent variable a dummy for cities where previous mayor is affiliated to government party or its allies and the candidate from government party is elected (*dummy mayor gov reelected*). If this beta is significant and positive, then government party rewards cities that reelects its candidates with more Bolsa Família benefits. In other words, government party would target the places where it continues as mayor.

$$dif\ BF\ benefits_i = \beta_0\ +\ \beta_1\ dummy\ mayor\ gov\ reelected_i +\ \epsilon_i \qquad (4.3)$$

Finally, the forth model (4.4) is a robustness test to the third model. The independent variable is a dummy for cities where previous mayor is affiliated to government party or its allies but the candidate from government party is not elected (*dummy mayor gov not reelected*). Like before, we could not observe third and forth model with its respective betas being both significant and with the same signal, because they indicate opposite effects. If this forth model beta is significant and positive, then government party rewards cities where it does not continue as mayor. It would be an unexpected result.

$$dif\ BF\ benefits_i = \beta_0\ +\ \beta_1\ dummy\ mayor\ gov\ not\ reelected_i +\ \epsilon_i \qquad (4.4)$$

The fifth, sixth and seventh models refers to presidential elections. The fifth model (4.5) tries to capture the swing voters effect, as described by Dixit and Londregan (1996). The main independent variable is the difference between the percentages of votes that government party obtains in the last two second round presidential elections in a given city (*dif percentage votes president*). This is a typical differences in differences model in an Angrist & Pischke (2009) approach. It should reveal the increment in Bolsa Família benefits received by a city that increments in government party votes provoke.

$$dif\ BF\ benefits_i = \beta_0\ +\ \beta_1\ dif\ percentage\ votes\ president_i +\ \epsilon_i \qquad (4.5)$$

Our sixth and seventh models modify the traditional DD approach. They offer another perspective as their main dependent variables refer to the last election results, not to the difference between the last two. These tests results should give more robustness to our fifth model results.

In our sixth overall (4.6), the independent variable is the percentage of votes that government party obtains in the last second round presidential elections in a given city (*percentage votes president*). Instead of testing the difference between the votes in the last two elections, like our first model, we test in this model only the result of the last election. As the dependent variable is the difference between the averages of credit supply before and after this election, this model should show how this election isolated influence the increase in credit supply.

$$dif\ BF\ benefits_i = \beta_0\ +\ \beta_1\ percentage\ votes\ president_i +\ \epsilon_i \tag{4.6}$$

Lastly, the seventh model (4.7) tests if Cox and McCubbins (1986) results apply to our data. We generate a dummy for cities with high percentage (80% or more) of votes for government party in second round president elections (*dummy votes president*). This dummy is the independent variable of this model. A significant beta indicates that government party tend to over-invest in their closest supporters. Additionally, with this model we test if our identification results are also statistically significant.

$$dif\ BF\ benefits_i = \beta_0\ +\ \beta_1\ dummy\ votes\ president_i +\ \epsilon_i \tag{4.7}$$

We analyze data from 2004 to 2014. We select this period because Bolsa Família started on 2004 and because of cities GDP data availability. We use secondary data in this work, available in open databases as Ipeadata, IBGE and TSE. Table (50) show the control variables we use in this study.

Table 50 – List of Control Variables

Variable	Source	Output
FDI	Firjan	Firjan Development Index of a city
FDII	Firjan	Firjan Income Development Index of a city
HDI	IPEA	Human Development Index of a city
GDP per capita	IBGE	City GDP/City population index
City Population	IBGE	Total of city residents

The dependent variables of all models are differences between averages of Bolsa Família benefits from three years before a specific election and three years after. We

exclude data related to elections years in order to avoid some distortions. We are more interested in capturing effects that lasted for longer periods.

We perform additional tests. We add to our models three control variables: the difference between a three year average city per capita Gross Domestic Product (GDP) before and after each election, the difference between a three year average city Firjan Development Index (FDI) before and after each election and the difference between a three year average city Firjan Income Development Index (FDI-I) before and after each election. A priori, we would expect a significant and negative relation between these variables and the number of benefits that each city receives. We report the results of those alternative models in our appendixes.

Given the existence of great disparities in Brazil, comparisons between different cities can be unfair and produce distorted conclusions. As an alternative way of testing the consistency of our results, we use an algorithm that minimizes the differences in the averages of pre-treatment characteristics (FDI, HDI and per capita GDP) of treated and non-treated groups. It produces samples of treated and non-treated cities with similar pre-treatment characteristics that can be more fairly compared. We call these samples our Matching Samples. We describe the range of values of each variable in each of the matching samples. We report the results of these tests in our annexes.

We perform additional tests applying the concepts of Regression Discontinuity Design (RDD). The purpose is to examine if our previous results are the same in a sample composed only by cities where government party wins or loses a given election by a small margin. If these RDD results are significant, then we we have stronger evidences of political interference.

We format these RDD tests differently for presidential and mayoral elections. In the case of mayoral elections, we select at first only the cities where the government party finishes in the first or second places. Then we calculate the difference in percentage of votes between government party and the other party. When this difference is equal or smaller than 10%, we include the city in the sample. When it is larger, we do not include. In the case of presidential elections, government party is always the winner or the second place. So, when the difference is equal or smaller than 10%, we include the city in the sample. When it is larger, we do not include. We report these results in our appendixes.

Lastly, to verify the consistency of our results, we repeat the tests in each of the five Brazilian regions separately. The purpose is to understand if the results we obtain to the whole country are the same for each region. We would expect to obtain similar results. But if not, it would be a valuable tool to better understand how each region contributes to the results of the whole country.

4.5 Results

Our results show the existence of distortions in Bolsa Família benefits distribution. Cities that elect government party candidates for mayor in 2012 where previous mayor is not affiliated to government party or its allies have significant and positive coefficients. It shows that these cities receive more benefits, proportionally to its populations, than cities where candidates from government party is not elected. Moreover, all coefficients of models (4.5) to (4.7) referring to 2006 presidential elections are significant and positive. It means the more a city votes for government party in this presidential election, more Bolsa Família benefits this city receives. This results also favors the swing voters theory.

Additionally, when we analyse Brazilian regions separately, coefficients of models (4.5) to (4.7) referring to 2010 presidential elections are also positive and significant in Midwest and Northeast. In Southeast, we obtain an opposite result in 2012 mayoral elections. Cities that reelect government party candidates for mayor in 2012 are those with significant and positive coefficients, not the cities where this party takes over as mayor.

Table 51 shows the regressions results for 2008 mayoral elections. The coefficients of our variables are not significant in any case. There is no evidence of manipulation in benefits allocation in this election. The results of this election are not relevant to explain variations in Bolsa Família benefits received by each city.

But in 2012 mayoral elections the results are relevant. Table 52 shows these tests. Cities where previous mayor is not affiliated to government party or its allies but the candidate from government party is elected have positive and significant coefficients at 95% level of confidence. It means that the increment in Bolsa Família benefits in these cities are higher than in others, proportionally to its respective populations.

We also argue that Dixit and Londregan (1996) model is relevant to explain how politicians behave in this election. This variable is our proxy for swing votes in mayoral elections. Therefore, government party seems to target the cities where it takes over as mayor.

On the other hand, it seems that cities where government party is already in charge are not the target. Our proxy for Cox and McCubbins (1986) results does not show any significance in any of the two mayoral elections we study.

Table 53 shows the results of 2006 presidential elections tests. All coefficients are significant and positive at 99,5% level of confidence. It confirms our identification results that localities with a high percentage of votes (80% or more) in favor of government party receives more Bolsa Família transfers. Moreover, it shows that the number of benefits each city receives is directly proportional to the percentage of votes in favor of government party. We argue that it shows that government party tries to reward their closest supporters in this election, supporting Cox and McCubbins (1986) results.

Table 51 – Regressions Results, 2008 Mayoral Elections

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	-0.05 (0.14)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.05 (0.14)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			-0.22 (0.15)	
	Cities where government party candidate is not elected in 2008 mayoral elections				0.22 (0.15)
n		3620	3620	1603	1603
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Also, the variable that measures the difference between the current and past percentages of votes has a positive and significant coefficient. This variable is our proxy for swing votes in presidential elections. Therefore, we argue that the Dixit and Londregan (1996) model is also relevant in this election.

Table 54 shows the results of 2010 presidential elections. Contrary to 2006, the coefficients are not significant in any case. The results of this election are not relevant to explain variations in Bolsa Família benefits that each city receives.

Our results remains the same when we add to the respective models our control variables. Every coefficient remains with the same level of significance and signal. It gives more consistency to our results. Our control variables are not always significant. Only in 2008 mayoral elections and 2006 presidential elections it happens in some cases. This may indicate that the allocation of benefits does not follow always poverty and human conditions indicators. Firjan Development Indexes (FDI and FDI-I) seem to be more relevant to explain benefits distribution than per capita GDP.

When we restrict the database to our matching samples the results remains the

Table 52 – Regressions Results, 2012 Mayoral Elections

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.19*** (1.03)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.19*** (1.03)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			0.00 (1.63)	
	Cities where government party candidate is not elected in 2012 mayoral elections				0.00 (1.63)
n		4744	4744	555	555
R^2		0.01	0.01	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not.
 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

same. The only exception are some tests in 2012 mayoral elections models. In this case the coefficients are not significant anymore.

We repeat the tests in each Brazilian region separately. We obtain some interest findings. In 2012 mayoral elections our results only remains the same in Northeast and Midwest regions. In south, southeast and north, the coefficient of cities where government party takes over as mayor is not significant. In southeast, instead, the coefficient is significant for cities where government party is reelected (Table 55). It favors the "closest supporters" theory.

On the other hand, in Midwest and Northeast regions the coefficients of 2010 presidential elections tests become significant and positive. Tables 56 and 57 show those results. Also, in these regions the results in 2012 mayoral elections are stronger than any other regions, and robust to the addition of control variables.

The North region is where we find the weakest results. Only the differences in votes from last to current elections are significant in both presidential elections (2006 and 2010). However, their coefficients are no longer significant when we add control variables.

Table 53 – Regressions Results, 2006 Presidential Elections

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.05* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.05* (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			1.96* (0.09)
n	5149	5257	5257
R^2	0,16	0,13	0,08

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more.

Table 54 – Regressions Results, 2010 Presidential Elections

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.02 (0.01)		
Government party percentage of votes in 2010 second round president elections		0.01 (0.02)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			1.22 (1.14)
n	5056	5085	5085
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

Table 55 – Regressions Results, Southeast Region, 2012 Mayoral Elections

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.19 (2.42)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.19 (2.42)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			4.29*** (2.06)	
	Cities where government party candidate is not elected in 2012 mayoral elections				-4.29*** (2.06)
n		1394	1394	186	186
R^2		0.00	0.00	0.02	0.02

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not.
Level of significance: *p<0.005; **p<0.025; ***p<0.05.

Table 56 – Regressions Results, Midwest Region, 2010 Presidential Elections

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.00 (0.01)		
Government party percentage of votes in 2010 second round president elections		0.02 (0.02)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			6.43* (1.61)
n	585	587	587
R^2	0.00	0.00	0.03

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more.
Level of significance: *p<0.005; **p<0.025; ***p<0.05.

Table 57 – Regressions Results, Northeast Region, 2010 Presidential Elections

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.03*** (0.01)		
Government party percentage of votes in 2010 second round president elections		0.03*** (0.01)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			1.36 (1.01)
n	1564	1493	1493
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

South and Southeast are not much different from North. However, their 2006 presidential elections coefficients are significant and robust to the addition of any controls.

Lastly, we perform the tests with the Regression Discontinuity Design (RDD). Our sample contains only cities where government party wins or loses the election by a small margin. The results are the same of previous tests except for 2012 mayoral elections. In this case, coefficients are not significant anymore. On the other hand, the coefficients of 2006 presidential elections tests once more are positive and significant. It confirms our previous results.

4.6   Conclusion

Our results show the existence of distortions in Bolsa Família benefits distribution. We find evidences that government party rewards cities that elect their candidates for mayor in 2012 where they are not in charge. We also find evidence of favoring the cities where they receive more votes in the 2006 presidential election. On the other hand, we do not obtain the same results in 2008 mayoral elections and 2010 presidential elections. Only in Midwest and Northeast regions the coefficients of 2010 presidential elections tests are positive and significant.

Our results are consistent with previous researches, like Dahlberg and Johansson (2002) and Marcelin (2014). It seems that politics plays an important role for Bolsa Família benefits allocation. We find evidences in favor of both Cox and McCubbins (1986) and Dixit and Londregan (1996) models. They show that politicians want to strengthen their

relations with their closest supporters as well as they try to capture swing voters. It depends on the election we analyse.

The most important limitations we have to deal with refers to the absence of some data. Information related to Brazilian cities, like HDI, Gini index, number of poor families, are not available yearly. IBGE only collects them every 10 years, when its census is made. These information would be important to strengthen our results and conclusions. Further developments on this field of research, in our opinion, depend on availability of those data.

4.7   Annexes

4.7.1   Regressions Results, 2008 Mayoral Elections, Control Variables Added

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	-0.08 (0.13)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.08 (0.13)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			-0.19 (0.14)	
	Cities where government party candidate is not elected in 2008 mayoral elections				0.19 (0.14)
Difference in city per capita GDP averages from 2009-2011 to 2005-2007		-0.01* (0.00)	-0.01* (0.00)	-0.02** (0.00)	-0.02** (0.00)
Difference in city Firjan Development Index averages from 2009-2011 to 2005-2007		11.83* (0.80)	11.83* (0.80)	11.32* (1.20)	11.32* (1.20)
n		3589	3589	1583	1583
R^2		0,06	0,06	0,06	0,06

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2009-2011 to 2005-2007 and the difference in city Firjan Development Index averages from 2009-2011 to 2005-2007.
 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	-0.08 (0.14)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.08 (0.14)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			-0.23 (0.15)	
	Cities where government party candidate is not elected in 2008 mayoral elections				0.23 (0.15)
Difference in city per capita GDP averages from 2009-2011 to 2005-2007		-0.02* (0.00)	-0.02* (0.00)	-0.02** (0.00)	-0.02** (0.00)
Difference in city Firjan Income Development Index averages from 2009-2011 to 2005-2007		1.19** (0.50)	1.19** (0.50)	1.23 (0.77)	1.23 (0.77)
n		3594	3594	1588	1588
R^2		0,01	0,01	0,01	0,01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2009-2011 to 2005-2007 and the difference in city Firjan Income Development Index averages from 2009-2011 to 2005-2007.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.2   Regressions Results, 2012 Mayoral Elections, Control Variables Added

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.26*** (1.04)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.26*** (1.04)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			-0.03 (1.65)	
	Cities where government party candidate is not elected in 2012 mayoral elections				0.03 (1.65)
Difference in city per capita GDP averages from 2013-2014 to 2009-2011		0.01 (0.05)	0.01 (0.05)	0.05 (0.10)	0.05 (0.10)
Difference in city Firjan Development Index averages from 2013-2014 to 2009-2011		-0.80 (12.37)	-0.80 (12.37)	17.11 (21.15)	17.11 (21.15)
n		4718	4718	553	553
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2013-2014 to 2009-2011 and the difference in city Firjan Development Index averages from 2013-2014 to 2009-2011.

 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.19*** (1.04)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.19*** (1.04)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			0.04 (1.65)	
	Cities where government party candidate is not elected in 2012 mayoral elections				-0.04 (1.65)
Difference in city per capita GDP averages from 2013-2014 to 2009-2011		0.00 (0.05)	0.00 (0.05)	0.04 (0.10)	0.04 (0.10)
Difference in city Firjan Income Development Index averages from 2013-2014 to 2009-2011		10.86 (6.92)	10.86 (6.92)	19.62 (12.33)	19.62 (12.33)
n		4722	4722	553	553
R^2		0.00	0.00	0.01	0.01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2013-2014 to 2009-2011 and the difference in city Firjan Income Development Index averages from 2013-2014 to 2009-2011.
 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

4.7.3   Regressions Results, 2006 Presidential Elections, Control Variables Added

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.04* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.04* (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			1.54* (0.00)
Difference in city per capita GDP averages from 2007-2009 to 2004-2005	-0.00 (0.01)	-0.01 (0.01)	-0.01** (0.01)
Difference in city Firjan Development Index averages from 2007-2009 to 2005	6.64* (0.71)	7.81* (0.71)	9.97* (0.71)
n	4905	4996	4996
R^2	0,17	0,15	0,11

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2007-2009 to 2004-2005 and the difference in city Firjan Development Index averages from 2007-2009 to 2005.
 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.05* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.05* (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			1.91* (0.09)
Difference in city per capita GDP averages from 2007-2009 to 2004-2005	-0.00 (0.01)	-0.01 (0.01)	-0.02* (0.01)
Difference in city Firjan Income Development Index averages from 2007-2009 to 2005	1.38* (0.37)	1.49* (0.37)	1.36* (0.38)
n	5043	5134	5134
R^2	0,17	0,14	0,09

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2007-2009 to 2004-2005 and the difference in city Firjan Income Development Index averages from 2007-2009 to 2005.
Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.4   Regressions Results, 2010 Presidential Elections, Control Variables Added

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.02 (0.01)		
Government party percentage of votes in 2010 second round president elections		0.01 (0.02)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			1.12 (1.15)
Difference in city per capita GDP averages from 2011-2013 to 2007-2009	-0.01 (0.03)	-0.01 (0.03)	-0.01 (0.03)
Difference in city Firjan Development Index averages 2011-2013 to 2007-2009	-1.94 (7.95)	-2.47 (7.91)	-1.98 (7.93)
n	5025	5051	5051
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2011-2013 to 2007-2009 and the difference in city Firjan Development Index averages from 2011-2013 to 2007-2009.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.02 (0.01)		
Government party percentage of votes in 2010 second round president elections		0.01 (0.02)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			1.21 (1.14)
Difference in city per capita GDP averages from 2011-2013 to 2007-2009	-0.02 (0.03)	-0.02 (0.03)	-0.02 (0.03)
Difference in city Firjan Income Development Index averages 2011-2013 to 2007-2009	2.52 (4.52)	3.83 (4.51)	3.75 (4.51)
n	5032	5058	5058
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2011-2013 to 2007-2009 and the difference in city Firjan Income Development Index averages from 2011-2013 to 2007-2009.

 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.5   Regressions Results, Matching Samples, 2008 and 2012 Mayoral Elections

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies (1)	Cities where government party candidate is elected in 2008 mayoral elections	-0.05 (0.14)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.05 (0.14)		
Cities where previous mayor is affiliated to government party or its allies (2)	Cities where government party candidate is elected in 2008 mayoral elections			-0.07 (0.14)	
	Cities where government party candidate is not elected in 2008 mayoral elections				0.07 (0.14)
n		3620	3620	937	937
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.
(1) Matching sample is obtained with all data. (2) Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.5 and 0.85.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies (1)	Cities where government party candidate is elected in 2012 mayoral elections	2.22*** (1.07)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.22*** (1.07)		
Cities where previous mayor is affiliated to government party or its allies (2)	Cities where government party candidate is elected in 2012 mayoral elections			1.36 (1.45)	
	Cities where government party candidate is not elected in 2012 mayoral elections				-1.36 (1.45)
n		4562	4562	352	352
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not.
 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.
(1) Matching sample is obtained restricting data to cities which per capita GDP average from 2004-2005 is 32 or lower. (2) Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.5 and 0.85.

4.7.6   Regressions Results, Matching Samples, 2006 and 2010 Presidential Elections

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.02* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.01** (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			0.67*** (0.33)
n	1320	1336	1336
R^2	0.01	0.01	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more.
 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.
Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.53 and 0.61.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	-0.01 (0.02)		
Government party percentage of votes in 2010 second round president elections		-0.01 (0.02)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			0.58 (1.56)
n	186	186	186
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

Matching sample is obtained restricting data to cities which 2000 HDI is higher than 0.54, per capita GDP average from 2004-2005 higher than 4.95 and Firjan Development Index in 2005 lower than 0.56.

4.7.7   Regressions Results, Matching Samples, 2008 Mayoral Elections, Control Variables Added

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies (1)	Cities where government party candidate is elected in 2008 mayoral elections	-0.08 (0.13)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.08 (0.13)		
Cities where previous mayor is affiliated to government party or its allies (2)	Cities where government party candidate is elected in 2008 mayoral elections			-0.05 (0.14)	
	Cities where government party candidate is not elected in 2008 mayoral elections				0.05 (0.14)
Difference in city per capita GDP averages from 2009-2011 to 2005-2007		-0.01* (0.00)	-0.01* (0.00)	-0.00 (0.01)	-0.00 (0.01)
Difference in city Firjan Development Index averages from 2009-2011 to 2005-2007		11.83* (0.80)	11.83* (0.80)	6.51* (1.36)	6.51* (1.36)
n		3589	3589	929	929
R^2		0,06	0,06	0,02	0,02

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2009-2011 to 2005-2007 and the difference in city Firjan Development Index averages from 2009-2011 to 2005-2007.

 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

(1) Matching sample is obtained with all data. (2) Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.5 and 0.85.

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies (1)	Cities where government party candidate is elected in 2008 mayoral elections	-0.08 (0.14)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.08 (0.14)		
Cities where previous mayor is affiliated to government party or its allies (2)	Cities where government party candidate is elected in 2008 mayoral elections			-0.06 (0.14)	
	Cities where government party candidate is not elected in 2008 mayoral elections				0.06 (0.14)
Difference in city per capita GDP averages from 2009-2011 to 2005-2007		-0.02* (0.00)	-0.02* (0.00)	-0.00 (0.01)	-0.00 (0.01)
Difference in city Firjan Income Development Index averages from 2009-2011 to 2005-2007		1.19** (0.50)	1.19** (0.50)	2.08** (0.75)	2.08** (0.75)
n		3594	3594	933	933
R^2		0,01	0,01	0,01	0,01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2009-2011 to 2005-2007 and the difference in city Firjan Income Development Index averages from 2009-2011 to 2005-2007.

 Level of significance: *p<0.005; **p<0.025; ***p<0.05.
(1) Matching sample is obtained with all data. (2) Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.5 and 0.85.

4.7.8   Regressions Results, Matching Samples, 2012 Mayoral Elections, Control Variables Added

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies (1)	Cities where government party candidate is elected in 2012 mayoral elections	2.97 (1.77)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.97 (1.77)		
Cities where previous mayor is affiliated to government party or its allies (2)	Cities where government party candidate is elected in 2012 mayoral elections			1.35 (1.45)	
	Cities where government party candidate is not elected in 2012 mayoral elections				-1.35 (1.45)
Difference in city per capita GDP averages from 2013-2014 to 2009-2011		0.02 (0.07)	0.02 (0.07)	0.02 (0.07)	0.02 (0.07)
Difference in city Firjan Development Index averages from 2013-2014 to 2009-2011		0.06 (22.73)	0.06 (22.73)	10.74 (20.76)	10.74 (20.76)
n		2612	2612	352	352
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2013-2014 to 2009-2011 and the difference in city Firjan Development Index averages from 2013-2014 to 2009-2011.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

(1)Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.51 and 0.85. (2) Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.5 and 0.85.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies (1)	Cities where government party candidate is elected in 2012 mayoral elections	2.88 (1.76)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.88 (1.76)		
Cities where previous mayor is affiliated to government party or its allies (2)	Cities where government party candidate is elected in 2012 mayoral elections			1.32 (1.45)	
	Cities where government party candidate is not elected in 2012 mayoral elections				-1.32 (1.45)
Difference in city per capita GDP averages from 2013-2014 to 2009-2011		0.00 (0.07)	0.00 (0.07)	0.03 (0.07)	0.03 (0.07)
Difference in city Firjan Income Development Index averages from 2013-2014 to 2009-2011		16.10 (12.08)	16.10 (12.08)	-3.01 (11.34)	-3.01 (11.34)
n		2616	2616	352	352
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2013-2014 to 2009-2011 and the difference in city Firjan Income Development Index averages from 2013-2014 to 2009-2011.
 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

(1)Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.51 and 0.85. (2) Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.5 and 0.85.

4.7.9   Regressions Results, Matching Samples, 2006 Presidential Elections, Control Variables Added

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.01* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.01 (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			0.60* (0.33)
Difference in city per capita GDP averages from 2007-2009 to 2004-2005	0.01 (0.01)	0.01 (0.01)	-0.01*** (0.01)
Difference in city Firjan Development Index averages from 2007-2009 to 2005	3.03* (1.20)	3.06* (1.20)	3.00** (1.20)
n	1249	1264	1264
R²	0,2	0,2	0,1

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2007-2009 to 2004-2005 and the difference in city Firjan Development Index averages from 2007-2009 to 2005.

 Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.
Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.53 and 0.61.

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.02* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.01** (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			0.67*** (0.33)
Difference in city per capita GDP averages from 2007-2009 to 2004-2005	0.01 (0.01)	-0.01 (0.01)	-0.01* (0.01)
Difference in city Firjan Income Development Index averages from 2007-2009 to 2005	1.44** (0.56)	1.39** (0.56)	1.36** (0.56)
n	1305	1320	1320
R^2	0,02	0,01	0,01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2007-2009 to 2004-2005 and the difference in city Firjan Income Development Index averages from 2007-2009 to 2005.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.
Matching sample is obtained restricting data to cities which 2000 HDI lies between 0.53 and 0.61.

4.7.10   Regressions Results, Matching Samples, 2010 Presidential Elections, Control Variables Added

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.01 (0.01)		
Government party percentage of votes in 2010 second round president elections		-0.02 (0.02)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			0.53 (1.56)
Difference in city per capita GDP averages from 2011-2013 to 2007-2009	-0.11 (0.08)	-0.11 (0.08)	-0.10 (0.08)
Difference in city Firjan Development Index averages 2011-2013 to 2007-2009	6.32 (9.57)	6.86 (9.54)	7.50 (9.59)
n	186	186	186
R^2	0.02	0.02	0.01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2011-2013 to 2007-2009 and the difference in city Firjan Development Index averages from 2011-2013 to 2007-2009.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

Matching sample is obtained restricting data to cities which 2000 HDI is higher than 0.54, per capita GDP average from 2004-2005 higher than 4.95 and Firjan Development Index in 2005 lower than 0.56.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	-0.02 (0.02)		
Government party percentage of votes in 2010 second round president elections		-0.02 (0.02)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			0.45 (1.56)
Difference in city per capita GDP averages from 2011-2013 to 2007-2009	-0.12 (0.08)	-0.12 (0.08)	-0.11 (0.08)
Difference in city Firjan Income Development Index averages 2011-2013 to 2007-2009	3.86 (5.17)	3.88 (5.17)	4.01 (5.18)
n	186	186	186
R^2	0.02	0.02	0.01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2011-2013 to 2007-2009 and the difference in city Firjan Income Development Index averages from 2011-2013 to 2007-2009.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

Matching sample is obtained restricting data to cities which 2000 HDI is higher than 0.54, per capita GDP average from 2004-2005 higher than 4.95 and Firjan Development Index in 2005 lower than 0.56.

4.7.11   Regressions Results, South Region, 2008 and 2012 Mayoral Elections

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	0.04 (0.20)			
	Cities where government party candidate is not elected in 2008 mayoral elections		-0.04 (0.20)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			0.02 (0.21)	
	Cities where government party candidate is not elected in 2008 mayoral elections				-0.02 (0.21)
n		770	770	356	356
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.65 (3.06)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.65 (3.06)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			-3.90 (2.52)	
	Cities where government party candidate is not elected in 2012 mayoral elections				3.90 (2.52)
n		1009	1009	129	555
R^2		0.00	0.00	0.02	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.12   Regressions Results, South Region, 2008 and 2012 Mayoral Elections, Control Variables Added

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	0.05 (0.20)			
	Cities where government party candidate is not elected in 2008 mayoral elections		-0.05 (0.20)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			-0.03 (0.21)	
	Cities where government party candidate is not elected in 2008 mayoral elections				0.03 (0.21)
Difference in city per capita GDP averages from 2009-2011 to 2005-2007		0.00 (0.01)	0.00 (0.01)	0.02 (0.02)	0.02 (0.02)
Difference in city Firjan Development Index averages from 2009-2011 to 2005-2007		3.01*** (1.47)	3.01*** (1.47)	3.57 (2.34)	3.57 (2.34)
n		764	764	351	351
R^2		0,01	0,01	0,01	0,01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2009-2011 to 2005-2007 and the difference in city Firjan Development Index averages from 2009-2011 to 2005-2007.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.81 (3.08)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.81 (3.08)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			-3.81 (2.53)	
	Cities where government party candidate is not elected in 2012 mayoral elections				3.81 (2.53)
Difference in city per capita GDP averages from 2013-2014 to 2009-2011		0.14 (0.20)	0.14 (0.20)	0.24 (0.21)	0.24 (0.21)
Difference in city Firjan Development Index averages from 2013-2014 to 2009-2011		-32.59 (40.53)	-32.59 (40.53)	-1.43 (37.20)	-1.43 (37.20)
n		1003	1003	129	129
R^2		0.00	0.00	0.03	0.03

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2013-2014 to 2009-2011 and the difference in city Firjan Development Index averages from 2013-2014 to 2009-2011.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

4.7.13   Regressions Results, South Region, 2006 and 2010 Presidential Elections

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.02* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.02* (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			2.28 (1.45)
n	1121	1130	1130
R^2	0,03	0,03	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	-0.02 (0.03)		
Government party percentage of votes in 2010 second round president elections		-0.03 (0.04)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			-0.65 (3.01)
n	1130	1135	1135
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.14   Regressions Results, South Region, 2006 and 2010 Presidential Elections, Control Variables Added

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.02* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.02* (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			2.11 (1.42)
Difference in city per capita GDP averages from 2007-2009 to 2004-2005	0.02*** (0.01)	0.02 (0.01)	0.01 (0.01)
Difference in city Firjan Development Index averages from 2007-2009 to 2005	3.45* (1.15)	3.71* (1.14)	4.08* (1.15)
n	1022	1031	1031
R^2	0,04	0,03	0,02

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2007-2009 to 2004-2005 and the difference in city Firjan Development Index averages from 2007-2009 to 2005.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.02 (0.03)		
Government party percentage of votes in 2010 second round president elections		-0.03 (0.04)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			-0.83 (3.03)
Difference in city per capita GDP averages from 2011-2013 to 2007-2009	0.00 (0.14)	-0.02 (0.14)	-0.03 (0.14)
Difference in city Firjan Development Index averages 2011-2013 to 2007-2009	18.96 (24.02)	23.50 (24.31)	22.72 (24.33)
n	1121	1126	1126
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2011-2013 to 2007-2009 and the difference in city Firjan Development Index averages from 2011-2013 to 2007-2009.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.15   Regressions Results, Southeast Region, 2008 and 2012 Mayoral Elections

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	0.04 (0.19)			
	Cities where government party candidate is not elected in 2008 mayoral elections		-0.04 (0.19)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			-0.06 (0.18)	
	Cities where government party candidate is not elected in 2008 mayoral elections				0.06 (0.18)
n		1071	1071	478	478
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

| | | Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011 | | | |
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.19 (2.42)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.19 (2.42)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			4.29*** (2.06)	
	Cities where government party candidate is not elected in 2012 mayoral elections				-4.29*** (2.06)
n		1394	1394	186	186
R^2		0.00	0.00	0.02	0.02

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.16   Regressions Results, Southeast Region, 2008 and 2012 Mayoral Elections, Control Variables Added

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	0.02 (0.19)			
	Cities where government party candidate is not elected in 2008 mayoral elections		-0.02 (0.19)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			-0.07 (0.18)	
	Cities where government party candidate is not elected in 2008 mayoral elections				0.07 (0.18)
Difference in city per capita GDP averages from 2009-2011 to 2005-2007		-0.01 (0.00)	-0.01 (0.00)	-0.01 (0.01)	-0.01 (0.01)
Difference in city Firjan Development Index averages from 2009-2011 to 2005-2007		5.19* (1.20)	5.19* (1.20)	6.66* (1.67)	6.66* (1.67)
n		1070	1070	474	474
R^2		0,02	0,02	0,03	0,03

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2009-2011 to 2005-2007 and the difference in city Firjan Development Index averages from 2009-2011 to 2005-2007.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.16 (2.43)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.16 (2.43)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			4.48*** (2.11)	
	Cities where government party candidate is not elected in 2012 mayoral elections				-4.48*** (2.11)
Difference in city per capita GDP averages from 2013-2014 to 2009-2011		-0.01 (0.07)	-0.01 (0.07)	0.06 (0.11)	0.06 (0.11)
Difference in city Firjan Development Index averages from 2013-2014 to 2009-2011		11.93 (29.10)	11.93 (29.10)	3.15 (26.66)	3.15 (26.66)
n		1392	1392	186	186
R^2		0.00	0.00	0.02	0.02

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2013-2014 to 2009-2011 and the difference in city Firjan Development Index averages from 2013-2014 to 2009-2011.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

4.7.17   Regressions Results, Southeast Region, 2006 and 2010 Presidential Elections

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.02* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.02* (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			0.72* (0.19)
n	1555	1565	1565
R^2	0,06	0,05	0,01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.04 (0.03)		
Government party percentage of votes in 2010 second round president elections		0.03 (0.03)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			1.79 (2.40)
n	1564	1571	1571
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.18   Regressions Results, Southeast Region, 2006 and 2010 Presidential Elections, Control Variables Added

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.02* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.02* (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			0.64* (0.19)
Difference in city per capita GDP averages from 2007-2009 to 2004-2005	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Difference in city Firjan Development Index averages from 2007-2009 to 2005	1.38 (0.88)	1.81*** (1.14)	3.18* (0.88)
n	1507	1516	1516
R^2	0,07	0,06	0,02

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2007-2009 to 2004-2005 and the difference in city Firjan Development Index averages from 2007-2009 to 2005.

 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.04 (0.03)		
Government party percentage of votes in 2010 second round president elections		0.03 (0.03)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			1.42 (2.42)
Difference in city per capita GDP averages from 2011-2013 to 2007-2009	0.00 (0.04)	-0.01 (0.04)	-0.01 (0.04)
Difference in city Firjan Development Index averages 2011-2013 to 2007-2009	-21.31 (17.42)	-25.02 (17.17)	-23.49 (17.28)
n	1561	1568	1568
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2011-2013 to 2007-2009 and the difference in city Firjan Development Index averages from 2011-2013 to 2007-2009.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.19 Regressions Results, Midwest Region, 2008 and 2012 Mayoral Elections

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	-0.23 (0.45)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.23 (0.45)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			0.20 (0.52)	
	Cities where government party candidate is not elected in 2008 mayoral elections				-0.20 (0.52)
n		356	356	220	220
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.85** (1.21)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.85** (1.21)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			0.32 (2.08)	
	Cities where government party candidate is not elected in 2012 mayoral elections				-0.32 (2.08)
n		531	531	53	53
R^2		0.01	0.01	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

4.7.20   Regressions Results, Midwest Region, 2008 and 2012 Mayoral Elections, Control Variables Added

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	-0.28 (0.45)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.28 (0.45)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			0.25 (0.52)	
	Cities where government party candidate is not elected in 2008 mayoral elections				-0.25 (0.52)
Difference in city per capita GDP averages from 2009-2011 to 2005-2007		-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Difference in city Firjan Development Index averages from 2009-2011 to 2005-2007		4.55 (2.51)	4.55 (2.51)	8.44*** (3.81)	8.44*** (3.81)
n		355	355	219	219
R^2		0,01	0,01	0,02	0,02

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2009-2011 to 2005-2007 and the difference in city Firjan Development Index averages from 2009-2011 to 2005-2007.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.84** (1.21)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.84** (1.21)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			0.90 (2.13)	
	Cities where government party candidate is not elected in 2012 mayoral elections				-0.90 (2.13)
Difference in city per capita GDP averages from 2013-2014 to 2009-2011		0.04 (0.07)	0.04 (0.07)	-0.22 (0.21)	-0.22 (0.21)
Difference in city Firjan Development Index averages from 2013-2014 to 2009-2011		0.59 (13.57)	0.59 (13.57)	-15.90 (26.60)	-15.90 (26.60)
n		530	530	52	52
R^2		0.01	0.01	0.02	0.02

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2013-2014 to 2009-2011 and the difference in city Firjan Development Index averages from 2013-2014 to 2009-2011.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.21 Regressions Results, Midwest Region, 2006 and 2010 Presidential Elections

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.05*		
	(0.01)		
Government party percentage of votes in 2006 second round president elections		0.06*	
		(0.01)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			1.27**
			(0.56)
n	572	585	585
R^2	0,12	0.10	0.01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.00 (0.01)		
Government party percentage of votes in 2010 second round president elections		0.02 (0.02)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			6.43* (1.61)
n	585	587	587
R^2	0.00	0.00	0.03

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.22   Regressions Results, Midwest Region, 2006 and 2010 Presidential Elections, Control Variables Added

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.05*		
	(0.00)		
Government party percentage of votes in 2006 second round president elections		0.06*	
		(0.01)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			1.17***
			(0.59)
Difference in city per capita GDP averages from 2007-2009 to 2004-2005	0.02***	0.02***	0.03**
	(0.01)	(0.01)	(0.01)
Difference in city Firjan Development Index averages from 2007-2009 to 2005	-1.71	-1.46	-1.77
	(2.03)	(2.04)	(2.15)
n	554	566	566
R^2	0,13	0,11	0,02

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2007-2009 to 2004-2005 and the difference in city Firjan Development Index averages from 2007-2009 to 2005.

 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.00 (0.02)		
Government party percentage of votes in 2010 second round president elections		0.02 (0.02)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			6.43* (1.61)
Difference in city per capita GDP averages from 2011-2013 to 2007-2009	0.01 (0.05)	0.01 (0.05)	0.01 (0.05)
Difference in city Firjan Development Index averages 2011-2013 to 2007-2009	13.28 (8.60)	13.90 (8.60)	13.35 (8.48)
n	583	584	584
R^2	0.00	0.01	0.03

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2011-2013 to 2007-2009 and the difference in city Firjan Development Index averages from 2011-2013 to 2007-2009.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.23   Regressions Results, Northeast Region, 2008 and 2012 Mayoral Elections

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	0.29 (0.25)			
	Cities where government party candidate is not elected in 2008 mayoral elections		-0.29 (0.25)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			0.28 (0.33)	
	Cities where government party candidate is not elected in 2008 mayoral elections				-0.28 (0.33)
n		1226	1226	452	452
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.33** (0.99)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.33** (0.99)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			-4.69 (3.51)	
	Cities where government party candidate is not elected in 2012 mayoral elections				4.69 (3.51)
n		1563	1563	134	134
R^2		0.00	0.00	0.01	0.01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

4.7.24   Regressions Results, Northeast Region, 2008 and 2012 Mayoral Elections, Control Variables Added

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	-0.40 (0.25)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.40 (0.25)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			0.28 (0.32)	
	Cities where government party candidate is not elected in 2008 mayoral elections				-0.28 (0.32)
Difference in city per capita GDP averages from 2009-2011 to 2005-2007		0.05* (0.02)	0.05* (0.02)	0.05 (0.04)	0.05 (0.04)
Difference in city Firjan Development Index averages from 2009-2011 to 2005-2007		3.76** (1.59)	3.76** (1.59)	2.76 (2.52)	2.76 (2.52)
n		1207	1207	447	447
R^2		0,01	0,01	0,01	0,01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2009-2011 to 2005-2007 and the difference in city Firjan Development Index averages from 2009-2011 to 2005-2007.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.35** (1.00)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.35** (1.00)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			-4.52 (3.55)	
	Cities where government party candidate is not elected in 2012 mayoral elections				4.52 (3.55)
Difference in city per capita GDP averages from 2013-2014 to 2009-2011		-0.11 (0.13)	-0.11 (0.13)	0.08 (0.17)	0.08 (0.17)
Difference in city Firjan Development Index averages from 2013-2014 to 2009-2011		-5.73 (11.62)	-5.73 (11.62)	9.83 (41.80)	9.83 (41.80)
n		1551	1551	134	134
R^2		0.00	0.00	0.02	0.02

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2013-2014 to 2009-2011 and the difference in city Firjan Development Index averages from 2013-2014 to 2009-2011.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

4.7.25   Regressions Results, Northeast Region, 2006 and 2010 Presidential Elections

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.02* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.02* (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			0.36* (0.13)
n	1669	1680	1680
R^2	0,01	0,01	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.03*** (0.01)		
Government party percentage of votes in 2010 second round president elections		0.03*** (0.01)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			1.36 (1.01)
n	1564	1493	1493
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.26   Regressions Results, Northeast Region, 2006 and 2010 Presidential Elections, Control Variables Added

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.01* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.02* (0.00)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			0.28*** (0.13)
Difference in city per capita GDP averages from 2007-2009 to 2004-2005	0.03 (0.02)	0.03 (0.02)	0.02 (0.02)
Difference in city Firjan Development Index averages from 2007-2009 to 2005	1.62 (1.33)	1.88 (1.32)	2.12 (1.33)
n	1612	1623	1623
R^2	0,01	0,01	0,01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2007-2009 to 2004-2005 and the difference in city Firjan Development Index averages from 2007-2009 to 2005.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.02*** (0.01)		
Government party percentage of votes in 2010 second round president elections		0.03*** (0.01)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			1.31 (1.02)
Difference in city per capita GDP averages from 2011-2013 to 2007-2009	0.00 (0.06)	0.00 (0.06)	0.00 (0.06)
Difference in city Firjan Development Index averages 2011-2013 to 2007-2009	-6.13 (7.42)	-5.86 (7.36)	-6.76 (7.34)
n	1469	1481	1481
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2011-2013 to 2007-2009 and the difference in city Firjan Development Index averages from 2011-2013 to 2007-2009.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.27   Regressions Results, North Region, 2008 and 2012 Mayoral Elections

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	-0.15 (0.49)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.15 (0.49)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			-1.00 (0.54)	
	Cities where government party candidate is not elected in 2008 mayoral elections				1.00 (0.54)
n		197	197	97	97
R^2		0.00	0.00	0.03	0.03

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	-2.07 (3.32)			
	Cities where government party candidate is not elected in 2012 mayoral elections		2.07 (3.32)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			4.88 (10.93)	
	Cities where government party candidate is not elected in 2012 mayoral elections				-4.88 (10.93)
n		247	247	53	53
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

4.7.28   Regressions Results, North Region, 2008 and 2012 Mayoral Elections, Control Variables Added

		Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	-0.10 (0.50)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.10 (0.50)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			-0.94 (0.57)	
	Cities where government party candidate is not elected in 2008 mayoral elections				0.94 (0.57)
Difference in city per capita GDP averages from 2009-2011 to 2005-2007		0.05 (0.08)	0.05 (0.08)	-0.04 (0.03)	-0.04 (0.03)
Difference in city Firjan Development Index averages from 2009-2011 to 2005-2007		4.87 (4.39)	4.87 (4.39)	10.80 (7.19)	10.80 (7.19)
n		193	193	92	474
R^2		0,01	0,01	0,08	0,03

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2009-2011 to 2005-2007 and the difference in city Firjan Development Index averages from 2009-2011 to 2005-2007.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

		Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011			
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	-1.35 (3.40)			
	Cities where government party candidate is not elected in 2012 mayoral elections		1.35 (3.40)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			2.33 (11.32)	
	Cities where government party candidate is not elected in 2012 mayoral elections				-2.33 (11.32)
Difference in city per capita GDP averages from 2013-2014 to 2009-2011		0.26 (0.59)	0.26 (0.59)	4.52 (2.45)	4.52 (2.45)
Difference in city Firjan Development Index averages from 2013-2014 to 2009-2011		69.16 (38.18)	69.16 (38.18)	111.15 (151.56)	111.15 (151.56)
n		242	242	52	52
R^2		0.02	0.02	0.09	0.09

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not. All models have as control variables the difference in city per capita GDP averages from 2013-2014 to 2009-2011 and the difference in city Firjan Development Index averages from 2013-2014 to 2009-2011.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

4.7.29   Regressions Results, North Region, 2006 and 2010 Presidential Elections

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.03**		
	(0.01)		
Government party percentage of votes in 2006 second round president elections		0.01	
		(0.01)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			-0.30
			(0.42)
n	232	297	297
R^2	0,03	0,01	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.08*** (0.04)		
Government party percentage of votes in 2010 second round president elections		0.00 (0.07)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			-3.89 (7.34)
n	297	299	299
R^2	0.01	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.30   Regressions Results, North Region, 2006 and 2010 Presidential Elections, Control Variables Added

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.02 (0.01)		
Government party percentage of votes in 2006 second round president elections		0.01 (0.01)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			-0.34 (0.48)
Difference in city per capita GDP averages from 2007-2009 to 2004-2005	0.04 (0.09)	0.04 (0.08)	0.04 (0.08)
Difference in city Firjan Development Index averages from 2007-2009 to 2005	-1.21 (4.28)	-0.63 (3.83)	-0.34 (3.83)
n	210	260	260
R^2	0,02	0,01	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2007-2009 to 2004-2005 and the difference in city Firjan Development Index averages from 2007-2009 to 2005.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.08 (0.04)		
Government party percentage of votes in 2010 second round president elections		0.00 (0.07)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			-3.92 (7.45)
Difference in city per capita GDP averages from 2011-2013 to 2007-2009	0.03 (0.16)	0.03 (0.16)	0.03 (0.16)
Difference in city Firjan Development Index averages 2011-2013 to 2007-2009	-4.15 (29.58)	0.63 (29.64)	1.14 (29.62)
n	291	292	292
R^2	0.01	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more. All models have as control variables the difference in city per capita GDP averages from 2011-2013 to 2007-2009 and the difference in city Firjan Development Index averages from 2011-2013 to 2007-2009.

Level of significance: *$p<0.005$; **$p<0.025$; ***$p<0.05$.

4.7.31   Regressions Results, RDD, 2008 and 2012 Mayoral Elections

| | | Difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007 | | | |
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections	-0.42 (0.23)			
	Cities where government party candidate is not elected in 2008 mayoral elections		0.42 (0.23)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2008 mayoral elections			-0.06 (0.26)	
	Cities where government party candidate is not elected in 2008 mayoral elections				0.06 (0.26)
n		384	384	350	350
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2009-2011 to 2005-2007. First two columns reffers to cities where the mayor from 2005-2008 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2008 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2005-2008 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities where government party elects in 2008 its candidates for mayor, and of model (4) is a dummy where it does not.

 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

| | | Difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011 | | | |
		Model (1)	Model (2)	Model (3)	Model (4)
Cities where previous mayor is not affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections	2.60 (1.72)			
	Cities where government party candidate is not elected in 2012 mayoral elections		-2.60 (1.72)		
Cities where previous mayor is affiliated to government party or its allies	Cities where government party candidate is elected in 2012 mayoral elections			-0.48 (2.24)	
	Cities where government party candidate is not elected in 2012 mayoral elections				0.48 (2.24)
n		2853	2853	378	324
R^2		0.00	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2013-2014 to 2009-2011. First two columns reffers to cities where the mayor from 2009-2012 period is not affiliated to government party or its allies. The independent variable of model (1) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (2) is a dummy where it does not. The last two columns reffers to cities where the mayor from 2009-2012 period is affiliated to government party or its allies. The independent variable of model (3) is a dummy for cities among those where government party elects in 2012 its candidates for mayor, and of model (4) is a dummy where it does not.

Level of significance: *p<0.005; **p<0.025; ***p<0.05.

4.7.32   Regressions Results, RDD, 2006 and 2010 Presidential Elections

	Difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2006 and 2002 second round president elections	0.04* (0.00)		
Government party percentage of votes in 2006 second round president elections		0.07* (0.02)	
Dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more			0.37* (0.13)
n	961	975	975
R^2	0,04	0,01	0,01

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2007-2009 to 2004-2005. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2006 and 2002 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2006 second round president elections. The independent variable of model is a dummy for cities where government party percentage of votes in 2006 second round president elections is 80% or more.

 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

	Difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009		
	Model (5)	Model (6)	Model (7)
Difference in percentage of votes for government party in 2010 and 2006 second round president elections	0.11 (0.02)		
Government party percentage of votes in 2010 second round president elections		-0.09 (0.14)	
Dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more			-0.15 (0.79)
n	1046	1051	1051
R^2	0.00	0.00	0.00

Notes: All models have as dependent variables the difference in Bolsa Família benefits averages from 2011-2013 to 2007-2009. The independent variable of model (5) is the difference in percentage of votes that government party obtains in 2010 and 2006 second round president elections. The independent variable of model (6) is the government party percentage of votes in 2010 second round president elections. The independent variable of model (7) is a dummy for cities where government party percentage of votes in 2010 second round president elections is 80% or more.

 Level of significance: *p<0.005; **p<0.025; ***p<0.05.

5   Conclusões

Os resultados revelam em primeiro lugar a existência de critérios políticos na oferta de crédito dos bancos públicos brasileiros no período estudado. De uma forma geral, quanto maior a votação do partido do governo nas eleições presidenciais em um município, maior foi o incremento na oferta de crédito dos bancos públicos nesta localidade. O mesmo não aconteceu com os bancos privados. Tais resultados são consistentes com os obtidos em pesquisas anteriores, como os de Dinç (2005) e Sapienza (2004).

Encontramos ainda uma relação significativa e positiva entre o lucro e o aumento da oferta de crédito. Emprestar mais gerou lucros maiores para bancos públicos e privados. No entanto, os retornos obtidos pelos privados foram superiores aos dos públicos ao ofertar mais crédito. Provavelmente estes últimos adotaram critérios ao concederem empréstimos que geraram problemas.

No segundo artigo, os resultados revelam que o crédito público influencia o desenvolvimento das cidades brasileiras. Os índices de desenvolvimento estudados (IFDM e IDH) evoluíram mais em cidades onde a maioria de suas operações de crédito vem de bancos públicos, mas menos em cidades onde a participação do crédito público aumentou após a crise de 2008. Esses resultados são os mesmos para macro e micro regiões brasileiras. Por outro lado, os resultados do PIB per capita não são conclusivos. Somente quando aplicamos nossos testes nas meso e micro regiões observamos um efeito positivo do aumento da participação do crédito público no PIB per capita das regiões.

Por último, no terceiro artigo, os resultados mostram a existência de influencia política na distribuição de benefícios do Bolsa Família. Encontramos evidências de que o partido do governo recompensou cidades que elegeram seus candidatos a prefeito em 2012, e também em cidades em que receberam mais votos nas eleições presidenciais de 2006. Por outro lado, não conseguimos identificar o mesmo padrão nas eleições para prefeito de 2008 e nas eleições presidenciais de 2010 (exceto para as regiões Centro-Oeste e Nordeste).

As principais limitações que enfrentamos se devem a disponibilidade restrita de alguns dados, notoriamente sobre os municípios brasileiros (como o IDH das cidades, só disponível no ano 2000). Outras informações, como o ndice de Gini, teriam nos ajudado a fortalecer nossas conclusões. Entretanto, elas não estão disponíveis anualmente para as cidades brasileiras. Como são coletadas somente quando o censo é feito pelo IBGE, a cada 10 anos, não pudemos incorporá-los a nossa análise.

Os dados bancários também não são adequados. Informações importantes como o Patrimônio Líquido de cada agência não estavam disponíveis na grande maioria dos casos. Também verificamos a existência de dados pouco críveis em alguns casos, principalmente

relacionados aos lucros.

Informações como as taxas médias cobradas por cada agência nos seus empréstimos em cada mês ou ano também teriam ajudado muito a fortalecer as conclusões deste trabalho. Seria igualmente relevante se houvesse um balancete de cada agência bancária, em que fosse possível analisar o seu resultado financeiro mensal/anual desmembrado em cada componente. Teria sido possível identificar com mais clareza problemas causados por créditos concedidos de baixa qualidade.

Igualmente relevante é explicar detalhadamente as metodologias adotadas no cálculo de índices como IFDM, IFDM e IDH, a fim de permitir aos pesquisadores selecionar melhor aqueles que melhor se ajustam aos seus interesses. Futuros desenvolvimentos em pesquisas neste campo dependem da disponibilidade desses dados.

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