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**HOLDING BRAZILIAN MAYORS ACCOUNTABLE: EVIDENCE
FOR RETROSPECTIVE VOTING IN BRAZILIAN SOCIAL POLICY**

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Report

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Dedication

I dedicate this report to my mother and father who have supported my intellectual growth, and curiosity, through the years.

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Abstract

Holding Brazilian Mayors Accountable: Evidence for Retrospective Voting in Brazilian Social Policy

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Notwithstanding convincing evidence of electoral returns associated with Brazil's non-contributory cash transfer program (*Bolsa Família*) captured at the national level in presidential elections, little empirical work has reviewed if program expansion translated into electoral returns for mayors, the key administrators of the flagship program that benefits 1 in 4 Brazilians. The results from the statistical analysis presented here reveal that, on average, adding eligible beneficiary families (what the study calls program performance) positively impacted reelection probabilities at the municipal level for incumbents in 2008. The political effect was mediated by the size of the program. That is, voters rewarded enrollment changes when a larger share of the total family population in a municipality participated in the program. Borrowing on theories of retrospective voting models developed in the United States, the paper explores conditions under which the scope of social programs engender retrospective electoral effects.

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INTRODUCTION

The central question advanced in this paper is whether a mayor's record of program performance in administering a highly popular cash transfer program impacts their reelection odds. I expand on prior research that points to the program's electoral effects of this highly popular program at the national level by using a municipal unit of analysis. In Brazil's federation of 27 states, municipal governments oversee many social programs that attempt to ameliorate poverty. The design of Bolsa Família, no different in this regard, relied heavily on the structure of federalist system to implement the program. In 2004, mayors in Brazil's 5,561 municipalities received a municipal target for the number of households that were considered eligible for participation in a cash transfers program, based on 1996 census data. The municipal governments, led by mayors, were then responsible for finding and enrolling households that were eligible for the program. Once enrolled in the program, transfers were directly sent to participants on an ATM debit card on a monthly basis by the federal government.

The design of the program put mayors at the forefront of this highly popular program. As Serguei Soares a leading researcher on Conditional Cash Transfers (CCTs) in Brazil argues, the municipality is the lifeblood of the Bolsa Família program (Soares 2012: 12) In order for the federal government to reach its target of 11 million families, set in 2002, mayors were responsible for identifying and enrolling low income families eligible to participate in Bolsa Família based on targets set by the Ministry of Social Development (MDS) (Fenwick 2009; 116).

Statistical models used to examine if mayors benefited from sharing the "day-to-day" operations of the this highly popular social program when the number of beneficiaries reached the peak of its expansionary period in 2008 show that net enrollment changes of families included in

the program by local government increased the likelihood that incumbent mayors were reelected. The implications of the local electoral effect in 2008, however, call for markedly different interpretations when juxtaposed with the widely cited effect of this program at the national level. Unlike former president Luiz Inácio Lula da Silva who was politically motivated to scale up the program in 2002 for his 2006 reelection bid, mayors participating in this process were simply meeting enrollment targets based on a neutral assessment of need from government officials in Brasília (Janvry et al. 2005, 2). In other words, Lula was rewarded for his efforts to expand the program, while the electoral effects explored in this report at the local level are inherently connected to program performance by local government.

In this vein, the argument made for local electoral effects is framed within in an analysis of retrospective voting. In the broadest of terms, this brand of political science scholarship is devoted to understanding the relationship between votes and voter evaluations of incumbent's performance in office (Fiorina 1981; Downs 1957; Key 1966). And with good reason: democracy certainly benefits from regular elections, but stronger democracies benefit from elections where voters utilize a fleeting political moment to hold politicians accountable for their performance in office.

In the first known analysis of retrospective voting in single-function elections for local office in the United States, Berry and Howell (2007) argue that the foremost challenges facing theories of retrospective voting fall around empirically demonstrating that a voter's calculus is built on information from a relevant performance outcome, and that the outcome must be associated with the incumbent who oversees this program (847). Because Mayors sit at the gateway to participation in the Bolsa Família program, municipal enrollment changes represent a robust, indicator of performance that is experienced by each enrolled (or excluded) family. Simply

establishing that the link between a political office and program responsibility has been conceived by the electorate, however, is not fully satisfactory for an analysis of retrospective voting. Even if citizens are aware of which elected officials are responsible for certain programmatic outcomes, they must first be concerned about such outcomes and, more importantly, have access to information that enables them to vote retrospectively. Berry and Howell expressly devote the majority of their analysis of school board elections in South Carolina to information provision. In their own words, to the extent that there is retrospective voting at all, “it critically depends on the volume, tone, and sources of information that voters have about recent change in the relevant domains of public life” (845).

Ultimately, the question of how program information is incorporated into voter evaluations is empirical (Berry and Howell 2007, 848). The analysis in this paper demonstrates that Bolsa Família’s rapid growth rate and high levels of national enrollment changes create a political effect when the size of the program in a municipality is taken into account alongside with performance indicators. For eligible families, information based on direct personal experience with access to the program vis-à-vis enrollment changes is a byproduct of a mayor’s enrollment performance (i.e. enrolling qualified families in the program). In municipalities where Bolsa Família is heavily represented, larger shares of voters are concerned about inclusion performance and therefore more likely to weigh performance in this program along with other considerations when casting votes.

An extension of the same statistical analysis in the subsequent electoral period, when enrollment rates slow, bolster the claim that experience based information with respect to enrollment contributes to retrospective voting in Bolsa Família. From 2008 to 2012, mayors continued expanding the program to participants not yet enrolled after initial efforts to connect families to the program. Because the number of new families entering the program was relatively

small in the second electoral cycle in the analysis, given the aggressive inclusion efforts between 2004 and 2008, the relative change in enrollment was modest. Because fewer families had to register with local government and the benefits now came exclusively from Brasilia, the one-time benefit of being at the forefront of the program significantly diminished. In fact, it is not present in this period at all.

To the author's knowledge, this paper offers the first analysis of local electoral effects over the life of the program (2004-2012) for the entire country. The assessment addresses two extant gaps in the research on cash transfers in Brazil and retrospective voting. With respect to the former, given Brazil's high levels of decentralization and the key role municipalities play in this program, the story of electoral effects is incomplete if the political officials largely responsible for the program's ability to reach the families in need are left out of the analysis. Far from being a one-off clientelistic exchange, the results presented here indicate that the electoral effect observed in program expansion is a sign of support for good governance and lacks the political motivations that dominate conclusions drawn from research that has covered this program in presidential elections.

At a more theoretical level, the findings offer an extension of local retrospective voting models developed in the United States by demonstrating that in the absence of reliable and regular program outcome reporting in traditional media outlets, under certain conditions, information from personal experience in a program is readily drawn on to evaluate local program performance. Information drawn from reputable media sources may very well be appropriate for analyses of retrospective voting in local elections in the United States. However, experienced based retrospective voting enables us to explore these issues in settings where access to program information is lacking or where it is sparsely covered, such as many places in the developing world.

If the sum of voter experiences with a particular program are large enough to reward or punish politicians' performance surrounding a policy in a voting district, then information drawn from experience in a program holds promise of being an indicator for past performance in retrospective voting models.

The paper is divided into seven sections. It begins with a brief description of the program along with a justification for extending the analysis of the program's electoral effects to local elections. In the second and third sections, the general theory of local retrospective voting is introduced and discussed in the context of Bolsa Família, along with the data used in the study to analyze these questions. The fourth and fifth sections of the paper articulate hypothesis statements and model specifications and methods used to address the main research questions. A discussion of results in the sixth section is presented before concluding.

Bolsa Família at the National and Local Level

By 2009, more than twenty developing countries began adopting a new experiment in social policy known as Conditional Cash Transfers (hereafter CCTs). CCTs are unique in that pre-identified beneficiaries, based on per capita poverty thresholds, receive transfers conditioned on such behaviors as school attendance for children and pre-natal health clinic visits for pregnant women. Elevated optimism surrounding successful outcomes for program participants has produced a vast number of studies to better understand the dynamics of social policy's new "magic bullet" that spread from Latin America to 150 million low income households around the world in less than 20 years (Adato and Hoddinott 2007, 42).

Brazil's Bolsa Família, the largest and most well-known CCT, has been at the center of this academic research since the program first appeared in 1995 as an experimental city-level cash

transfers initiative in Campinas, São Paulo and Brasilia. Although program requirements and values of the transfers have been adjusted as the program evolved, it focuses on two types of families (Hall 2009, 4): the first group includes families with self-reported monthly income per capita up to 140 reais (\$62 USD). Families in this income category receive cash transfers that vary according to number of children and pregnant and nursing women per household. For children, families receive 32 reais per child for up to five children under the age of 15. The families receive an additional 15 reais for pregnant women in the household. The second group targeted in the program, classified as the “extreme poor,” receive the same variable benefits, but are also entitled to a 70 reais monthly transfer independent of the number of children present in the household.

In return for cash assistance, families must adhere to two conditions. First, all school aged children (7-17) must attend school. Attendance records, monitored by the municipality, must be above 85 percent. Children up to the age of 7 must be vaccinated and attend nutritional development check-ups throughout the year. Pregnant women are also required to complete pre and post-natal visits and attend health and nutrition seminars (Fiszbein et al. 2009, 37). Compliance with conditions is monitored by health centers and schools who report records to *Caixa*, the government bank which authorizes a monthly electronic transfer to a debit card held by the female head of household.

Numerous impact assessments of Bolsa Família show the program’s impressive impacts on poverty and inequality. The program is considered to have significantly reduced high levels of inequality in Brazil. By some estimates, the program alone is responsible for 25-30 percent of the drop in Brazil’s Gini coefficient between 2004 and 2006 (Soares 2012, 20). In reducing poverty, the program has performed equally well. For those families classified as living in extreme poverty,

Soares et al. (2011) show that monthly transfers from Bolsa Família reduced the incidence of extreme poverty by almost 25 percent.

Following up on the success Bolsa Família has had in ameliorating poverty and reducing inequality, scholars have turned to question the political dimensions of a social program that benefits one in four of all Brazilians. Social policy, as Hall notes in his review of Bolsa Família, is inherently political (Hall 2012, 7). Given such drastic economic improvements for low-income Brazilians, and the speed with which this program took off, this body of research has focused on the potential electoral effects of Bolsa Família. That is, the extent to which Bolsa Família strengthens the political positions of incumbent politicians (Hall 2012, 31).

Prior research on Bolsa Família emphasized two observations. The consensus among most scholars is that the expansion of the program in 2006 was directly related to Lula's reelection in 2006. Irrespective of methods used in different analyses, including standard regression, public opinion survey data, spatial statistical analysis, all studies indicate a statistically significant relationship between Bolsa Família and voting behavior (Soares 2012; Marques et al. 2009; Nicolau and Peixoto 2007; Soares and Terron 2008). Hunter and Power (2007), for example, argue that in addition to overcoming an onslaught of corruption scandals leading up to the election, and steering the economy towards high growth, Bolsa Família was "arguably the single most plausible explanation" for Lula's reelection in 2006 (20). Precisely because the north and northeast regions of Brazil rank low on indicators of human development, relative to Brazil's more developed southern regions, the success of the program in these regions, the authors argue, helped Lula secure 65-80 of all valid votes for these states (4). Beyond the northeast, the article reveals how closely linked voter preferences for Lula reflected the extent of program coverage. At the state level, their analysis reveals that the share of families covered by Bolsa Família was highly

correlated (.62) with all valid votes casted for Lula in 2006 (19). Zucco (2011), taking a slightly different approach, reviews the impact of the electoral effect of Bolsa Família by examining the size of the program and expenditure levels of the transfers. With respect to program size, he finds that as the scope of the program expands, or simply, as the percentage of beneficiary families increases in a municipality, the incumbent vote share increased by almost a fifth of a percentage point in 2006 (16).

All studies share an exclusive focus on the impact that scaling up the program had in Lula's presidential bid in 2006.¹ Under Lula's initiative, the program rapidly added 7 million households between 2002 and 2006. The magnitude of expansion and speed with which Lula scaled up the number of beneficiaries is indeed impressive. The graph in Figure 1 (See appendix Figure 1) shows the exponential degree of program expansion achieved in less than three years.

For Lula, the move to integrate all sub-national programs into one national program had several strategic advantages. Coming into office, Lula made three campaign promises, that according to public opinion polls, voters felt strongly he would accomplish in his four year term. They included alleviating poverty, hunger and misery; promoting job growth; and, raising the minimum wage (Fenwick 2009, 106). Shortcomings in social programs, such as *Fome Zero* (Zero Hunger), in Lula's first two years in office elevated the stakes for his administration to find a cost effective strategy to gain traction on the country's pressing social challenges before elections were held again in 2006 (Hunter & Power 2007, 19). Accomplishing this would not be easy. High levels of party fragmentation and decentralization, two characteristics of Brazil's democracy, make it hard for presidents to form coalitions and govern according to their policy preferences (Fenwick 2009, 107; See Ames 2008).

¹ Zucco (2011) also reviews the electoral effect at the national level in 2002 and 2010.

By integrating all sub-national programs into Bolsa Família, and relying on the constitutional authority of municipalities to administer poverty and social assistance programs, the Lula administration was able to successfully eliminate interference from state governments and bypass a complex landscape of executive-legislative relations that have traditionally hinder the policy process in Brazil (Fenwick 2009, 35).

At the same time consolidation helped the Lula administration achieve its ambitious social policy objectives, federal-local collaboration empowered local governments. The change was experienced in two distinct ways. First, consolidation of all cash transfers under Bolsa Família leveled the financial playing field for municipal governments. Until 2003, CCTs were largely financed by state funds, when states could afford to do so. In the wake of the high inflationary period of the mid 1990s, high levels of sub-national debt put severe constraints on the ability to finance such programs. (Fenwick 2009: 112).

Next, and most important for this analysis, the design of the program put mayors at the forefront of this highly popular program. As Serguei Soares one of the program's a leading researcher on CCTs in Brazil argues, the municipality is the lifeblood of the Bolsa program (Soares 2012, 12) For the expansion presented in the graph in Figure 1 (see appendix Figure 1) to have taken place, municipal agents of Bolsa Família, led by mayors, were identifying and enrolling low income families eligible to participate in Bolsa Família based on targets set by the Ministry of Social Development (MDS). Municipalities quickly responded to the opportunity to participate in the new national program and by 2006 all of Brazil's 5,564 municipalities became full participants in the program (Fenwick 2009, 116).

Various administrative decisions made by municipal governments, however, can result in different performance outcomes. Examples include the way in which registration into the Cadastro

Único (Brazil's social registry) is carried out (e.g., the location, scheduling of interviews; selection and training of interviewers and supervisors; use of technology, etc.); the reliability of information collected in the monitoring of conditionalities; the existence and functioning of social controls councils (SCCs) which are support organizations used during the enrollment phase; and (4) the use of complementary programs outside of Bolsa Família to assist families receiving the transfers (Lindert et al. 2007, 30). Reflecting on implementation and the tremendous range in administrative capacities and decisions that affect enrollment efforts, Lindert et al. (2007) conclude:

With these sources of heterogeneity – combined with differing administrative and financial capabilities as well as variance in political will and commitment to the program across municipalities – there will always be a spectrum for the quality of implementation, ranging from high to low performers (30).

This paper examines such differences by considering if votes fall in line with better performance in enrollment. To what extent did mayors benefit politically from sharing “day-to-day” operations of this highly popular social program when the number of beneficiaries reached the peak of its expansionary period in 2008 and again when expansion rates attenuated as the program reached saturation in 2012? The questions are explored through an analysis of municipal election outcomes and program performance in statistical models introduced in the next sections. Before proceeding to empirical tests, the paper reviews how performance based information is theoretically accounted for in the models by returning to core components of the retrospective voting framework introduced above.

Local Elections and Retrospective Voting

Berry and Howell (2007) offer convincing empirical evidence of how information on district level pupil achievement is processed in voter evaluations of incumbent school board members in school board elections in South Carolina in 2000. In particular, they show that when local newspapers devote significant coverage to learning trends, a positive relationship between student learning and incumbent's reelection chances presents itself. On the other hand when media coverage declines, the empirical evidence for retrospective voting is absent. The strength of their work lies in their ability to focus on incumbent performance in single function elections (i.e. a position responsible for a single public process or program), thereby weeding out competing voter motivations such as party politics or likeability. They are also able to review information from media outlets, such as local newspapers, that relayed performance outcomes on school board members to the public.

In Brazil, and in most countries, mayors do not meet the single function criterion that facilitates the ease of analyzing single-function political offices and elections. Nevertheless, municipalities in Brazil enjoy high degrees of fiscal and executive policy autonomy, making mayors influential actors in politics in Brazil's federation of 26 states. Part of their executive autonomy comes from constitutional powers vested in local government through laws such as the Organic Law of Social Assistance (LOAS No. 8.742, December 1993)² which attributes the execution of all programs confronting poverty to municipal governments. While mayors oversee a good deal of other municipal projects including basic education, and small to medium sized infrastructure projects, social programs are a policy area that they have devoted significant administrative efforts towards since Brazil returned to democracy in 1985.

² In Portuguese: *Lei Organica da Assistencia Social*

With respect to responsibility in the Bolsa Família program, it is clear that enrollment is the Mayors' most visible and important task. Although funding for Bolsa Família comes from Brasilia, municipal governments, led by mayors, control the registration of potential beneficiaries onto the central database from which automated monthly payments are made. Although performance outcomes related to enrollment and implementation cannot completely rule out other competing factors in an election that sway votes, it offers a strong empirical link for an assessment of retrospective voting in political offices that complicate the single function approach by looking at responsibility in one program that is readily identified by the public. For other factors that compete with performance based voting, standard control variables are introduced.

Some scholars contend that an analysis of mayoral performance in Bolsa Família should extend beyond enrollment. Janvry et al. (2007) adopted this approach in their work on electoral incentives for Bola Escola, the cash transfer program focused on reducing school dropout rates that preceded Bolsa Família. Despite a sophisticated econometric analysis, the authors are unable to justify why the appropriate explanatory variable to assess performance in a cash transfer program should be school dropout rates in their analysis of program performance and retrospective voting in 261 municipalities in the northeast of Brazil. The reporting cycle for adherence to the attendance requirements for participants begins with teachers sending monthly attendance records to the secretary of education, and ends with local governments enforcing penalties such as suspensions for conditionality transgressions, which in reality is very rare (Lindert et al. 2007; 55). In Bolsa Escola, teachers, the ministry of education, and Caixa, the national bank that administers the automated payments to participants, work in conjunction with mayors to administer this component of the program. It is clear that mayors are fairly far removed from the direct responsibility of the educational component of the Bolsa Escola, which was later incorporated into

Bolsa Família. Not only is it harder to untangle administrative responsibility of school enrollment for this program, it could be that the cash incentive is having its intended effect. In other words, Mayors are facilitators of increased school enrollment, but not ultimately responsible for intra-household decision making that has been altered as a result of an influx of monthly cash incentives.

At an even more basic level, Javry et al. (2007) make questionable assumptions about the electorates' interest in public education outcomes related to Bolsa Família. It makes intuitive sense that voters would care about dropout rates. Research by Bursztyn (2011) on revealed preferences of redistributive spending in Brazilian municipalities through survey experiments, however, indicates that between cash transfers and spending in public education, low income voters in Brazilian municipalities presented with experimental information shocks prefer policies that provide immediate assistance over increased spending on public education. While this does not affirm that voters don't care about school dropout rates, since it is a separate issue altogether, it shows that beyond participation, votes don't conform to the program's desired outcomes such as human capital gains addressed through attendance requirements.

The models utilized here begin the simple assumption that families who are qualified for the program prefer to receive assistance. With this fundamental interest in the program among voters, I then extend performance evaluations to incumbent mayors who have the legal mandate to enroll qualified families to receive assistance.

After establishing a link between program responsibilities and the correct political office, it is necessary to understand how performance information from this link is obtained, when it becomes salient, and , identify how performance information is placed on the causal pathway of voter evaluation. Berry and Howell (2007) stress that mediated information, rather than extrapolations from personal experiences, what is referred to in the literature as unmediated

information, is better suited to demonstrate the causal processes of retrospective voting in local elections. The authors do, however, cite the potential weaknesses of mediated information sources such as newsprint, and local media. Above all, it cannot be assumed that all voters have access to mediated information covering outcomes (848). As a complement to formal mediated information used in retrospective voting, the authors postulate that unmediated information can substitute information gaps where formal mediated performance outcomes are not present (848).

Brazil, compared to other countries with comparable per capita income levels, has the lowest levels of newspaper penetration in the world (Ferraz and Finan 2007, 709). For example, newspaper coverage only reach about 42 copies per 1000 habitants. Instead, local radio has become the central source of information on local politics in Brazil since the mid-1980s. Although radio offers an important link between politics and the electorate in the absence of newspapers, whether or not it functions as a disinterested medium between society and politics has been called into questioned by Boas and Hidalgo (2011). The authors contend that since the federal government added community radio to its regulatory responsibility in 1998, local political bosses who have acquired licenses for community radio shows by the ministry of communication in non-competitive processes, benefit electorally from favorable coverage of what may be the only source of information reporting on local politics (870).

Given the dearth of newsprint sources, as well as the high potential for political control of local radio stations in Brazil, the most reliable source of information on Bolsa Família's performance, then, is based on direct experience with the program. Berry and Howell (2007) warn against an unmediated approach namely because of the possibly that voters using personal experience can err in trying to assess political performance for the municipality as a whole. That is, if a poor family is wrongfully excluded from the program, their negative evaluation of

performance may not fit with the mayor's better than average enrollment efforts overall in a given municipality. To get around this, the paper looks at program performance with respect to program size. If poor performance is punished where the program affects larger numbers of families, then experiences match performance reality. In other words, voters are correctly voting against underperformance in a program that has meaningful negative consequences in their voting district.

Election & Program Performance Data

The dependent variable (election outcomes) as well as several independent variables such as percent vote share, campaign expenses, party affiliation, age, education and marital status of each candidate are drawn from data reported by the Superior Electoral Court (TSE) covering local elections in Brazil in 2000, 2004 and 2008 2012.³ Independent variables covering municipal characteristics were acquired through the Ministry of Social Development's (MDS) portal for Management and Evaluation of Information (SAGI).⁴ Information on GDP and GDP per capita, federal transfers, population characteristics are all reported at the municipal level by year. A summary table of descriptive statistics, including municipal controls not mentioned here, is found in the appendix (see Table 1.2).

Key explanatory variables used to estimate program performance were taken from summary statistics of Brazil's yearly household survey (PNAD) reported on the SAGI portal online. Municipal coverage for the program is derived from base line estimates for municipal program eligibility set by MDS using census data compared to all participating families.

³ Information taken on elections in 2000 is needed to track mayors eligible for reelection in 2008. Because the analysis centers on incumbents, I exclude mayors constrained by the two term constitutional limit in 2008 (those who won in 2000) from the analysis.

Following Zucco (2011) in his article on the national electoral effect for Bolsa Família, to measure program size I added the number of beneficiary families for each municipality and divided this number by the total number of families in that municipality. Although an imperfect measure of size, this variable is a good proxy of the potential political salience a program can have when it is weighted by the number of its beneficiaries.

Hypothesis Statements

Responding to the widely reported positive electoral effect of Bolsa Família in 2006, the primary hypothesis of this paper is that higher relative enrollment changes, driven by local government, are expected to increase the reelection odds of incumbent mayors who administered Bolsa Família between 2004 and 2008. I expect the electoral effect to be further conditioned by the size of the program in the municipality. That is, program expansion is politically powerful when the municipality has a larger proportion of Bolsa Família beneficiaries. This condition is accounted for through the use of an interaction term between program size and the relative expansion of the program in four years.

Hypothesis 1: As the relative change in enrollment between 2004 and 2008 increases at the municipal level, the probability that incumbent mayors are reelected in 2008 is expected to increase when the share of families participating in the program is large relative to the total family population.

In 2012, when enrollment slows after most eligible families have joined the program, information that connects voters to mayoral performance is present for fewer families among the electorate. That is, experience in program performance is reduced to few families not yet enrolled making performance in this program less salient for mayoral elections as the program has matured. As such, I expect no political payoff for enrollment changes.

Hypothesis 2: The relative change in enrollment between 2008 and 2012 will have no effect on the probability that incumbent mayors are reelected in 2012.

Enrollment captures one dimension of Bolsa Família's electoral effect. In addition to looking at new recipients vis-à-vis enrollment indicators, I also examine how the enforcement of program conditions affected reelection odds. In each assessment period, families that do not meet the conditional requirements for the program are identified. The failure of meeting education conditions arise when attendance for children of participating families falls below 85 percent. Families are reported as failing to meet the health conditions set out in the program when children less than 7 years old fail to provide up to date vaccine booster reports or when pregnant women do not attend pre-natal visits in local health clinics.

In theory, benefits are withheld until local social workers approve a family's re-admittance into the program. Some argue that the enforcement of program conditions is soft because most mayors are reluctant to punish non-compliance (Javry et. al 2005: 05). For those mayors who do more vigorously apply program conditions, this paper examines whether enforcement of program conditions is rewarded when they stand for re-election. If "good governance" is really driving the electoral effect of cash transfers, then the number of program suspensions should also increase election odds. In other words, good governance should be rewarded for two administrative components of the program: implementation and regulation.

Hypothesis 3: The enforcement of program conditions, a proxy for engagement and administrative competency in the Bolsa Família program, should increase reelection odds for incumbent mayors in both periods.

Model Specification and Methods

The dependent variable is limited to two outcomes of an election where $Y=1$ for a reelection and $Y=0$ for a loss at the polls. The model in equation 1.1, estimated with a logistic regression by Maximum Likelihood Estimation (MLE), takes the following form:

(1.1)

$$P(Y_i = 1) = \gamma_0 + \gamma_1 W_i + \gamma_2 Z_i + \gamma_3 T_i + \gamma_4 Z * T_i + \gamma_5 X'_i + u_i$$

Where the left hand side of the equation is the probability of reelection, $Y=1$, in 2008 and 2012. The probability of winning is expressed as function of four policy variables W , Z , T , $Z*T$ and X , a matrix of covariates relating to each candidate as well as municipal characteristics previously discussed in the section above. Where W is a dummy variable for the number of benefit cancellations/suspensions for school and health condition violations, Z is the relative expansion of enrollment over four years, T captures the size of the program, and $T*Z$ is the interaction effect that measures the impact of enrollment expansion when the size of the program is taken into account.

Data limitations that arise from incumbents elected in 2004 that opted out of a reelection bid in 2008 ($N=1153$), and candidates elected in 2008 that did not stand for reelection in 2012 ($N=1,035$), make estimations of equation 1.1 on only those incumbents who opted to stand for reelection in 2008 ($N=2801$) and 2012 ($N=2,112$) prone to a sample selection bias. In this case, because the missing data falls on our outcome variable, the decision not to rerun potentially poses a sample selection bias that might influence the true significance and or magnitude of the policy variables with respect to reelection odds. There may be underlying characteristics, or patterns,

among incumbent non-candidates (herein retirees) that force performance coefficients to over or underestimate election outcomes when they are removed from an equation that is making statements about the entire population of mayors.

To account for a potential selection effect, equation 1.1 is estimated on two different dependent variable structures in order to determine the extreme upper and lower bounds for the explanatory variables' impacts on reelection odds.

Dependent Variable Structure 1:

$$P(Y_i = 1) = \gamma_0 + \gamma_1 W_i + \gamma_2 Z_i + \gamma_3 T_i + \gamma_4 Z * T_i + \gamma_5 X'_i + u_i$$

$$Y_i = \begin{cases} 1 & \text{Winners} \\ 0 & \text{Losers/early retirees} \end{cases}$$

Dependent Variable Structure 2:

$$P(Y_i = 1|W_i = 1) = \gamma_0 + \gamma_1 W_i + \gamma_2 Z_i + \gamma_3 T_i + \gamma_4 Z * T_i + \gamma_5 X'_i + u_i$$

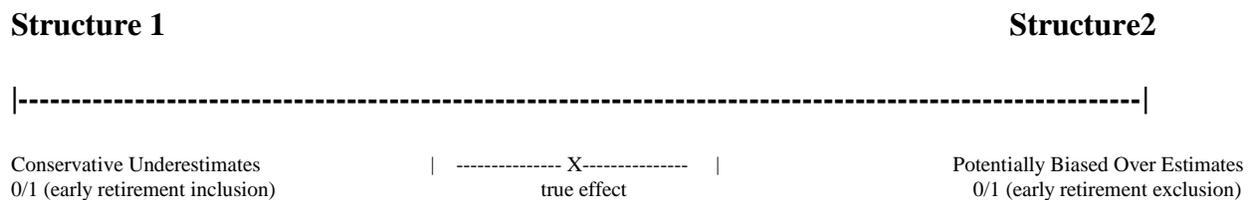
$$W_i = \begin{cases} 1 & \text{incumbents who rerun} \\ 0 & \text{incumbents who retire} \end{cases} \quad \text{And} \quad Y_i = \begin{cases} 1 & \text{Winners} \\ 0 & \text{Losers} \end{cases}$$

Structure 1 combines all early retiree incumbents into the $Y_i = 0$ outcome along with incumbent mayors that ran and actually lost. Therefore, the logistic regression is estimated for all mayors in 2008 that did not face term limits (N=3,755) and (N=3,147) in 2012, including mayors who didn't run. Under this condition, the model assumes that regardless of performance on Bolsa Família, the mayor that chose early retirement would have lost the election had she entered the race in 2008 or 2012. This procedure forces the estimates of policy variables to be on the extreme lower end of the true effect on election outcomes in both periods. This procedure allows the retired incumbent outcomes to be included in the model without biasing the estimates of

Bolsa Família policy variables upwards. The key advantage of estimating the model (equation 1.1) on this dependent variable structure is that if the policy variables indicate the right sign and achieve statistical significance, then the conditional hypothesis is correct and potentially underestimated with a set of very strict assumptions.

Whereas the estimation with Dependent Variable Structure 1 automatically penalizes every non-incumbent by assigning them to the 0 outcome to fully account for any selection effect, Dependent Variable Structure 2 allows the selection effect to be present by excluding outcomes from retirees in the model. The procedure with the second structure relaxes all assumptions (i.e. it ignores the effect of selection if present) and produces the extreme upper bounds for the policy coefficients on election outcomes. Thinking visually about the true effect of policy variables on a continuum, Figure 1.1 identifies the two estimation techniques and the extreme upper and lower bounds of our coefficient estimates. In addition to the technique explored here, the appendix offers a second method wherein a Heckman selection procedure is used to correct for the potential selection bias in early incumbent retirement (see appendix: Heckman Procedure).

Figure 1.1: Range of Policy Coefficient Magnitude



Discussion of Results

The results reported in the appendix in Table 1.3 that compare the electoral effect under two different data structures discussed above, largely mirror Bolsa Familia's electoral effect widely reported at the national level in the 2006 presidential elections. The policy variable estimates confirm that in 2008, mayors who expanded the program during their four year term in office were rewarded at the polls when the number of family beneficiaries represented a large portion of the total municipal family population. This is shown with respect to the interaction term *Program Size and Program Enrollment Change*. The conservative lower bound coefficients show that expansion efforts increased reelection odds by 12% in Model 1. In Model 2, where the selection bias is not treated, the odds of reelection climb to 15%. For Model 3, when the most recent electoral cycle in 2012 is examined, policy variables, as hypothesized, lose their significance. With some certainty, the results indicate that under certain conditions, a mayor's effort to expand enrollments has positive electoral effects. In addition to enrollment indicators, the results also indicate that electoral rewards were significant and positive when mayors enforced the program's conditions.

Working under the assumption that selection is present but not strongly influencing our variables of interest, the rest of the analysis focuses on interpreting logit results from Table 1.3. The empirical contribution from the models and interpretation of these results with support from survey data are explored in turn.

Turning to the variables of interest, it is worth noting that across all models, increased enrollment alone is found to reduce reelection probabilities for all three estimations in Table 1.3. This seemingly contradictory result, in fact, gives strength to the decision to interact this variable with program size. To put it simply, program expansion was hypothesized to have an impact given

that the program was large, relative to the size of the municipality. If expansion reached 120 percent during a mayor's tenure, but the absolute expansion only meant that beneficiary families jumped from 10 to 22, one would not expect much of an electoral effect in a municipality of 3,000. In this instance, the magnitude of non-participation would drown out the electoral effect for enrollment performance.

To gauge the impact of unit changes in this variable, Table 1.4 found in the appendix (see appendix Table 1.4: Reelection Probabilities and Enrollment Changes for Top enrollment and No enrollment 2004-2008) shows the predicted probabilities of reelection for mayors in the top 5 percent of enrollment performance compared to mayors who did not expand the program at all during their four year term. The comparison is done by holding the size of the program at quintiles of family representation in a municipality constant. For mayors who failed to expand the program (i.e. no net enrollment change between 2004-2008) when the number of families participating in the program is large relative to all families in the municipality (80 to 100 percent), mayors are 4 percent less likely to win a reelection compared to mayors who fail to enroll families when the program has a smaller presence in a municipality (20 to 40 percent).

Turning to mayors in the top 5 percent of program enrollment (i.e. a 300 percent enrollment change), the inverse occurs: mayors who are able to extend the program to more families in municipalities where the program is large relative to the total family population (80 to 100 percent) have slightly higher predicted probabilities compared to mayors who achieve equally large enrollment changes in municipalities where program participation is low. On balance, the policy coefficients were fairly small and outsized by explanatory variables such as vote capture coming from the prior election. Given the myriad of competing factors that explain election outcomes, this is an impressive result.

Expectations that strong program enforcement would yield electoral benefits were strongly met. Program suspension, cancellations and warnings for the final reporting period before the 2008 election strongly increased the probability that a mayor would be reelected. Point estimates reveal that in each increasing quartile of repercussions reported, mayors have higher odds of winning. Mayors falling in the top quartile of repercussion enforcement, for example, were 86 percent more likely to be reelected. If the positive coefficients for program enrollment efforts interacted with program size measure one end of the electoral effect, the positive impact of enforcement measures demonstrate that citizens rewarded mayors who were actively engaged with the program.

Insights drawn from this effect should be balanced by the likelihood that enforcement variables are most likely related to levels of local government engagement and proficiency. Meaning, high enforcement is likely a sign that the government is active in other areas of public life that voters are aware of and responding to. In addition, it is unclear how reliable information coming from this variable is given that reporting across municipalities is not uniform. While municipalities reporting the least number of enforcement actions in the September 2008 reporting period ranged from 0 to 4, the upper quartile reported between 60-800 repercussions. Nevertheless, these results indicate that the electoral effect is multidimensional. Where mayors do report, the effect was not only about connecting qualified citizens, but politicians benefited from having an active presence in administering the more sensitive components of the program. Despite meeting expectations for hypothesized impact in 2008, in 2012, program enforcement lose significance in the models in table 1.3. Unlike enrollment, this aspect of program administration continues to be important as it applies to all families each year. The novelty of the program could have explained voter attention to enforcement in the first period that wears off after the program and adherence to program conditions becomes routinized.

Survey data analyzed by Zucco (2011) with program participants and non-participants in Bolsa Família in 2006 lends further support to the results reported above. Zucco examines voting behavior between recipients and non-recipients of Bolsa Família in the 2006 presidential election. He finds that among the program's poorest voters, the probability of voting for Lula increased by 32 percent as function of participation in the program. The probability is slightly less, but still highly significant, for families living just below the program threshold for participation. While the assumption that participants vote for more favorably for incumbents overseeing the program is built into models above, the survey data gives concrete evidence that participation is tied to the vote.

The survey data also sheds light on an interesting dynamic that could be explaining how program size moderates the salience of program performance by considering non-participants. To test the effect of a potential redistribution backlash by non-beneficiaries, Zucco used the same survey data to match non-beneficiaries who knew at least one beneficiary to non-beneficiaries who did not know a program participant on a set of socio-demographic indicators. The analysis revealed that non-beneficiaries who knew a program participant were 18 percent more likely to vote for Lula in 2006 (15). In the same study he also examines the backlash effect by matching non-beneficiaries where Bolsa Família had high rates of participation, with their non-beneficiary counterparts in municipalities where program participation was low. The results show that higher program coverage at the municipal level increased the probability of the non-beneficiary vote for Lula by 30 percent (Zucco 2011; 24). In addition to participants who benefited economically supporting program performance, Zucco concludes that the electoral support is driven, in part, by a "solidarity effect" between non-beneficiaries and participants that leads non-recipients to factor program performance into voting. While municipal level survey data on mayoral elections would

be needed to adopt the solidarity argument wholesale, it is clear that program size is important but instead of being tied solely to participant evaluations of performance, a community level awareness of performance outcomes might also explain retrospective voting in municipalities where participation is high.

Conclusion

This paper has examined an important gap in the political analysis of one of the most popular innovations in social policy in the developing world. In the context of Brazil's Bolsa Família, several scholars have reviewed the political dimensions of this program. Their analyses have been restricted to the one-time electoral effect that expanding the program had for President Lula in 2006. Taking into account Brazil's highly decentralized federalist government, this paper considers how incumbent mayors fared in reelections as a result of their integral role in enrolling residents and administering this program. From my analysis, two conclusions emerge.

The primary question asked in this paper is whether enrollment expansion improves reelection odds for incumbents. The results from the statistical analysis reveal that, on average, adding eligible beneficiary families positively impacted reelection probabilities at the municipal level for incumbents in 2008. Further, this political effect was mediated by the size of the program in the municipality. When the program has low coverage, the salience of program performance is most likely replaced by other factors motivating voters. Marginal predictions show that the top performers have a slight electoral advantage when enrollment changes take place in high representation municipalities. In those same municipalities, if enrollment does not change at all, mayors are slightly disadvantaged compared to underperforming mayors where program

participation is low. To put it concretely, the political payoff was present where the policy was most visible and deeply felt by voters

As enrollment begins to taper off, contact with municipal governments for this program is significantly reduced in the 2008 and 2012 period. As expected, in the declining enrollment phase, performance on enrollment indicators is not significant. In the 2012 election, variables that helped explain reelection outcomes in 2008, such as the share of all valid votes in the previous election had a positive, and statistically significant, impact on reelection odds. In the 2012 election, Bolsa Familia loses part of its novelty, and traditional determinants of reelections such as vote share and municipal characteristics surface as the main predictors of reelection for incumbents.

Lastly, in addition to enrollment indicators, including additional variables related to condition enforcement revealed that the electoral effect was also determined by how active mayors were in the program in 2008. The paper demonstrated that in addition to enrolling families, mayors that enforced program conditions at higher levels were rewarded at the ballot box. Limitations to this interpretation are related to the fact that governments achieving high enforcement were also likely engaged in other areas of municipal governance that was also evaluated by citizens during the election. The reliability of this measure is also challenged by a reporting structure that varies highly across municipalities. Despite the 2008 results for this variable corresponding to my hypothesis, the non-significance of enrollment indicators in 2012 is puzzling. It indicates, to some degree, that citizens are less concerned with a mayor's engagement with the program as the program matures. Future research would benefit from tackling this area of work. However, taken collectively with the results from non-significance in enrollment changes in 2012, it is hard to imagine that mayors will continue to benefit from this program electorally given the initial hype, and their role in the program, has passed.

Notwithstanding convincing evidence for a local electoral effect, several outstanding questions remain for future research. To begin, omitted variables are most likely present. At the outset of this paper I argued that the first methodological task was to correctly model the determinants of reelection. The model is potentially strong and correctly specified for incumbents, but it does not address how challengers influenced election results. For example, mayors who are incumbents in 2008 could face mayors who served from 2000-2004, were defeated by a close margin in 2004, but ran again in 2008. Without challenger characteristics specified in the model, a large portion of the election outcome is left out of the analysis. Although the number of candidates was used to control for electoral competition resulting from challengers running in an election, more variables are needed to fully specify this relationship.

Related omitted variable bias arises from limiting the analysis to Bolsa Família. A more robust analysis of social policy and retrospective voting would include the thirty social programs (including other cash transfer programs) that contributed to improving the quality of life for Brazil's marginalized citizens in the time period used for this study (Hall 2012: 8). Without including the contribution of performance in all social programs, which are assumed to carry their own political weight, the electoral effect of Bolsa Família is not fully determined.

With respect to the policy reviewed in this paper, the ability to draw conclusions from this analysis to make broader statements about good governance in other social policy arenas is limited due to the unique characteristics of Bolsa Família. The results, however, offer promise that citizens in this period, held local politicians accountable for a social program that penetrates what Howell and Barry refer to as the relevant arenas of public life (Howell and Barry 2012: 3). This is welcome news for a country that delegates such high degrees of political autonomy and policy making influence to its municipal governments.

Appendix

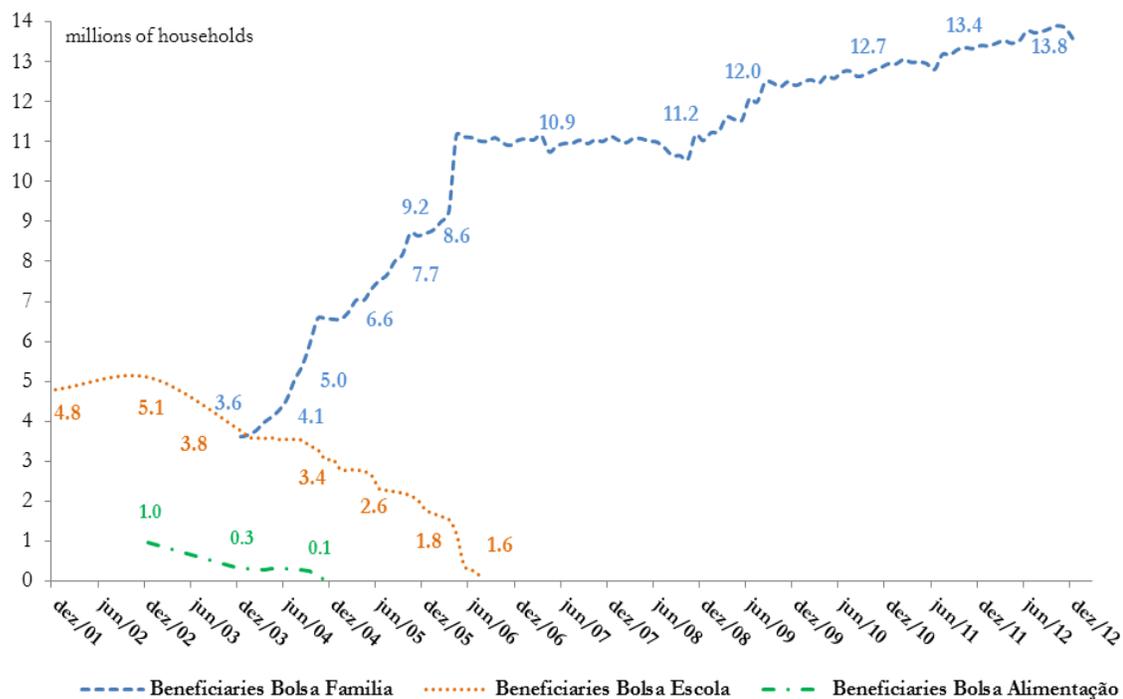
Figure 1: Bolsa Familia Expansion 2004-2012

Table 1.2: Summary Statistics

Covariate Summary Statistics		N	Mean	Std Dev.
<u>Municipal Variables</u>				
Area		2801	1447.15	4678.24
Density		2801	114.05	575.94
Population (Categorical)	Frequency			
1,000-5,000	25%	--	--	--
6,000-10,000	24%	--	--	--
11,000-250,000	25%	--	--	--
GDP pc 08		2676	8776.89	5756.45
Change GDP pc 04-08		2663	0.74	8.43
<u>Mayor Level Characteristics</u>				
Vote Share 2004		2799	0.5301	0.11
Reais per vote		2637	67.72	130.07
Federal Transfers 2004-2008 (log)		2801	17.28	0.78
Education Electorate				
<i>Primary or less</i>		2637	0.429	0.036
<i>High School and Above</i>		2637	0.299	0.032
Mayor's Education	Frequency			
<i>read and write</i>	1.52%	--	--	--
<i>primary incomplete</i>	10.76%	--	--	--
<i>Primary Complete</i>	6.81%	--	--	--
<i>Secondary Incomplete</i>	4.64%	--	--	--
<i>Secondary Complete</i>	26.85%	--	--	--
<i>College Incomplete</i>	6.73%	--	--	--
<i>College Complete</i>	42.68%	--	--	--
Number of Candidates	Frequency			
1	34%	--	--	--
2-3	33%	--	--	--
4-6	33%	--	--	--
		2800	50.49	9.33
Marital Status	Frequency			
<i>Married</i>	81%	--	--	--
<i>Widow</i>	11%	--	--	--
<i>Separated</i>	1.29%	--	--	--
<i>Divorced</i>	3.33%	--	--	--
<u>Bolsa Variables</u>				
Repercussions(categorical)	Frequency			
1-2	25%	--	--	--
2-3	25.88%	--	--	--
3 or more	24.99%	--	--	--
Program Size		2717	0.57	0.16
Enrollment change		2790	1.18	5.01
Enrollment change * Program Size		2706	0.409	2.15

Table 1.3: Main Results

		Lower Bounds2008	Upper Bounds 2008	Upper Bounds 2012
		[1]	[2]	[3]
<i>Independent Variables</i>				
<u>Municipal Level Characteristics</u>				
Area		.999***	.999**	1.000
Density		.999+	0.999	1.000
Population (11,00-250,000)		.773+	.701**	.985(.117)
<u>Mayor level Characteristics</u>				
Vote Share 2004		1.81+	6.85***	1.03***
Reais per vote		1.08	1.06	-
Federal Transfers (log)		1.13	1.06	1.01
Education (Electorate)	(Primary=>)	.422	8.09	1.05
	(HS=>)	.962	8.41	1.07
Number Candidates	(2 or 3)	.419***	.040***	.500**
	(3 or more)	.274***	.024***	.031***
Age		.937***	.964***	.97***
Marital status	Married	1.41**	1.47***	.888
	Widow	.501+	1.01	1.18
	Separated	2.12***	2.10***	.646
	Divorced	1.22	1.27	.832
<u>Bolsa Familia Policy Variables</u>				
Repercussions	(1-2)	1.30***	1.289*	1.09
	(2-3)	1.60***	1.54***	.885
	(3 or more)	1.70***	1.88***	.934
Program Size		.342	.787	1.25
Enrollment Change		.954+	.942*	.842
Program Size*Enrollment Change		1.12*	1.15*	1.03
[1]	[2]	[3]		
N=3755	N=2686	N=2111		
pseudo R2=.09	pseudo R2=.06	pseudo R2=.03		
Wald Chi2 (298)(p=.000)	Wald Chi2(158) (p=.000)	Wald Chi2(95) (p=.000)		

Notes: *p ≤ .05; ** p ≤ .01; *** p ≤ .001; + p ≤ .10

Table 1.4: Reelection Probabilities and Enrollment Changes for Top enrollment and No enrollment 2004-2008

No Enrollment Change					Top 5% Enrollment Performance			
Municipal Coverage (%)	probability	Std. Err.	Z	P>z	Probability	Std. Err.	Z	P>z
20	0.7035509	0.011826	59.49	0.00	0.6767301	0.015509	43.63	0.00
40	0.6923949	0.008865	78.1	0.00	0.6842253	0.009937	68.86	0.00
60	0.6810261	0.011316	60.18	0.00	0.6916319	0.011985	57.71	0.00
80	0.6694543	0.017336	38.62	0.00	0.6989481	0.019028	36.73	0.00
100	0.6576902	0.024645	26.69	0.00	0.7061712	0.027209	25.95	0.00

Heckman Procedure

To account for the potential selection bias, robustness checks using a Heckman selection method are introduced below. Heckman's (1979) insight to abating the selectivity bias was originally designed for linear regression models. The aim of the current paper was to replace the categorical dependent variable (election outcomes) with a variable appropriate for the second stage of the Heckman procedure. Although a vote share variable would offer a feasible opportunity to extend the analysis to a linear regression model, vote shares reported for each candidate in 2008 are fraught with inconsistency. A closer review of the data shows that 1196 mayors received over 100 percent (in some cases mayors received in excesses of up to 500 percent) of the valid vote share. To avoid including heterogeneity that would result from vote cancellations, I employ a Heckman selection model that uses two probit estimations where the second equation takes a broader measure of elections by looking at outcomes only, not votes captured by each candidate.

Although an OLS estimation would be ideal, the two stage probit has become increasingly popular in the social sciences for analyzing bivariate outcomes (Dubin and Rivers: 1994).

The procedure is broken down into two equations: the first equation determines the probability of appearing as a candidate. It is estimated using a probit regression with maximum likelihood estimators. Results from the selection model are then incorporated in a second equation that estimates the probability of winning by “weighting” the equation with an estimation of the “omitted variable” using the inverse Mills ratio.⁵

The key to this first equation (herein the selection equation) is the use of an instrumental variable that is important for estimating the probability of running in the selection equation and has no influence on election outcomes in the equation of interest. The difficulty of finding an instrumental variable between contiguous electoral cycles has long been recognized as a thorny challenge for electoral research (See Jacobson 1990). This paper leverages two unique aspects Brazil’s weakly institutionalized political party systems in order to use incumbent mayors’ political parties as instrumental variables in the equation that predict running, but not election outcomes.

Scholars have long noted the discrete weaknesses of Brazil’s political party system. Mainwaring (1999) in particular argues that parties in Brazil have weak roots in society. In this type of weak party system voting behaviors are highly personalistic and only a minority of the votes at all levels of government are in fact party based. The low levels of party identification among the Brazilian electorate supports the argument that parties should have little to no influence on election outcomes. From this standpoint, political parties do not impact election outcomes. In

⁵ For all mayors who faced the decision to run in 2008 compute $\hat{\lambda}_i = \frac{\phi'_i(\omega_i \hat{Y})}{\Phi(W_i \hat{Y})}$ in the selection equation. The equation of interest is then estimated by OLS with Y as function of X and our $\hat{\lambda}$ estimates for each mayor.

the context of Brazil's weak party system, this aspect of political parties satisfies the first condition of the instrumental variable in the Heckman procedure.

Although political parties may not influence electoral outcomes, a function of their weak institutionalization, it does not mean that parties are not used strategically by mayors. This second feature characteristic of Brazil's weak party system is evidenced by a combination of theory and empirical research. In Brazil's weak party system, politicians often switch party affiliations numerous times over their careers. For example, in his study of incumbency effects in Brazil's mayoral elections, Magalhes shows that up to 30 percent of incumbent mayors switched parties in 2008. It could be argued, then, that party switching is a strategic decision thought to influence the probability of winning. In the same study on incumbency effects, Magalhes employs regression discontinuity design (RDD) to show that there is no effect on elections odds for party switching between incumbent near winners and near losers in 2008. In other words, even if mayors think their strategic switch increased the chances of winning, it doesn't. This analysis only looks at a very special group of mayors who barely won and barely lost elections (N=683) but it shows that switching is not statistically linked to the equation of interest.

Beyond winning, there are several plausible reasons to explain party switching. For mayors, it is often the case that development projects or lucrative government contracts must be negotiated with strong state governors who oversee a large portion of expenditures for local governments. Aligning with the state governor, elected in 2006, could be a decisive factor for politicians who decide to rerun in 2008. If their party aligns with the governor, they may not switch. Even in the case where mayors share the same party as the state governor, non-switching is a strategic choice.

The distinction between perceptions of party importance for winning compared to parties used as factors that influence a candidates' decisions to run is an important one to recapitulate. Using prior theory of low levels of party system identification among the Brazilian electoral, we know that political parties should not predict mayoral election outcomes. Because they do not influence outcomes in our equation of interest, political parties satisfy one requirement of the instrumental approach. Using theory about the strategic use of political parties vis-à-vis switching and the dependency of municipalities under powerful state governments, the paper argues that parties are in fact important for what predicts an incumbent's probability of re-running in 2008. Although, it is easy to argue that switching patterns equate to strategies used for winning (thereby influencing our outcome equation) prior research shows that these strategic choices, despite intentions, are not rewarded electorally. The argument hinges on the statistical significance of political parties predicting decisions to run in the selection equation.

The Heckman procedure is expressed below with the following two equations:

Selection equation (Probit)

$$P(Y_i = 1) = \gamma_0 + \gamma_1 V_i + \gamma_2 R_i' + \gamma_3 X_i' + u_i \quad (1.2)$$

Equation of Interest (OLS)

$$S = \alpha_0 + \alpha_1 R_i' + \alpha_2 X_i' + \hat{\lambda} + u_i \quad (1.3)$$

Where P is the probability of running, $Y= 1$, for the i th mayor in 2008 in equation 1.2. The probability of running is expressed as function of a candidate's political party V_i , R_i' a matrix of covariates relating to performance for Bolsa Família and X_i' a matrix of variables related to

municipal and mayoral characteristics. In the equation of interest 1.3, S stands for the vote share of the i th mayor in 2008. Just as in equation 1.1, equation 1.3 is expressed as a function of R'_i , a matrix of covariates relating to performance for Bolsa Família, X'_i a matrix of variables related to municipal and mayoral characteristics previously discussed in the section above. The $\hat{\lambda}$ estimate is the inverse mills ratio that accounts for early retirement. Political parties are excluded from equation 1.3.

Unlike the extreme bounds approach discussed above, if specified correctly, the Heckman selection procedure has the added benefit of producing unbiased, and efficient, estimates for the policy variables. By modeling the selection effect in a separate equation and then incorporating it into the equation of interest, the early retirees have been accounted for and the estimations are made on incumbents that ran. The Heckman method can give a better gauge of the true policy effect that is produced in the first methodological approach to selection.

The results from the Heckman procedure are compared against probit estimations on the two different data structures in Method 1 (i.e. upper and lower bounds) in Table 1.5 below. the odds of reelection and the variables of interest when confronting a potential selection bias.

Each coefficient from Table 1.5 gives the change in the z-score for a unit change in the model covariates. Point estimates for explanatory policy variables in all three models show a stable and positive influence on election outcomes. With respect to the key explanatory variable, *Program Size and Enrollment Change*, assuming the Heckman procedure is correctly specified, after correcting for selection by way of the political party exclusion restriction, the influence of this variable drops from .07 and .08 in the lower and upper boundary probit estimations (Models 1 and 2), to .06 in the Heckman estimation (Model 3). The variable also remains significant in the selection corrected model. The comparison across the three models supports the argument that

good governance with respect to enrollment efforts in Bolsa Família is a marginal determinant for reelection, even after considering selection issues.

Table 1.5: Heckman Results

Dependent Variable (Election Outcomes)	Probits		Heckman Selection	
	Data Structure 1 [1]	Data Structure 2 [2]	Probit (Election Outcomes) [3]	Probit (selection) [4]
<u>Bolsa Família Policy Variables</u>				
Repercussions	.166** .259 ***	.151 * .258 ***	.092 .159*	-.181** -.049
	.323 ***	.371***	.272**	.043
Program Size	-.113	-.149	-.135	.042
Enrollment Change	-.030 **	-.0351*	-.026 +	-.008
Program Size*Enrollment Change	.074 **	.087 *	.067 *	.018
Political Party [4 only]	N= 3755 Wald Chi2 =332.95 p > Chi2 =0.000 Pseud R2=.08	N= 2686 Wald Chi2 =172 p > Chi2 =0.000 Pseud R2=.059	N= 3755 Wald Chi2 =101.16 p > Chi2 =0.000 rho =-.7801828 p > Chi2 =0.023	N= 3750 Wald Chi2 =415.22 p > Chi2 =0.000 Pseud R2=.097

Notes: *p ≤ .05; ** p ≤ .01; *** p ≤ .001; + p ≤ .10

The results from this procedure, however, are not free from complications that challenge key assumptions of this two-step procedure. In the sections above, I provided a theoretical foundation for using political parties to instrument for any potential selection bias. Results from

Table 1.6 on the next page, provide empirical evidence that the use of political parties come very close to satisfying both requirements of the instrumental approach to a selection bias.

Table 1.6 provides the joint hypothesis tests for political party inclusion for each probit and logit estimation for the probability of rerunning as well as election outcomes for 2008. For both logit and probit models for the selection equation (1 and 2), although not all parties reach statistical significance, considering parties with respect to the model's explanatory power, this variable has significant effects for the model when joint hypothesis testing is introduced. Moving to outcomes in models 3 and 4 in the equation of interests, it is clear that political parties offer less explanatory power. For logit model 3, the joint hypothesis test reveals that political party inclusion is just over the conventional .05 level of significance. The joint hypothesis tests for political parties in the probit estimation in model 4 still reaches significance (indicating parties predict outcomes to some extent) but the test statistic is larger than the first probit estimation on a candidate's decision to run (indicating less significance compared to the selection equation)

Taking stock of the results from Table 1.6, it is safe to conclude that political parties are weak instruments to address the selection effect. Notwithstanding these empirical shortcomings, the output from Table 1.5 show that any bias coming from weak instruments does not have much of an influence on the standard errors for key policy variables. Not only are the standard errors consistent, note that the coefficient from Model 3 (.06) falls strikingly close to the values of the estimates from Models 1 (.07) and 2 (.08) that introduce strict assumptions and bias, respectively.

Table 1.6: Joint Hypothesis Tests for Political Party Instruments 2004-2008

Rerun	<u>Logit [1]</u>	<u>Probit[2]</u>	Outcome 2008	<u>Logit [3]</u>	<u>Probit[4]</u>
11(PP)	0.882	-0.068		0.906	-0.062
12(PDT)	1.654**	0.269***		1.457	0.227
13(PT)	1.185	0.099		1.018**	0.015
14(PTB)	0.991	-0.003		0.872	-0.088
15(PMDB)	6.235+	0.993**		3.853	0.8
17(PSL)	0.402	-0.522		0.341***	-0.668
19(PTN)	0.291	-0.751**		0.759	-0.184
20(PSC)	0.901	-0.07		0.879	-0.078
22(PR)	0.936	-0.054		0.855	-0.095
23(PPS)	0.882	-0.076		0.815	-0.13
25(DEM)	1	0		1	0
27(PSDC)	1.1	0.079		1.76	0.342
28(PRTB)	1.464	0.27		2.159	0.487
31(PHS)	1.218	0.129		1.597	0.283
33(PMN)	3.507+	0.764**		2.06	0.431
36(PTC)	1.273	0.149		0.895	-0.076
40(PSB)	0.898	-0.069		1.11	0.059
43(PV)	1.532	0.264		1.257	0.142
44(PRP)	1.547	0.291		1.577	0.276
45(PSDB)	0.766+	-0.162+		0.889	-0.072
65(PCdoB)	0.428	-0.506		2.785	0.671
70(PTdoB)	1.273	0.133		0.903	

Notes: *p ≤ .05; ** p ≤ .01; *** p ≤ .001; + p ≤ .10

<u>Wald Chi2</u>				
Prob>Chi2	.000	.000	.000	.000
<u>Hypothesis Test</u>				
Prob>Chi2	0.0182	0.0084	0.0596	0.0397

When the two step procedure is estimated without a political party exclusion restriction in Model 4, the results for the explanatory variable of interest are identical to all other models (.07) and have similar standard errors. If selection is present, indicated by the rho in Table 1.5, then the bias on the policy coefficients is very small. For other variables in the model, selection is potentially acting stronger.

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