

PAYING THE POOR: *BOLSA FAMILIA* AND CHILD MORTALITY IN BRAZIL

By

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To the people of Brazil: It is my hope that the *Bolsa Família* program continues to improve the lives of Brazilians until it is no longer necessary to combat poverty

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## LIST OF ABBREVIATIONS

BCG	Bacillus Calmette-Guérin (a vaccine against tuberculosis)
BF	<i>Bolsa Família</i>
CadÚnico	<i>Cadastro Único</i>
CCTs	Conditional cash transfer programs
DPT	Diphtheria, Pertussis, Tetanus vaccine
IBGE	<i>Instituto Brasileiro de Geografia e Estatística</i> (the Brazilian Institute of Geography and Statistics)
MDS	<i>Ministério do Desenvolvimento Social e Combate à Fome</i> (the Brazilian government's Ministry of Social Development and Combat against Hunger)
OLS	Ordinary Least Squares regression (a statistical analysis method)
Peti	<i>Programa de Erradicação do Trabalho Infantil</i> (a cash transfer program of the Brazilian government with the objective of ending child labor)
PNAD	<i>Pesquisa Nacional por Amostra de Domicílios</i> (a national household survey that is conducted by the Brazilian Geographic and Statistics Institute)
PSDB	<i>Partido da Social Democracia Brasileira</i> (the Brazilian Social Democracy Party)
PT	<i>Partido dos Trabalhadores</i> (the Brazilian Worker's Party)
\$R	The real is the currency in Brazil; 1 Real = ~ 0.60 US Dollars
WWII	World War II

Abstract of Thesis Presented to the Graduate School  
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This thesis examines *Bolsa Família* and its effects on child mortality in Brazil.

*Bolsa Família* is the Brazilian government's premiere poverty reduction program and it is part of a relatively new family of poverty alleviation programs known as conditional cash transfer programs. The basic premise of the *Bolsa Família* program is that the government gives poor families a small sum of money monthly if the family complies with all mandated requirements which include both health and educational requirements. Theoretically, if families are meeting the set health requirements and receiving a small additional monthly salary, we would expect to see a decrease in child mortality. My research hypothesis is that, controlling for several socio-economic factors such as place of residence, region, age, ethnicity, literacy, years of school completed, per capita income and running water in the house, participants in the *Bolsa Família* program will be less likely to have a child die than non-program participants.

Results of the analysis are conflicting at best and do not offer a clear picture of the program effects. The majority of the results were not statistically significant. However, when separating the results by the region of the respondent (between the High-Mortality region of the North and the Northeast and the Low-Mortality region of the Southeast,

South and Central-West) we observe the program participation does not reduce child mortality in the High-Mortality region, but it does reduce child mortality in the Low-Mortality region. This suggests that a better developed healthcare infrastructure (in the Low-Mortality region as compared to the High-Mortality region) may facilitate the program in reducing child mortality.

## CHAPTER 1

### INTRODUCTION

My interest in Brazil and its struggle to overcome the poverty and inequality that it faces was born out of an experience that happened over 3,000 miles away from the capital of Brasília. I remember the day very distinctly. It was a sweltering hot day in San Salvador, El Salvador and I had just begun my journey of learning about Latin America. I grew up in a small town in North Carolina, and traveling to San Salvador really opened my eyes to the reality of the world outside of my small town microcosm. When I agreed to go on a volunteer trip to El Salvador, I didn't really know what to expect.

Just looking around San Salvador I was immediately struck by the fact that El Salvador, (and all of Latin America, as I would later learn), is a place of contradictions where the powerful rich live side-by-side with the extremely impoverished. The wealthy, upper-class families live behind their wrought-iron gates, with their personal security cameras perched sentinel-like on top of balconies that afford stunning views of the city below. In stark contrast, homeless children live on the streets of San Salvador. Many people living in rural areas do not have access to electricity, decent education, or sanitary water. One afternoon my group visited the Multiplaza Mall, where a large sign outside of the entrance proclaimed "Multiplaza: What more could you want?" I stopped and thought about the homeless men with whom we had just shared a lunch. I felt disgusted by the thought of families living in the rural communities walking around on their callused feet while a seemingly calloused society pretended not to notice. What more could I want?

Fast-forward to today. After spending time traveling in Latin America and studying the region for more than five years, I have learned a lot about the inequality that I

experienced for the first time in El Salvador. I learned that Brazil has one of the highest rates of wealth inequality in the world. I learned that Rio de Janeiro is similar to San Salvador in terms of contrasting wealth and poverty, except worse. I saw the squalid living conditions that are known as the *favelas* (slums) of Rio. But, I also learned that the Brazilian government is trying to implement long-term solutions to this problem, including *Bolsa Família*, the focus of this investigation. While I was in Rio this past summer, I spoke to a woman that lives in Rocinha, the largest favela in Rio, while waiting for the bus one night. We began to talk about the *Bolsa Família* program which I was researching and what she thought about the program. She emotionally told me how receiving the small transfer of money from the federal government every month allowed her to keep her children in school and provide for the family needs. As we neared my bus stop, she looked me squarely in the eyes and asked me to please write whatever I needed to write to help ensure that the *Bolsa Família* program continues. Though I do not remember her name, this is for her.

Brazil is a country of contradictions. In Brazil, the poor and the wealthy live side-by-side. Shanty towns, or *favelas* as Brazilians call them, begin where middle class neighborhoods end. Due to this inequality and the pervasiveness of extreme poverty, the Brazilian government has implemented several poverty reduction programs in an attempt to alleviate the problems associated with poverty and to reduce the national incidence rate of poverty. One of the largest poverty reduction policy initiatives of the Brazilian government is called *Bolsa Família* and it is part of a new family of conditional cash transfer programs (or CCTs) that reward poor families by giving them a small sum

of money each month if the family meets certain pre-set conditions that the government establishes to augment human capital.

In addition to being gripped by pockets of extreme poverty, Brazil is affected by other social problems, including inadequate educational and health programs. Poor individuals generally (though not always) are more associated with low educational levels and poor health outcomes than those that are not poor. Given the idea that all of these problems are related, it is feasible that a program could be designed to counteract the negative consequences of poverty, educational and health deficiencies at the same time. That is precisely what a conditional cash transfer program, such as *Bolsa Família*, is designed to do. The aforementioned conditions that a family must comply with to receive the program benefits are designed to enhance educational outcomes and to improve the health of program participants. Whether *Bolsa Família* and other CCTs are successful in achieving their desired outcomes is debatable. Some authors, such as Soares et al. (2007: 24), have found positive outcomes, including a reduction of inequality measured by the Gini coefficient, correlated with being a beneficiary of the *Bolsa Família* program. Still others have found little or no evidence of an association between program participation in a CCT and some of the desired outcomes. For example, Behrman et al. (2009) did not find any discernable relationship between program participation and higher test scores for school age children in Mexico's *Oportunidades* program.

High child and infant mortality rates are a serious social and health problem in the developing world. Child mortality rates are correlated with availability of safe drinking water, sanitary living conditions and access to healthcare. Improvements in any

of these conditions generally help reduce the child mortality rates for a country or a region within a country. However, they are not the only factors that determine the child mortality rate of a country. Also highly associated with child mortality rates are household income and poverty levels. One study of the relationship between income and infant mortality rates in São Paulo states: "In 1965, when real wages began to fall, the infant mortality rate began to rise. In 1971, 1972 and 1973 the infant mortality rate reached a high of just under 95 per thousand. When the real wage index began to increase after 1974, the death rate dropped off" (Wood and Carvalho 1988: 116). This connection is also made clear by the fact that the regions of Brazil with the highest child mortality rates also have the highest poverty rates. It can be argued that variable correlation does not automatically imply causation; however, it should be sufficiently self-evident that living in conditions of poverty greatly increases the odds of having a child die at a young age. But how do child mortality rates relate to poverty alleviation programs? I hypothesize that participating in a poverty alleviation program could have positive effects in reducing the likelihood of having a child die at a young age, thereby reducing the child mortality rate.

The purpose of this thesis is to explore the possible relationship between participation in the *Bolsa Família* program and child mortality. Because child mortality rates are linked closely to several of the program conditions that are set forth for participants, I hypothesize that a correlation exists between child mortality and the *Bolsa Família* program. This line of reasoning suggests the following specific expectation: after controlling for many relevant factors including urban residence, level of schooling,

and race among others, program participants are less likely to have a child die than non-program participants.

Chapter 2 discusses the rise and importance of conditional cash transfer programs in Latin America and Brazil due to the prevailing poverty and inequality. It begins by addressing inequality in Latin America and outlining the history of CCTs. Then it continues on to discuss the economic justification for using CCTs as a means of combating poverty and inequality. Chapter 2 contains an overview of the specifics of the *Bolsa Família* program and how it operates including program qualifications, requirements and benefits. Chapter 2 concludes by briefly examining program successes and critiques.

Chapter 3 examines the targeting of *Bolsa Família*. Because it is such a major governmental initiative, it affects millions of Brazilians and in order to evaluate if the program is having the intended effects or not, it is first necessary to know who receives the program benefits. I examine the distribution of program funds according to qualification for program participation, geographic location, race and employment status.

Chapter 4 reviews the literature about *Bolsa Família* and its impacts on health outcomes. Programs of a similar nature have demonstrated positive effects on health outcomes in Mexico and other countries. The literature examining how *Bolsa Família* affects health outcomes is scarce and not highly optimistic given the results. Chapter 5 briefly introduces the problem of child mortality in Brazil. Over the past decades Brazil has made significant advances in combating child mortality. Chapter 5 covers the factors that normally affect child mortality and briefly describes the history of child

mortality in Brazil. Finally, it reviews some of the more recent statistics and research about child mortality and how it is changing in Brazil.

Chapter 6 analyzes the PNAD 2006 data to determine if there is a relationship between participation in the *Bolsa Família* program and the likelihood of having a child die at a young age. Chapter 6 describes the data set and the methodology used for the study. Furthermore, it interprets the results and offers thoughts on how the *Bolsa Família* program can be improved to better meet its objectives. Finally, Chapter 7 summarizes the results of the study and provides some suggestions for future research.

## CHAPTER 2

### CONDITIONAL CASH TRANSFER PROGRAMS

#### **What Are Conditional Cash Transfer Programs (CCTs)?**

Conditional cash transfer programs are some of the latest and most innovative tools in the fight against poverty. Implemented and run by national governments, these programs give poor families a small sum of money on a regular basis, provided that the families meet certain conditions and comply with the program requirements. CCTs attempt to identify poor families and provide them with a monetary incentive to meet the program requirements, which are set by the government for the benefit of the program participants. Typical examples of program requirements that governments employ include educational requirements (such as school attendance and performance) and health requirements (such as receiving proper immunizations and going to health clinics for regular check-ups).

Brazil is not alone in using conditional cash transfer programs to combat poverty. Other countries in Latin America began their own CCTs shortly after witnessing the initial success of Mexico's and Brazil's programs. Today, many prominent examples of operating CCTs exist throughout Latin America including Mexico's *Oportunidades* program, Colombia's *Familias en Acción*, Peru's *Juntos*, Chile's *Chile Solidario*, and Brazil's *Bolsa Família*. *Oportunidades* in Mexico reaches more than 5 million families which account for 24% of Mexico's population and nearly every household living in extreme poverty (Levy 2006: 2). *Bolsa Família* on the other hand covers more than 12 million families, which is equal to roughly 24% of Brazil's population (*Bolsa* 2010). Currently, 29 developing countries have a CCT program in effect, including almost

every country in Latin America<sup>1</sup>, and many other countries are planning on developing their own program (Fiszbein et al. 2009: 31). Therefore, it is evident that conditional cash transfer programs are a major governmental initiative for combating poverty in the developing world.

Conditional cash transfer programs have been hailed by various international organizations, including the World Bank, and development specialists as creative approaches to solving the problem of poverty. Seemingly, much of the excitement and praise for CCTs has been spawned by their rapid expansion and acceptance as a tool to combat poverty. The history of CCT programs is detailed in the next section but suffice it to say that they had humble beginnings. Over the past decade governments throughout Latin America, and many others across the world, have implemented their own versions of conditional cash transfer programs. Brazil's *Bolsa Família* program is unique due to the size and scope of the program, its attempt to deal with many different social problems while redistributing wealth and reducing inequality, and its resilience in the face of criticism.

### **History of CCTs**

The mere existence of conditional cash transfer programs raises the question, why are they needed in the first place? Poverty has long plagued many nations, Brazil included, and developing countries struggle to alleviate the social ills caused by constant poverty. After WWII, countries actively sought development economists to promote poverty reduction through economic growth. However, they soon realized that economic growth did not necessarily benefit everyone in a country equally. Recently,

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<sup>1</sup> Uruguay, Venezuela, Haiti and Cuba do not have an operating CCT.

Brazil has achieved success in economic growth, but the growth was not spread equally across all socio-economic classes. Therefore, because a significant inequality gap existed before Brazil's push for economic growth in the 1960s and 70s, the growth tended to exacerbate the inequality problem rather than solve it. Even today, Brazil still has a very unequal distribution of wealth as evidenced by its Gini coefficient.

The Gini coefficient is a measure of wealth equality that varies between 0 (perfect equality) and 1 (perfect inequality). According to the United Nations Development Programme (2009) *Human Development Report*, the Gini coefficient for Brazil is 0.55. That places Brazil in 15<sup>th</sup> place in the region of Latin America, ahead of only Honduras, Bolivia, Colombia and Haiti<sup>2</sup>. Perhaps even more staggering, that corresponds to Brazil being ranked 133<sup>rd</sup> out of 142 countries in the world in terms of Gini coefficient. Policy makers acknowledge that CCTs alone will not completely close this wealth gap, nor is that goal even realistic given that exact income equality does not exist anywhere in the world; but the logic of providing additional monthly income is to allow families to buy more nutritious food and meet basic human needs, while simultaneously investing in human capital development.

Unfortunately, poverty and inequality in Brazil and all of Latin America was exacerbated by a period of economic history known as the Lost Decade due to economic crisis and subsequent stagnation of the 1970s and 1980s. In response to this period and under considerable pressure from the International Monetary Fund and the World Bank, Latin American countries adopted a neoliberal economic model in the

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<sup>2</sup> That is if we consider Latin America as the 18 Spanish speaking countries of the Americas, plus Haiti and Brazil. Note that Cuba is not included in this rank because data were not available for Cuba from the 2009 United Nations Development Programme *Human Development Report*.

1990s that emphasized the private sector instead of the state controlled economies. This model was known as the Washington Consensus and at the time, governments in Latin America began to develop a new definition of social policy and how it should be approached. Prior to the Washington Consensus, social welfare had traditionally been viewed as the responsibility of the state. However, the post Washington Consensus period saw the development of a new direction for social policy. According to Maxine Molyneux, a professor of sociology at the University of London, Latin American governments adopted social policies that took the burden and responsibility of social welfare and shared it with the people that the policies were supposed to be helping. She writes,

the official policy discourse and forms of entitlement that are being created in Latin America tend to place more emphasis on individual responsibility, while social security is defined in official statements as no longer residing solely with the state. It now involves the ‘co-management of risk’: that may be interpreted to mean that the individual has to make responsible provision against risks (through education and employment), the family, too, must play its part (through better care), while the market (through private interests) and the community (through decentralization ‘co-responsibility’ and the voluntary sector) are all involved in the decentering of expectations of welfare from the state. (Molyneux 2006: 430-31)

In short, governments were no longer going to be fully responsible for the implementation of social welfare policy but instead were forcing the population to share in the responsibility of welfare. Thus, new policies such as conditional cash transfer programs that demanded that participants comply with set requirements made those participants partly in charge of their own development.

It was in this context that CCTs were born. Conditional cash transfer programs began around 1997 with *Progresa* in Mexico and a trial program in two Brazilian municipalities. Initial indicators of success in both the Mexican and Brazilian programs

helped fuel their expansion and growth. Brazil's first conditional cash transfer program began in 1996 with the intent of eradicating child labor. Known as the Program for the Eradication of Infant Work, or *Peti* (*Programa de Erradicação do Trabalho Infantil*) by its name in Brazil, the program awarded participating families small sums of money to keep their children out of the workforce (Focalização 2009: 7). CCTs quickly gained popularity, as evidenced by the expansion of the *Peti* program and the addition of other cash transfer programs.

### **Justification for Conditional Cash Transfers**

CCTs are designed to reduce current poverty by providing poor families with additional income while helping reduce future poverty by investing in the human capital of children. Conditional cash transfer programs provide a small sum of money on a regular basis to families that participate in the program in order to provide the incentive for them to meet pre-determined conditions. Different CCTs vary in terms of their requirements, but they generally include criteria such as keeping children enrolled in school, vaccinating children and requiring pregnant women to receive pre-natal and post-natal care. All of the conditions are intended to augment the human capital of the poor population and thereby reduce poverty in the future.

Acclaimed economist James Heckman stresses that investing in people when they are young rather than when they are old makes economic sense because “poor outcomes in early childhood have long-lasting implications for functioning in adulthood” and “often result from adverse home environments, including the absence of a stable family structure and nurturing relationships for children” (cited in Fiszbein et al. 2009: 55). Numerous studies document that, by and large, CCTs increase school enrollment among target families and, to a lesser extent, increase use of preventative health

services. However, evidence about the effects of CCTs on “final” or measurable outcomes (such as test scores, child mortality rates, etc.) is mixed at best, and the majority of the evidence comes from Mexico’s *Oportunidades* program (Feiszbein 2009: 127).

### **Brazil and Bolsa Família**

By 2003, the Brazilian government operated several different programs, each of which targeted a cause of poverty. These programs included *Programa Bolsa Escola* (School Scholarship Program), *Programa Bolsa Alimentação* (Nourishment Fund Program), *Auxílio Gas* (Gas Assistance) and *Programa Nacional de Acesso à Alimentação* (the National Program of Access to Alimentation). Two of these programs, *Bolsa Escola* and *Bolsa Alimentação*, were transfer programs contingent on stipulated behaviors (Focalização 2009: 7). However, there was little coordination between the various programs.

Each of these programs were scattered throughout Brazil’s infamously complex federal bureaucracy, each with separate offices, separate administering officials, separate lists of program recipients and separate sources of funding (Soares 2009: 7). This patchwork system did not always meet the needs of Brazil’s poorest families. Under this system, one poor family could receive benefits from all programs and another poor family might not receive any benefits (Soares 2009: 7). In 2003, all programs were unified under one program known as *Bolsa Família*, except for *Peti*, which was eventually incorporated into *Bolsa Família* at the end of 2005. The unification of all these programs was part of a strategy of Brazil’s Ministry of Social Development and Combat against Hunger (or MDS by its abbreviation in Portuguese) to end hunger

and poverty in the country. The programs were centralized in order to streamline the administration of the conditional cash transfer programs, redefine the eligibility criteria, and organize the data so that families can be served fairly by the program.

### ***Bolsa Família Program Requirements and Conditions***

In order to qualify to receive the benefits of *Bolsa Família* the family must have a monthly income less than or equal to 140 *reais* (Brazilian currency, often abbreviated R\$) per family member (*Bolsa* 2010). Monthly per capita income is calculated by summing the monthly earnings of each person in the family and dividing the total by the number of family members. Furthermore, families with a monthly per capita income between R\$ 70 and R\$ 140 only qualify for *Bolsa Família* if they have a child that is 17 years old or younger. All families with a monthly per capita income less than R\$ 70 qualify for *Bolsa Família* regardless of their situation with children (*Bolsa* 2010). The government considers these criteria valid indicators of poverty among Brazilian families. In this sense, *Bolsa Família* can be considered unique among CCTs in Latin America because for the poorest of the poor, eligibility depends only on income and not on the presence of children.

According to the program website, the conditions are designed to be commitments for both the participating families (who are expected to actively improve their conditions) and the public services of the government (who are expected to provide access to quality healthcare, education and social assistance). The idea is that children will have to attend school on a regular basis and receive their vaccinations for the family to qualify for the program, and the children will thus be better equipped for the future in terms of both health and educational attainment.

For educational requirements, *Bolsa Família* stipulates that, for a family to remain eligible, children aged 5-15 must be enrolled in school and have a minimum attendance rate of 85% (Fiszbein et al. 2009: 45). For children ages 16-17, the attendance rate at school must be a minimum of 75%. The completion of educational requirements is monitored by the Ministry of Education. By using the *Cadastro Único* (discussed below), the government assigns each student a number and a school code based on the family's registration (Soares and Satyro 2009: 16). The Secretary of Education at the municipal level monitors the attendance of all the students whose family receives *Bolsa Família* benefits. According to Soares and Satyro, the Ministry of Education sends a summary of attendance for each municipality to the MDS (2009: 16).

In addition to educational requirements, participating families must comply with health requirements. Families with children between the ages of 0 and 7 years must follow the recommended vaccination schedule, and should follow the recommended growth and development nutritional accompaniment program (Condicionalidades 2010). Women aged 14-44 that are pregnant must receive pre- and post-natal care and should also follow the nutritional accompaniment program for babies (Condicionalidades 2010). Completion of health requirements is monitored by the Ministry of Health. Unlike the education requirements, which are updated every 2 months, health requirements are updated every 6 months (Soares and Satyro 2009: 16). The final requirements are referred to as Social Assistance Conditions. If children under the age of 15 are considered to be at risk, or if they are a part of the Program for the Elimination of Child Labor, families must participate in socio-educational services provided by the government, with an attendance rate of at least 85% (Condicionalidades 2010).

The Ministry of Social Development and Combat against Hunger (MDS by its abbreviation in Portuguese) reviews the summaries sent to it by the local municipalities to verify that families comply with all of the requirements. When a family does not meet the required conditions, the MDS undertakes a series of steps. First, they investigate the reason for not complying with the requirements. If noncompliance is justifiable, no punitive action is taken. If noncompliance is not justifiable, the family is given five chances to meet program requirements. At the first offense, the family receives a warning; at the second offense, the family is blocked temporarily from receiving its monthly benefit, but the benefit can be withdrawn the next month (Soares and Satyro 2009: 16). The third and fourth offenses result in suspensions of one and two months, respectively, without being able to make up the missed benefit. A fifth means that the family is no longer eligible for support from the program and is replaced by another family (Soares and Satyro 2009: 17).

### ***CadÚnico***

Families are selected for participation in *Bolsa Família* based on a proxy-means testing system called *Cadastro Único para Programas Sociais* (*CadÚnico*) that identifies poor families. A proxy-means test is a statistical analysis of a household data set that is frequently used to identify poor families. *CadÚnico* reports these findings to the Ministry of Social Development and Combat against Hunger, which automatically selects which families will participate in *Bolsa Família*.

*CadÚnico* is a unique means of measuring and registering the poor population of Brazil. Families that have a monthly per capita income of less than half of the minimum wage or less than three times the minimum wage for the entire family are encouraged to enlist in the *CadÚnico* (Cadastro 2010). It was created in 2001, specifically to locate and

register poor families so that they could be enrolled in social programs and receive benefits from the government (Barros et al. 2009: 7). At its inception, local governments hired teams to go door to door and show people how to register in the new system. Teams were sent to the poor city neighborhoods across Brazil, and information detailing the process was disseminated throughout the country. Beginning in January 2010, families had to register themselves through the *CadÚnico* system and update their information from time to time. According to a news release from the Ministry of Social Development and Hunger Combat, Decree 6.135 of 2007 requires that families re-register with *CadÚnico* every other year (MDS 2010). As of March 9<sup>th</sup>, 2010, only 320,896 families had updated their information in *CadÚnico*. That leaves more than 846,000 families that still had to update their information before October 31<sup>st</sup>, 2010 or they would have their *Bolsa Família* program benefits blocked pending re-registration (MDS 2010).

The *CadÚnico* system currently contains information on nearly 19 million Brazilian families, many of which are very poor and qualify for *Bolsa Família* (Barros et al. 2009: 7). Because families must register themselves and report their own income, some observers question the accuracy of *CadÚnico* for determining which families should receive program benefits. However, many other questions are included in the survey to determine the respondent's socio-economic status. This information, coupled with the self-reported monthly per capita family income allows the MDS to focus on families who should qualify for *Bolsa Família* and who are not simply under-reporting their income. Currently, the MDS makes decisions based on the self-identified per capita income. Nevertheless, Barros et al. suggest that the self-reported income could

be used in combination with other available information to generate a better predictor of family income (2009: 9). Finally, because it is such a large system for monitoring the poor population of Brazil, *CadÚnico* can have implications for more than just the *Bolsa Família* program. Barros et al. describe *CadÚnico* as a census of the poor population of Brazil since it contains a wealth of information. They suggest that it could also be used to select participants for other social programs and to measure regional differences in poverty (2009: 10-11).

### **Program Benefits**

If all of the conditions are met, the program pays the family a monthly stipend based on the family's per capita monthly income and the number of children. For example, extremely poor families (less than R\$ 70 per month) receive R\$ 68 automatically, a child conditional benefit of R\$ 22 for each child between 0-15 years old (up to three children), and R\$ 33 for each child between 16-17 years old (up to two children) (Benefícios 2009). Families that earn between R\$ 70 and R\$ 140 are awarded the same amount per child, but they do not receive the automatic basic benefit that families in extreme poverty receive (Benefícios 2009). Three types of benefits thus exist: 1) the Basic Benefit of R\$ 68, 2) the Variable Benefit of R\$ 22 (children ages 0-15, families can receive a maximum of 3 variable benefits), and 3) the Variable Benefit Linked to Adolescence of R\$ 33 (children ages 16-17, each family can receive a maximum of 2 variable benefits linked to adolescence).

Once chosen to participate in the *Bolsa Família* program, a representative of each family (typically the mother) is given a card, known as the *Bolsa Família Social Card*. It is magnetic, personalized, and can be used to withdraw the cash once per

month at designated machines, known as Federal Economic Cashiers – Caixas Econômicas Federais - (Benefícios 2010). The card also allows holders to access other government programs.

### **Program Success**

The *Bolsa Família* program is successful in several respects. For starters, it is extremely popular with program participants. Participating families are typically happy with program administration and benefits. Marco Weissheimer cites a study in which a group of *Bolsa Família* recipients were interviewed and asked to evaluate the program. Respondents overwhelmingly responded that their evaluation of the program was either “good” (49.9%) or “very good” (38.8%) (Weissheimer 2006: 99), indicating that 88.7% has a positive evaluation of *Bolsa Família*. Only 1.6% of the respondents in the survey ranked the program as either “bad” or “terrible” (Weissheimer 2006: 99).

In terms of program outcomes, various studies including Weissheimer (2006) and Soares et al. (2007) find that *Bolsa Família* is having a positive effect on the socio-economic status of participating families. Weissheimer cites a survey from the *Instituto Datafolha* in São Paulo, Brazil that found that from 2003, many voting age individuals had improved their socio-economic standing. The study states that from 2003–2006 (the time period during which the vast expansion of the *Bolsa Família* program was carried out by the Lula government), nearly 6 million people advanced from socio-economic classes D/E to class C, which is considered middle class (Weissheimer 2006: 104). Although it is not possible to claim that *Bolsa Família* is entirely responsible for this significant improvement, it is likely that program contributed to the observed improvement.

Similarly, Soares et al. (2007) found that *Bolsa Família* reduced inequality. The authors break income down into various categories to analyze the effect of different types of income increases on inequality. Although the amount of money received by a participating family in *Bolsa Família* is not a large percentage of a family's total income, the distribution of *Bolsa Família* funds is of particular benefit to the poorest families, leading the authors to conclude that it is indeed correlated with a decrease in the Gini coefficient in Brazil.

### **Criticisms of *Bolsa Família***

In spite of its success and its endorsement by participants, *Bolsa Família* has also been criticized. Some of the most common complaints include suggesting that *Bolsa Família* could have ulterior political motives, that it reinforces perpetuated gender stereotypes, and that it weakens the incentive to work.

Some scholars claim that *Bolsa Família* is a form of political clientelism, the use of benefits/favors to gain political support. The manner in which the federal government implemented *Bolsa Família* gave rise to this charge. Marcel Medeiros et al. point to the fact that the federal government initially gave each municipality a quota of people that it could enroll in the program, thereby delegating decision-making power to municipal managers who could select their friends, or family members, or people who were politically supporters (2007: 23). Furthermore, they state that *Bolsa Família* contrasts with CCTs in other countries that use “complex multi-dimensional indexes” because it uses a simple per capita income cut-off line (Mendeiros et al. 2007: 23). Consequently, when there are two families that both qualify for *Bolsa Família* there is no predetermined method for deciding which family should be enrolled first.

Several separate conditional cash transfer programs in Brazil were begun under the administration of President Henrique Cardoso. However, they quickly became associated with President Lula (the succeeding president) and his party the PT (*Partido dos Trabalhadores* – Worker’s Party). The various programs were combined to form *Bolsa Família* during Lula’s presidency. Furthermore, the vast majority of the expansion of *Bolsa Família* was authorized by the Lula government so that it grew to include over 12 million families. Even with this expansion, not all poor eligible families receive program benefits and thus the argument for clientelism persists. Additionally, some opponents of the PT claim that *Bolsa Família* is a form of political clientelism that buys votes in the form of social welfare handouts. While there is little doubt that program beneficiaries appreciate the benefits, it is not clear if *Bolsa Família* alone is enough to buy their loyalty and support at the ballot box.

Another strong criticism of *Bolsa Família* (and conditional cash transfer programs in general) is that it perpetuates negative gender roles in society. Most conditional cash transfer programs (*Bolsa Família* included) give the cash transfers to the mothers of the family. Mothers are seen as the homemakers and the ones that will use the money more responsibly to buy food or clothing for their children. One objective of Mexico’s *Oportunidades* program is to empower poor women by making the cash payments to them. Maxine Molyneux argues that CCTs tend to have the opposite effect. Because women are required to manage the funds and see that their children meet program requirements, the program only solidifies traditional gender roles. Molyneux writes, with fathers marginal to childcare and further marginalized by the design of the programme, the state plays an active role in re-traditionalizing gender roles and identities....In effect, *Oportunidades* creates a dependency on a subsidy which confirms mothering as women’s primary social role, one

which may enhance their social status and self-respect, but nonetheless, in doing little to secure sustainable livelihoods, puts them at risk of remaining in poverty for the rest of their lives. (2006: 440)

A third criticism of *Bolsa Família*, which applies to almost all social welfare programs, is that cash payments reduce the incentive to work. Brazilians who oppose *Bolsa Família* claim that some poor people will not look for a job or accept a low paying job because it would mean they would have too high of an income to qualify for *Bolsa Família*. However, it is theoretically conceivable that some individuals would think they can do better with *Bolsa Família* than with a low paying job.

Nonetheless, caution should be employed before assuming that this is a norm for poor families. Clarissa Teixeira measured the effect of *Bolsa Família* on the number of hours that people worked. She used data from the 2006 *Pesquisa Nacional por Amostra de Domicílios* (PNAD) to compare people who received *Bolsa Família* payments with people who did not. According to Teixeira, the results show that Program *Bolsa Família* marginally diminishes the number of hours worked although the effect is not uniform among individuals.

The impact is more expressive for informal workers, women, low paid workers, and the ones whose wage represents a smaller share of total household income, that is, the other members apart from the household leader. (Teixeira 2009: x-xi)

Because the effect is only observed for some individuals, and because it is small, she concludes that a work-reducing effect does not represent a significant threat to the *Bolsa Família* program objectives (Teixeira 2009: xi).

Others criticize the effectiveness of *Bolsa Família*'s educational goals. Program participants may have the incentive to send their children to school, but attendance does not guarantee good performance in the classroom. Similarly, the program can

require that children go to school, but when the schools are underfunded and of poor quality, attendance does not mean that students receive an education.

While I was in Brazil, I asked some people what they thought of the *Bolsa Família* program. Of those who were opposed to the program, the most common responses were that it makes people lazy and also that women were having babies just to qualify for program benefits. Quite frankly I was surprised by the last assertion but it should not be written off as out of the realm of possibility. Tina Rosenburg, a journalist for the New York Times, briefly addressed and rejected this criticism, arguing that conditional cash transfer programs, to the contrary, encourage the use of contraceptives and small families. She writes, “There are caps on the benefits, so it does not encourage larger families – in Mexico, for example, three children is the limit. More important, education for girls is the most effective contraceptive” (Rosenburg 2011).

One study, carried out by Bruna Atayde Signorini and Bernardo Lanza Queiroz compared data from the 2004 and the 2006 PNAD datasets to see if there was a statistically significant difference in the rate of fertility for program and non-program participants, both within and between the two years. Signorini and Queiroz found that women who participated in the program actually had somewhat lower fertility rates compared to women who did not participate. Although, this study did not support the hypothesis that *Bolsa Família* promoted higher fertility, the authors recognize that more appropriate data and methods could be employed to provide a more robust treatment of the issue.

### **Political Implications of *Bolsa Família***

Because it is a social welfare program, the *Bolsa Família* program inevitably has far reaching political implications. In the 2006 Brazilian presidential election, the

incumbent president Luiz Inácio Lula da Silva ran for re-election against opponent Geraldo Alckmin, the candidate for the PSDB (*Partido da Social Democracia Brasileira* – The Brazilian Social Democracy Party). Alckmin's showing forced a second round election that Lula handily won. Lula did very well in the North and the Northeast regions, which are the two poorest regions of Brazil and therefore the main beneficiaries of the *Bolsa Família* program.

What does this imply about the role of *Bolsa Família* in politics in Brazil? First, it demonstrates that social welfare programs can impact the reputation and legacy of politicians. Lula did better in regions with higher percentages of program beneficiaries. This could be due to the fact that some individuals aligned themselves with Lula and the PT because they are grateful for the benefits they receive from *Bolsa Família* (Oliveira 2006: 6). However, that is not necessarily the case. It could be that the PT and Lula have more progressive social policies that benefit the poor and lower class Brazilians independent of *Bolsa Família*. We cannot conclusively determine the degree to which *Bolsa Família* was responsible for Lula's re-election, but there appears to be a strong connection between program participation and support for Lula and the PT.

The massive program expansion that began in 2003 reinforced and solidified the public association of Lula with the *Bolsa Família* program. Since 2006, the Lula government has further expanded the *Bolsa Família* program. Some intellectuals have taken up the fight to disassociate *Bolsa Família* from Lula. For example, journalist Gilberto Dimenstein argued in the July 3<sup>rd</sup>, 2006 issue of *Folha de São Paulo* that Lula poses a threat to the *Bolsa Família* program. Given the nature of electoral changes, Dimenstein worries the survival of *Bolsa Família* could be threatened if Lula began to

lose popularity, or if he were to lose an election. *Bolsa Família*, he contends, should be recognized as part of a “national patrimony, and not as a personal mark of Lula” (Dimenstein 2006).

Such fears are not unfounded, but due to a number of converging factors, it seems unlikely that *Bolsa Família* is in any immediate threat of survival. Brazil has enjoyed economic growth and more international recognition throughout the entirety of the Lula administration. In the fall of 2009, Rio de Janeiro was chosen to host the 2016 Summer Olympics, marking the first time the Olympic Games will be held in South America. Brazil also weathered the global financial crisis of 2008 and 2009 better than other countries due to its robust economic growth recently. All of these factors combined to help Dilma Rousseff win the election to be the next president of Brazil in 2010. Dilma Rousseff is Lula’s hand-picked successor and therefore she represents continuity of PT policies and the insured continuation of *Bolsa Família*. Lastly, many Brazilians believe that the *Bolsa Família* program is so popular that even opposition parties would not dismantle the program if they were elected to the office of president. Thus, for the time being, it appears that *Bolsa Família* is a reality for Brazilians that is here to stay.

## CHAPTER 3

### WHO GETS BOLSA FAMILIA?

When they began, the programs that make up the current *Bolsa Família* program were scattered, fragmented and less organized than they are now. Even when they were combined to form *Bolsa Família*, it was still a fledgling program that has since grown and matured by winning more support from the federal government. I used the PNAD 2006 data set to contrast Brazilians that do and do not receive *Bolsa Família*. PNAD is a national survey designed to measure many different indicators of socio-economic status and general well-being. In 2006 the sample included over 400,000 cases, which can be expanded using a weight factor (supplied in the dataset) to estimate the total population of Brazil. Multiplying each case by the weight factor yields a total number of 186,020,850 cases, equal to the entire population of Brazil in 2006 at the time of the survey. Using the PNAD data from 2006, the estimated number of *Bolsa Família* recipients in all of Brazil at that time was 39,107,308 or 21.03% of Brazil's population. By 2010 however, Brazil's *Bolsa Família* had expanded to cover 12 million families (or more than 46 million people) throughout the country (*Bolsa* 2010). Who are these 12 million families and what do they have in common?

To fully understand the range of Brazilians who participate in the *Bolsa Família* program, it is first necessary to remember the requirements for program eligibility. *Bolsa Família* program requirements state that families that have a monthly per capita income of less than R\$ 140 and have children between the ages of 0-17 years qualify for the program. Families that are considered to be "extremely poor," defined as having a monthly per capita income of less than R\$ 70, qualify for program benefits regardless of their situation with children. However, "extremely poor" families that have children are

expected to meet all of the same education and health conditions to continue receiving program benefits.

### **Distribution of *Bolsa Família* by Region**

Poverty in Brazil is most prevalent in the Northeast. Although the North is largely undeveloped, the Northeast is still the most backward region of the country. In contrast to the cities of São Paulo, Rio de Janeiro and Belo Horizonte in the Southeast, which contains the majority of the Brazilian population, the Northeast is known for its poverty.

In colonial Brazil the Northeast region flourished on the production of sugar cane for export and a slave labor economy. Once a center of prosperity and economic growth, the Northeast slumped into a decline following the shift of economic power to the mining region, and the coffee plantations of the Southeast. But with time, the Brazilian economy grew and industrialized to the benefit of São Paulo and the surrounding area much more than the Northeast. Long characterized by racial inequalities, the Northeast found it challenging to escape the legacy of slavery and achieve the level of economic development in the South and the Southeast.

The share of national income garnered by each region evidences this inequality. In 1970, the Northeast contained 30.3% of the population in Brazil, yet only accounted for 12.2% of the national income. The Southeast, on the other hand, accounted for 64.5% of the national income despite having only 42.7% of the population (Wood, Carvalho: 1988, 72). Complete income equality in Brazil would suggest that a region with 30% of the population would also account for 30% of the national income. Conditional cash transfer programs, such as *Bolsa Família*, aim to reduce the poverty rates in the short term and to establish the basis for longer term development.

Today, the Northeast has the lowest per capita income in the country and the greatest percentage of population below the poverty line. Table 3-1 shows the average monthly per capita income for each region of Brazil. The Northeast has an average per capita income of R\$ 292.91 and the North region has an average of R\$ 327.05. Both of these numbers are low compared to other regions. The Southeast, with an average of R\$ 610.31, boasts the highest average monthly per capita income in the country. Meanwhile, the South and the Central-West regions have average monthly per capita incomes of R\$ 590.98 and R\$ 558.07 respectively. Therefore, there is a wide gap in the per capita income distribution by region with the northern area of Brazil lagging far behind the rest of the country.

Thus, it is not surprising to discover that the greatest percentage of *Bolsa Família* recipients lives in the Northeast. Figure 3-2 shows the distribution of *Bolsa Família* within each region. Of the entire Brazilian population, 21.03% participate in the *Bolsa Família* program. This figure visually represents which regions have the highest proportion of their residents enrolled in the program. According to Figure 3-2, 40.28% of the people living in the Northeast receive cash transfers from the *Bolsa Família* program. It is clearly visible that the Northeast has the highest concentration of *Bolsa Família* recipients in Brazil. The region with the second highest concentration of recipients is the North region. In the North 25.78% of the population region receives money from *Bolsa Família*. The other 3 regions have relatively low concentrations of program participants, compared to the North and the Northeast. In the Central-West region 12.70% of the population participates in *Bolsa Família*; in the Southeast 11.97% participates in *Bolsa Família*; and in the South, only 11.51% of the population

participates in the *Bolsa Família* program. The observed differences between regions are statistically significant at the 1% level.

Table 3-2 further shows that there is also variation of the distribution of *Bolsa Família* within regions. For example, in the North, Amazonas and Pará account for the majority of the region's population enrolled in *Bolsa Família*. There is also significant variation in the Southeast region where Minas Gerais accounts for 11.15% of all *Bolsa Família* recipients. The state of São Paulo appears to account for a large percentage of *Bolsa Família* recipients, but due to its large population it has a much lower concentration of *Bolsa Família* recipients than other states. Bahia in the Northeast has the greatest number of recipients at 5,404,968 and also one of the highest concentrations in the country of *Bolsa Família* recipients.

Figure 3-3 shows all of the *Bolsa Família* recipients and their distribution by region, or in other words, of those that receive *Bolsa Família*, where they are located. This figure clearly shows that the Northeast overwhelmingly dominates the *Bolsa Família* program. Of all *Bolsa Família* beneficiaries in Brazil, 53.90% reside in the Northeast and 24.00% reside in the Southeast. That means that of all *Bolsa Família* recipients in Brazil (which is 39,107,308), 24.00% live in the Southeast. This may seem like a large percentage, but due to the region's enormous population, it actually has a lower percentage of program participants per resident of the region than the North.

### ***Bolsa Família Distribution by Race***

Because the Northeast has the largest number of poor people in the country, it stands to reason that the Northeast also contains the largest proportion of *Bolsa Família* participants. The Northeast is also distinguished for having the largest Afro-Brazilian population. Given the scholarly interest in racial inequality, it is useful to classify the

percent of *Bolsa Família* participants by race. Brazil is a multi-racial country with a history of racial discrimination and thus, there is a significant wealth gap between white Brazilians and Afro-Brazilians. Numerous scholars (Neal and Johnson 1996; Altonji, Doraszelski and Segal 1999) have researched causes of the difference in earnings between the two racial groups. According to PNAD 2006 data, on average, white Brazilians earn approximately 1.93 times, or roughly \$R 316.46 per month per capita, more than black Brazilians.

Furthermore, white Brazilians earn 2.21 times or \$R 351.19 per capita on average each month than those Brazilians that classified their ethnicity as brown. These findings are consistent with the existing literature on racial income inequality in Brazil and suggest that more Afro-Brazilian families should qualify for *Bolsa Família* than white Brazilians. Because each respondent in the PNAD dataset reports his/her per capita income, it is possible to calculate the average income for each ethnic group. Granted that this measure is still an estimate and is not precise, because there could be outliers (either extremely high or extremely low values that skew the average so that it does not accurately reflect the distribution of the data) that affect the average. However it is highly unlikely that outliers significantly change the average value for any ethnic group due to the extremely large size of the dataset. Regardless of the actual difference in average income, it is clear that Afro-Brazilians earn less than white Brazilians and that the difference is statistically significant at a .000 level of significance.

PNAD 2006 data confirm the findings. According to Table 3-4, of all white Brazilians, only 12.89% participate in the *Bolsa Família* program. Because the majority of Brazilians classify themselves as white, that equals approximately 11,868,002 white

recipients of *Bolsa Família*. On the other hand, roughly 3,052,882 black Brazilians and 24,017,969 brown Brazilians participate in the program. That is 23.74% of the black population and 30.17% of the brown population of Brazil. Furthermore, 22.94% of indigenous Brazilians receive program benefits. It is evident that the groups that would constitute a traditional definition of Afro-Brazilian (black, brown, and indigenous because of the skin color) have a higher percentage of individuals enrolled in *Bolsa Família* than the average percentage of all individuals enrolled in the program (21.03%).

If on average, Afro-Brazilians receive a lower salary than white Brazilians, it stands to reason that Afro-Brazilians constitute more of the poor population than white Brazilians. If *Bolsa Família* is properly targeted, it should include more Afro-Brazilian participants than white Brazilians due to the nature of targeting the poorest people in Brazil. Fortunately, *Bolsa Família* appears to target Afro-Brazilians effectively by providing them with equal access to the program. When controlling for other confounding variables, Fiszbein et al. conclude that “Afro-Brazilians were significantly less likely to be excluded [from *Bolsa Família*], all else being equal” (2009: 77). However, that is not to say that *Bolsa Família* uses perfect targeting techniques and that there is no room for improvement. As mentioned previously, given two families that qualify for *Bolsa Família*, there is no factor for measuring which family is more deserving and should be enrolled first. Is it ideal to enroll more Afro-Brazilian families in an attempt to reduce the income inequality between ethnic groups? The ideal solution would be to enroll the families that are in the most need, regardless of skin color. However, the Brazilian government has not currently developed a means of evaluating families any more in depth than using the per capita income measure, and inherently any further

measures taken would draw criticism from one or more segments of the Brazilian population.

### ***Bolsa Família Distribution by Employment***

As is common throughout Latin America, Brazil has a high unemployment rate. A significant proportion of the Brazilian population is not formally employed but works in the informal sector. Those that work in the informal sector engage in various economic activities such as selling food or other items on the street. Also, those involved in drug trafficking in Rio de Janeiro's *favelas* would be included in the informal sector. Thus, the informal sector makes up a large population that might qualify to receive *Bolsa Família* funds because the income is not formally reported to the government and there is no mechanism in place for insuring that families report all of the income earned appropriately in the *Cadastro Único*. The Brazilian government would prefer to have people engaged in the formal economy as opposed to the informal economy because that way it could collect more taxes.

*Bolsa Família*, like any other social welfare program, has drawn criticism from some opponents for wasting money. Some argue that giving cash to poor families reinforces laziness and discourages the unemployed and those employed in the informal sector from trying to find a job out of fear that the household per capita income would increase beyond the maximum threshold for receiving program benefits. However, I was not able to find any literature to substantiate these claims. Of the people that I spoke to about *Bolsa Família*, some repeated these claims about the program contributing to laziness, but others responded that those claims were the standard mantra of the opposition to the ruling political party the *Partido dos Trabalhadores – PT* (Worker's Party). It is true that there is a higher correlation between being unemployed

and receiving *Bolsa Família* than being employed and receiving program benefits.

According to the PNAD 2006 data, summarized in Table 3-5, of those that are unemployed 20.84% receive benefits from *Bolsa Família*. In contrast, for those that are employed, 17.39% receive benefits of *Bolsa Família*.

That is a relatively small, but statistically significant (at the 1% level) difference due to the large number of available cases. However, this only lends credence to the idea that unemployed individuals are more likely to receive *Bolsa Família* funds than employed individuals, which is the relationship that should be expected because logical reasoning would suggest that being unemployed also leads to a greater probability of having a per capita family income less than R\$ 140.

### **Who Qualifies?**

Theoretically, all of the recipients of *Bolsa Família* belong to poor families but as I will demonstrate, not everyone that is poor receives a share of the funds and sometimes families that should not qualify for *Bolsa Família* are able to exploit the program for their benefit. According to the World Bank Policy Research Report *Conditional Cash Transfers: Reducing Present and Future Poverty*, 100% of Brazilian families in the bottom quintile of income earnings qualify to receive funds from *Bolsa Família* but only 55% actually receive the funds (Fiszbein 2009: 76). My analysis of the PNAD 2006 data is summarized in Table 3-6 which corroborates the findings of the research report.

Of the individuals who qualify as being “extremely poor” (having a monthly per capita income of less than R\$ 70 regardless of their situation with children), only 57.62% receive program benefits. Similarly, of the individuals who fall in the category of “poor” R\$ 71 – 140 (which is the cut-off line for qualifying for the program if the family has children between 0-17 years old), 48.12% receive *Bolsa Família* program benefits.

From these data it is clear that not everyone that qualifies for the program is enrolled and participates. More than 40% of the “extremely poor” and 50% of the “poor” individuals do not receive program benefits.

What are the reasons for these errors of exclusion? There are many possible explanations for this lack of coverage. Fiszbein et al. suggest that due to the limited funds the *Bolsa Família* program is not able to offer all eligible families a place in the program. Since the municipal governments have the authority to choose which families can enroll in the program, Fiszbein et al. refer to this problem as a “lack of offer” to eligible families to join *Bolsa Família* and conclude that this is probably the main cause of under coverage (2009: 77). Some people believe that the *Bolsa Família* program is simply not large enough to provide coverage for all of the poor families in Brazil. Soares et al. analyze the expansion of *Bolsa Família* to include more than 11 million families and they determine that latest phases of expansion were necessary but not sufficient to meet the needs of all of Brazil’s poor population. In their study, “*Focalização e Cobertura do Programa Bolsa-Família: Qual o Significado dos 11 Milhões de Famílias*”, Soares et al. conclude that expanding *Bolsa Família* significantly helped cover more families that qualify for the program, but that it was not enough to reach all eligible families. According to their estimates, the program would have to expand to 14 million families to cover every family in “extreme poverty” and increase to include 16 million families to cover every family living in poverty in Brazil (Focalização 2009: 23).

Another hypothesis about the lack of sufficient coverage for qualifying families is the idea that there is an institutional bias against families that may not be equipped to enroll in the program. Institutional bias could result if families are unable to comply with

*Bolsa Família* conditions. For example, if a rural community does not have a health clinic and the people living there have to travel a long distance to reach the closest health clinic, people cannot comply with the health requirements. Another explanation focuses on the challenges of filling out the *Cadastro Único* if the family unwittingly makes a mistake in completing the survey. When this occurs the family might not even be considered by the municipal government to be qualified for the program. Therefore, a mixture of institutional and program factors could prevent some eligible families from participating in *Bolsa Família*. There is not much research concerning institutional bias and how it can affect/prevent families from participating in *Bolsa Família*, and it is an area that merits further study.

Finally, poor targeting of program participants is one other commonly cited reason for the lack of coverage of qualifying families. Fiszbein et al. propose that instead of targeting errors, there may be an element of “self-selection” that causes some families to choose not to enroll in the program despite qualifying. People with higher income, higher education, or who live in urban areas were less likely to participate than others (Fiszbein 2009: 77). However not all of the exclusion error can be attributed to self-selection. When *Bolsa Família* began, program representatives administered the *Cadastro Único* to determine eligibility for the program. Today, program participants must update their own *Cadastro Único* in order to prove that they still qualify. This system seems to work fairly well, but it is far from perfect as it opens the possibility of fraud.

Somehow families that do not qualify for *Bolsa Família*, because they have a per capita monthly income that is too high, are able to receive monthly cash transfers from

the program. Table 3-6 indicates that of individuals with a monthly per capita income of R\$ 141 – 210, 30.98% participate in *Bolsa Família*. Seemingly these individuals should not qualify for *Bolsa Família* because their monthly per capita income is above R\$ 140; however because of the way the question was asked when administering the PNAD survey, income from the *Bolsa Família* program is included in the calculation of per capita income. Thus, a family's per capita income theoretically could be R\$ 135 per month, they would qualify for and receive *Bolsa Família* and then report their total per capita income to PNAD as being higher than R\$ 140. Therefore, this variable exhibits circularity in that given the information as is, we cannot know if receiving *Bolsa Família* benefits is the factor responsible for the per capita income being greater than \$R 140. However, somewhat alarmingly, Table 3-6 also shows that individuals in the per capita income categories of R\$ 211 – 280 and R\$ 281+ receive *Bolsa Família*, 18.08% and 3.73% respectively. The argument of circularity is only valid up to a certain point because the program benefits are not large enough to raise poor families from less than R\$ 140 to more than R\$ 281 per capita. Therefore, it is probable that some families are committing fraud or that respondents did not truthfully answer all of the questions in the survey.

Given the fact that there are Brazilians who are eligible for *Bolsa Família* that are not enrolled in the program, it is interesting to examine who are the individuals that are being excluded from the program. Interestingly enough, both the region where a person lives and his/her ethnicity significantly affects whether they will be enrolled in *Bolsa Família* or not.

Table 3-7 was generated using the PNAD 2006 data, and it shows a strong bias in favor of the Northeast and the Central-West over other regions. In the Northeast only 37.7% of the people that are eligible for *Bolsa Família* are not enrolled in the program. Likewise, in the Central-West 29.8% of the eligible population does not receive *Bolsa Família*. Compared to the other regions, that is a very low percentage. In the other regions of Brazil, the percentage of the eligible population that is not enrolled in the program ranges from 57.0% in the North to 59.9% in the Southeast. That is in accordance with the general sentiment of the Brazilian population. While I was in Rio de Janeiro and I told people that I was studying *Bolsa Família*, many of them asked me why I was there instead of in the Northeast. There seems to be a strong bias towards the Northeast because of the perception of it being a “poorer” region. Correspondingly, there is a higher concentration of *Bolsa Família* recipients there than in other regions.

By the same token, ethnicity also affects who receives *Bolsa Família*. Table 3-8 shows that respondents who classified themselves as brown were significantly more likely than those of other races to receive *Bolsa Família* if they are eligible. Of the *Bolsa Família* eligible population among brown Brazilians, 45.3% do not participate in the program. Approximately 53% of black, white and indigenous Brazilians who are eligible for *Bolsa Família* do not receive program benefits. The ethnic group that appears to be most biased against when eligible for *Bolsa Família* is Asian-Brazilians. Perhaps this is due to the fact that Asian-Brazilians constitute a small minority of the Brazilian population and there is a perception that Brazilians of Asian descent are relatively well-off compared to other ethnic groups.

Table 3-3 shows that on average, Asian-Brazilians have a greater monthly per capita income than other ethnic groups. Therefore, if a municipality does have two families that qualify for *Bolsa Família* and one happens to be Asian-Brazilian while the other is brown, it is conceivable that the brown family might be chosen for program participation based on the perception that Asian-Brazilians are relatively well off. Either way, these findings do not suggest that there is much perceptible racial discrimination against Afro-Brazilians because, brown, black and indigenous Brazilians have just as much or more access to *Bolsa Família* if they are eligible as white Brazilians.

Overall, *Bolsa Família* is a fairly well targeted program. The majority of recipients (by percentage) are in the North and the Northeast regions. *Bolsa Família* is not large enough, however, to cover the entire poor population of Brazil. By percentage more Afro-Brazilians receive *Bolsa Família* funds than white Brazilians and also, the unemployed are more likely to receive program benefits than those that are employed.

Table 3-1. Average monthly per capita income by region, Brazil 2006

Region	Per capita income
North	R\$ 327.05
Northeast	R\$ 292.91
Southeast	R\$ 610.31
South	R\$ 590.98
Central-West	R\$ 558.07
Total	R\$ 490.78

F = 1329035, ss = 0.000

Source: PNAD 2006

Table 3-2. Distribution of *Bolsa Família* by Regions and States Brazil 2006

Region	Within the Region		State	Within the State	
	% of BF Recipients	# of BF Recipients		% of BF Recipients	# of BF Recipients
North	9.80%	3,832,516	Rondônia	0.75%	292,765
			Acre	0.52%	204,781
			Amazonas	2.11%	824,723
			Roraima	0.34%	131,406
			Pará	5.01%	1,960,214
			Amapá	0.11%	44,687
			Tocatins	0.94%	366,486
Northeast	53.90%	21,078,839	Maranhão	7.39%	2,890,406
			Piauí	3.54%	1,382,651
			Ceará	9.35%	3,655,051
			Rio Grande do Norte	2.82%	1,101,346
			Paraíba	4.26%	1,664,055
			Pernambuco	7.91%	3,095,041
			Alagoas	3.41%	1,331,638
			Sergipe	1.45%	568,163
			Bahia	13.82%	5,405,968

Source: PNAD 2006

Table 3-2. Continued

Region	Within the Region		State	Within the State	
	% of BF Recipients	# of BF Recipients		% of BF Recipients	# of BF Recipients
Southeast	24.00%	9,385,754	Minas Gerais	11.15%	4,362,195
			Espírito Santo	1.69%	661,876
			Rio de Janeiro	2.54%	992,589
			São Paulo	8.60%	3,364,031
South	8.00%	3,128,585	Paraná	3.46%	1,351,313
			Santa Catarina	0.97%	379,168
			Rio Grande do Sul	3.53%	1,381,912
Central-West	4.30%	1,681,614	Mato Grosso do Sul	0.73%	283,667
			Mato Grosso	1.13%	440,723
			Goiás	2.04%	797,905
			Distrito Federal	0.44%	172,548
Brazil	100.00%	39,107,308	Total	100.00%	39,107,308
Chi-square = 17793294.793, ss = 0.000			Chi-square = 20792164.273, ss = 0.000		

Source: PNAD 2006

Table 3-3. Average monthly per capita income by ethnicity, Brazil 2006

Ethnicity	Per Capita Income	Income Ratio (White Brazilians: comparison group)
White	R\$ 662.75	1 = (R\$ 662.75 / R\$ 662.75)
Asian	R\$ 1073.79	0.62 = (R\$ 662.75 / R\$ 1073.79)
Black	R\$ 346.29	1.93 = (R\$ 662.75 / R\$ 346.29)
Brown	R\$ 311.56	2.21 = (R\$ 662.75 / 311.56)
Indigenous	R\$ 353.44	1.88 = (R\$ 662.75 / R\$ 353.44)
Total	R\$ 490.78	1.35 = (R\$ 662.75 / R\$ 490.78)

F = 2021707, ss = 0.000

Source: PNAD 2006

Table 3-4. Distribution of *Bolsa Família* by ethnic groups, Brazil 2006

Ethnicity	% of BF Recipients	# of BF Recipients	Population of Brazil
White	12.89%	11,868,002	92,071,391
Asian	5.34%	48,278	904,081
Black	23.74%	3,052,882	12,859,656
Brown	30.17%	24,017,969	79,608,781
Indigenous	22.94%	117,804	513,530
Total	21.03%	39,106,849	185,957,439

F = 2052780, ss = 0.000

Source: PNAD 2006

Table 3-5. Distribution of *Bolsa Família* among employed and unemployed Brazilians, Brazil 2006

Employment Status	% of BF Recipients	# of BF Recipients	Working Age Population
Employed	17.39%	12,386,995	71,230,563
Unemployed	20.84%	17,499,098	83,968,800
Total	18.98%	29,456,839	155,199,363

F = 299108.3, ss = 0.000

Source: PNAD 2006

Table 3-6. *Bolsa Família* distribution by monthly per capita income, Brazil 2006

Per Capita Income	# of BF Recipients	% of BF Recipients	Brazilian Population
R\$ 0 - 70	9,294,055	57.62%	16,129,912
R\$ 71 - 140	14,218,977	48.12%	29,548,996
R\$ 141 - 210	8,318,276	30.98%	26,850,470
R\$ 211 - 280	3,841,009	18.08%	21,244,521
R\$ 281 +	3,438,593	3.73%	92,187,478
Total	39,107,678	21.03%	185,961,377

F = 14580017.292, ss = 0.000

Source: PNAD 2006

Table 3-7. Distribution of *Bolsa Família* by region within the eligible population (monthly per capita income  $\leq$  R\$ 140), Brazil 2006

Region	<u>Bolsa Família Recipient</u>		
	<u>Yes</u>	<u>No</u>	<u>Total</u>
North	2,199,879 (43.0%)	2,912,275 (57.0%)	5,112,154 (100.0%)
Northeast	14,748,193 (62.3%)	8,927,419 (37.7%)	23,675,612 (100.0%)
Southeast	4,376,479 (40.1%)	6,533,269 (59.9%)	10,909,748 (100.0%)
South	1,468,797 (41.2%)	2,094,876 (58.8%)	3,563,673 (100.0%)
Central-West	1,696,869 (70.2%)	720,852 (29.8%)	2,417,721 (100.0%)
Total	23,514,200 (51.5%)	22,164,708 (48.5%)	45,678,908 (100.0%)

Chi-square = 17793294.793, SS = 0.000

Source: PNAD 2006

Table 3-8. Distribution of *Bolsa Família* by ethnicity within the eligible population (monthly per capita income  $\leq$  R\$ 140), Brazil 2006

Ethnicity	<u>Bolsa Família Recipient</u>		
	<u>Yes</u>	<u>No</u>	<u>Total</u>
White	6,437,393 (46.3%)	7,456,226 (53.7%)	13,893,619 (100.0%)
Asian	27,752 (32.4%)	57,934 (67.6%)	85,686 (100.0%)
Black	1,767,162 (47.5%)	1,955,602 (52.5%)	3,722,764 (100.0%)
Brown	15,207,287 (54.7%)	12,609,195 (45.3%)	27,816,482 (100.0%)
Indigenous	73,549 (46.2%)	85,751 (53.8%)	159,300 (100.0%)
Total	23,513,143 (51.5%)	22,164,708 (48.5%)	45,677,851 (100.0%)

Chi-square = 7863883, SS = 0.000

Source: PNAD 2006



Figure 3-1. Map of the regions of Brazil

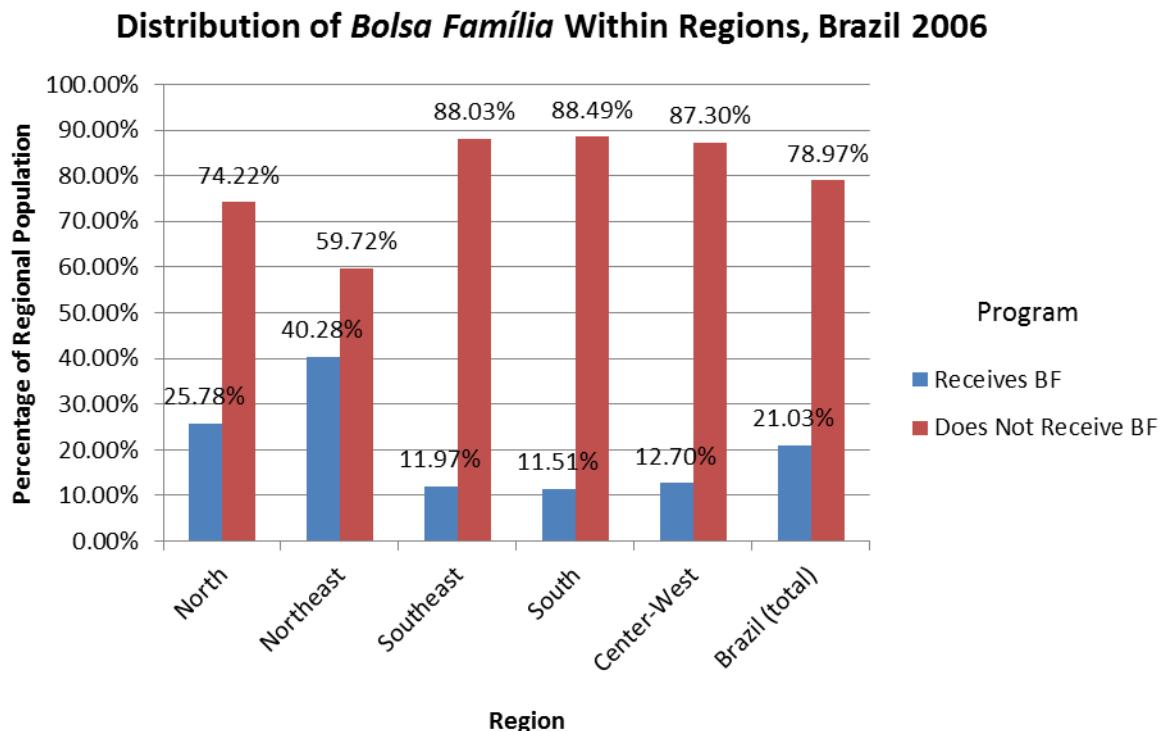


Figure 3-2. Distribution of *Bolsa Família* within regions, Brazil 2006

Source: PNAD 2006

### **Distribution of *Bolsa Família* by region Brazil 2006**

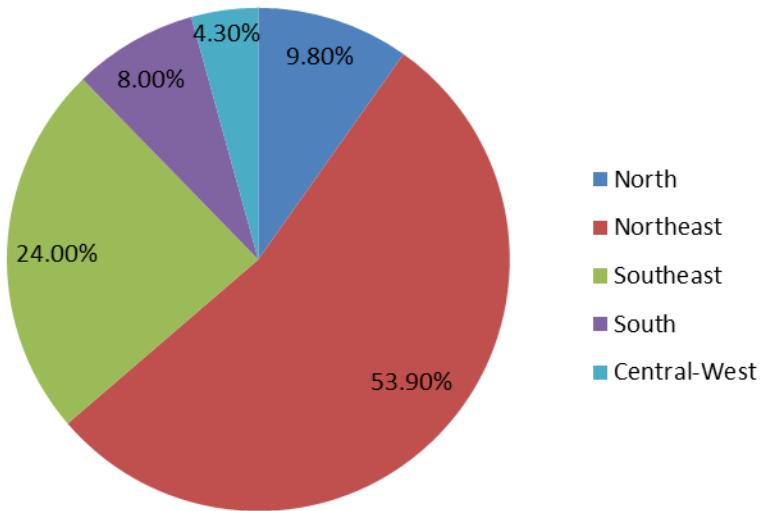


Figure 3-3. Distribution of *Bolsa Família* by region, Brazil 2006

Source: PNAD 2006

## CHAPTER 4

### EFFECTS OF CONDITIONAL CASH TRANSFER PROGRAMS ON CHILD HEALTH OUTCOMES

Improving health conditions and particularly child health conditions has long been a goal of developing countries. Conditional cash transfer programs are first and foremost, poverty alleviation programs; however, they have secondary goals of improving health and educational outcomes. Many questions remain about the effectiveness of conditional cash transfer programs. Primarily, are they achieving their stated goals? How much of an impact are these programs having on a range of health indicators including, vaccination rates, pre-natal care, malnutrition and mortality rates? Many authors have attempted to answer these questions. *Bolsa Família* includes conditions that directly promote vaccination rates and pre-natal care for expecting mothers. Moreover, we can hypothesize that participating in *Bolsa Família* might be correlated with lower child mortality rates because the program aims to improve health outcomes. Other conditional cash transfer programs across Latin America have had measurable positive influences on the health conditions of program participants. A review of the studies nonetheless shows how difficult it is to determine that *Bolsa Família* is having a positive impact on health outcomes of program participants.

#### **Justification for Program Impact on Various Health Indicators**

Many politicians focus on GDP growth, poverty reduction, unemployment, inequality and a range of other economic indicators to define development and the success of a program such as *Bolsa Família*. I however, would argue that the general wellbeing and health of people should be considered an important facet of measuring development. Denis Goulet takes the same position writing “Underdevelopment is

shocking: the squalor, disease, unnecessary deaths, and hopelessness of it all! No man understands if underdevelopment remains for him a mere statistic reflecting low income, poor housing, premature mortality, or underdevelopment" (cited in Franko 2007: 12). Therefore, health indicators can and should be used as measures of development as well. Furthermore, economic wellbeing is generally associated with improved health conditions and if the goal of economic development is to increase wealth and reduce poverty, it follows logically that a result and desired outcome should be better health outcomes.

### ***Bolsa Família Effects on Vaccination Coverage***

Participating in a conditional cash transfer program such as *Bolsa Família* has the potential to greatly influence health indicators. Vaccinations have a significant effect on child health because they help prevent diseases that can be debilitating or deadly from a very young age. Jeni Vaitsman and Rômulo Paes-Sousa organized a study to evaluate the effects of participating in *Bolsa Família* on health indicators. They used a Propensity Score Matching technique that compares the results of similar families from the treatment group (eligible families enrolled in the program) with the control group (eligible families not enrolled). The paired comparisons were necessary because the families chosen to participate in *Bolsa Família* are not randomly selected (they are determined by eligibility). As such, the Vaitsman and Paes-Sousa analysis is based on a quasi-experimental design. According to Vaitsman and Paes-Sousa, because

the program of vaccination has been a priority of the Ministry of Health and vaccination coverage in Brazil has grown considerably, there might not be a large difference between homes that have similar conditions of access to public health services. (2007: 32)

But they go on to state that program participation could still have a measurable impact. "Insertion in the *Bolsa Família* program can increase vaccine coverage for at least two reasons: first for being a condition of the program, which makes people (especially mothers) worry more about carrying out this type of care; and, secondly through an indirect impact, another way is that it can alter the expectations/behavior of individuals in relation to the public health care system" (Vaitsman & Paes-Sousa 2007: 32). Increasing vaccination coverage alone should make for a healthier society and reduce morbidity and mortality rates among children living in conditions of poverty.

They attempt to measure program participation by examining an experimental group that receives monthly transfers from the *Bolsa Família* program and a control group that does not. Furthermore, to control for time since entering the program, they calculate the indicators of vaccination considering three different age groups: children 0 – 6 years old, children 0 – 2 years old, and children 0 – 1 year old. By estimating the program impact for the 0 – 1 and 0 – 2 year old age groups, their idea is to control for entrance in the program inasmuch as younger children have a better chance of having been born while the program was already implemented in their household.

Vaitsman and Paes-Sousa find that there is not much of a difference in vaccination rates for children enrolled in the *Bolsa Família* program when compared to children that are beneficiaries of some other program. For example, the results on a national level indicate that children 0 – 6 years of age that participate in some social assistance program other than *Bolsa Família* are .007% more likely to have up-to-date vaccinations than those that participate in *Bolsa Família* (Vaitsman & Paes-Sousa 2007: 34). But what happens if program participants are compared to eligible yet non-program

participants? Comparing these two groups, Vaitsman and Paes-Sousa find that the differences are again minimal. In the Northeast region, more non-program participants were able to present their vaccination card (-0.050% for 0 – 6 years at an income cut-off of R\$200.00), whereas in the South and Southeastern regions, a larger percentage of *Bolsa Família* participants had their vaccination card ready (a difference of 0.067% in favor of program participants for 0 – 6 years old at R\$200.00) (Vaitsman & Paes-Sousa 2007: 38). Thus, the authors were unable to establish a definitive relationship between program participation and the likelihood of having their children immunized and being able to present a vaccination card.

The authors then turn their attention to the required vaccines during the first 6 months of life. In Brazil, every child below the age of 6 months is required to have a BCG (tuberculosis) vaccine, the first and second doses of anti-polio, DPT (Diphtheria, Pertussis, and Tetanus vaccine) and Hepatitis B vaccines (Vaitsman & Paes-Sousa 2007: 38). Again, the authors find that there isn't much of a difference, and if there is any effect, non-program participants are more likely to have received all of the obligatory vaccinations. Among children from 0 – 6 years old (using \$R 200.00 as the cut-off line for program eligibility), the difference between program participants and non-program participants is -0.004 meaning non-program participants are slightly more likely to have all required vaccinations. The same holds true for children aged 0 – 2 years old (-0.013), and 0 – 1 years old (-0.047) (Vaitsman & Paes-Sousa 2007: 39). This national pattern is observed generally in the Northeast, Southeast and South regions of Brazil, while in the North and Central-West program participants tended to have met the obligation of getting vaccinated more frequently than non-program participants

(Vaitsman & Paes-Sousa 2007: 39). It thus appears that participation in *Bolsa Família* has not proved successful in guaranteeing the vaccination of participants any more or less than those that do not participate in the program.

Vaitsman and Paes-Sousa offer a summary of the findings and one possible explanation:

the differences in the proportion of vaccinated children are unfavorable for the children that live in treated households [program participant households] in relation to children that live in households that are eligible beneficiaries of other programs and in relation to children that do not benefit from the program. This pattern repeats itself for Brazil and large regions of the country, with the exception of only the Southeast. One hypothesis that could justify this negative difference in the rate of vaccination is the access to public health services. The beneficiaries of *Bolsa Família* could live in areas of less demographic density and with worse conditions of access to health services. (2007: 40)

However, there are many more indicators to examine before determining whether *Bolsa Família* has had a positive health effect.

### ***Bolsa Família Effects on Pre-natal Care***

Care for expectant mothers is another central component of child health care. If mothers-to-be do not receive proper medical attention, their child's health will likely be compromised. Brazil's program requires expectant mothers to receive appropriate pre-natal care. However, because little research has estimated program effects on pre-natal care in Brazil, it is instructive to note a very similar program in Mexico. As in Brazil, the *Oportunidades* program requires that participants seek appropriate pre-natal care as one of the conditions for receiving the cash transfer. Several studies have attempted to determine the effect of this condition. For example, "Skoufias (2000) reported an 8% increase in the number of first-time prenatal care visits among first-trimester pregnant women" (Levy 2006: 50). Additionally, Levy (2006: 50) cites a study by Hernández and

Huerta that shows an increase in the percentage of program participants who sought prenatal care. The benefits of receiving prenatal care are multi-faceted, and should theoretically provide better care for the mother and child.

The same authors of the vaccination report in Brazil, Vaitsman and Paes-Sousa, also include a short section about the differences in the realization of pre-natal care. They attempted to measure whether or not expectant mothers received adequate pre-natal care. Vaitsman and Paes-Sousa point out “as was mentioned earlier, the adequacy of pre-natal care is a condition of *Bolsa Família*, so that it can be expected that pregnant women who receive program benefits have an additional incentive to realize all of the pre-natal consultations. Moreover, the perceptions that these women have of the offering of public services can be altered when they begin receiving the benefits from the program, so that their search for health services is more effective” (2007: 40). They constructed a dummy variable whereby they assigned a 0 to those who did not receive appropriate pre-natal care and a 1 to those who did. According to the authors, the minimum number of consultations that a woman should have during gestation is 6 (Vaitsman & Paes-Sousa 2007: 40). One of the complicating factors for this study is the fact that only a small number of cases are available for analysis. Of the women ages 10 – 49 surveyed only 582 or 3% were pregnant at the time of the survey and 101 of these cases had to be excluded because it was not possible to calculate the indicator of adequate pre-natal care for them (Vaitsman & Paes-Sousa 2007: 40). In the case of vaccinations, the authors observed little if any difference in receiving pre-natal care when comparing recipients of *Bolsa Família* with participants of other social programs (Vaitsman & Paes-Sousa 2007: 41). When they compared recipients of *Bolsa*

*Família* to pregnant women who do not receive benefits from any government program, the difference is a 0.748 in favor of *Bolsa Família* recipients with a cut-off of R\$200.00, but a difference of -.0925 with a cut-off of \$R100.00 (Vaitzman & Paes-Sousa 2007: 41). These conflicting results do not allow the researchers to draw firm conclusions about program effectiveness. Seemingly, participating in the *Bolsa Família* program does not increase the likelihood of pre-natal care. A more positive assessment of these findings concludes that the absence of a program effect is due to the fact that the rate of pre-natal care is similar for all groups, which itself is an accomplishment considering that the families in the *Bolsa Família* program are among the poorest and historically least served families in Brazil.

### ***Bolsa Família Effects on Child Weight and Height***

In addition to vaccination rates and pre-natal care, program participation could also have an impact on indicators of child malnutrition, as indicated by average child weight and average child height. In a study published in the *Journal of Nutrition*, Morris et al. state, "Stunting, the retardation of linear growth, is caused by factors that include lack of access to nutritionally rich diets (1), inadequate infant feeding practices (2), and repeated illness (3). All of these factors are related to poverty, with the result that, within countries, stunting consistently affects children from poorer families more than those who are better off" (2004: 2336). The authors attempted to measure the impact of being a beneficiary of *Bolsa Família* on child height and weight. At the time of the study, the *Bolsa Família* program as it is today did not exist. Before *Bolsa Família* existed there were various other conditional cash transfer programs that were targeted towards specific needs. For example *Bolsa Escola* included educational requirements and *Bolsa*

*Alimentação* included nutritional and health requirements. The *Bolsa Alimentação* recipients were the target study group of this analysis.

To create experimental and control groups, Morris et al. evaluated “program beneficiaries with matched individuals from households that were originally selected to receive the benefit but who subsequently were excluded due to 1 of 3 quasi-random, administrative errors” (2004: 2337). The authors also attempted to account for other factors, such as receiving benefits from another program like *Bolsa Escola*, that could bias the outcome of the study. “After adjustment for *Bolsa Escola* beneficiary status and number of other children in the family,” the authors concluded that “children living in *Bolsa Alimentação* beneficiary households had significantly lower weight-for-age at the time of the survey than did children living in excluded households ( $P=0.024$ )” (Morris et al. 2004: 2339). This would seem to indicate that receiving benefits from *Bolsa Alimentação* does not significantly improve the average weight-for-age of children living in beneficiary households. They go on to conclude that, “the retrospective cohort analysis of the routinely recorded weight data indicated that there was weak or no evidence of a weight difference between *Bolsa Alimentação* beneficiary children and excluded children at the time of enrollment ( $P=0.063$ ). However, every additional month of receipt of *Bolsa Alimentação* transfers was associated with  $31 \pm 7$  grams (SE) less weight gained ( $P<0.001$ ). Over a 6 month period, this implies that *Bolsa Alimentação* beneficiary children gained 183 grams less than excluded children of the same ages. If the same analysis is repeated excluding all children in households receiving *Bolsa Escola* benefits, an even larger differential growth rate of *Bolsa Alimentação* beneficiary children is found, with each additional month of receipt of *Bolsa Alimentação* transfers

associated with  $40 \pm 9$  grams (SE) less weight gained ( $P<0.001$ )” (Morris et al. 2004: 2339).

Similar results were found in studies of program impact on average child height-for-age measures. Morris et al., showed negative outcomes for the coefficient of the impact on height-for-age: -0.110 for children younger than 24 months, -0.190 for children from 24-48 months and -0.040 for children from 49-83 months (Fiszbein et al. 2009: 146). Again, this signifies that participating in the program is correlated with a more adverse outcome. The authors conclude that although being a program beneficiary tends to increase the availability of nutritious foods for a household, there might still be a negative impact because of the incentive effects. That is to say that, mothers might have believed that receiving the benefits of *Bolsa Família* were also contingent on their children being underweight, even though the transfers depend solely on income and not on the child’s weight. Such a perspective could exist, as Morris et al. indicate, since a subsidized nutritional supplement program did function on the basis of having underweight children in the past. Specifically, the *Incentivo para o Combate de Carências Nutricionais* program provided mothers with powdered milk if they had underweight children (2004: 2340). This could be one possible explanation, but we have no way of verifying the validity of this claim.

### ***Bolsa Família Effects on Child Mortality Rates***

Child healthcare can be measured in a number of different ways. Depending on the gravity of the health situation, some indicators might offer a more accurate picture of the panorama of the health problems facing a country than others. For example, a country with good health conditions might be more concerned with average child weight and height indicators, whereas countries with poor health conditions might be focused

on child mortality rates and vaccination coverage. Brazil is a middle-income country with relatively good health indicators, but it still faces the challenge of improving its infant mortality rate, which is 17 deaths per 1,000 live births, according to the World Bank. Reducing poverty is a bigger concern for Brazil, but as Sonia Rocha points out, poverty is not synonymous with a range of problems that are commonly associated with poverty. She writes,

marginality, malnutrition, unemployment, illiteracy are all critical problems in Brazil, but they are not synonyms with poverty, nor are they always associated with it, especially if poverty is defined as a lack of income, and not as a symptom of diverse deficiencies. (Rocha 2008: 103)

She goes on to conclude that “using income as the criteria for defining a poor sub-population and from there inferring that the poor are malnourished is a grave conceptual mistake” (Rocha 2008: 103). She is correct in saying that neither does being poor make a person malnourished, nor does being malnourished make a person poor.

However, poverty and malnourishment are indeed positively correlated. In their study of demography and inequality in Brazil, Charles Wood and José Alberto Magno de Carvalho (1988) document a correlation between income and the infant mortality rate. They analyzed data from São Paulo from 1963-1979 and found that as the real wage index increased, infant mortality rates declined. Then during a period of economic hardship and declining real wages, the infant mortality index increased. Referring to a graph that shows the relationship between the two measures, they write

the trends are nearly mirror images of one another, indicating a strong inverse relationship between the two. The decline in the real value of the minimum wage from 1964 through the early 1970s is associated with a rise in infant mortality. The upward trend in the death rate, however, was reversed in the late 1970s, when the minimum wage regained purchasing power. (Wood and Magno de Carvalho 1988: 116)

Therefore, it is evident that there is an inverse relationship between income and infant mortality rates. Conceptually, that implies that changes in the real income of a family could affect the child mortality rates. Thus, it is both possible and logical to hypothesize that receiving a monthly cash stipend from a conditional cash transfer program could have an effect on the child mortality rates of program participants.

Although it is theoretically possible to foresee a relationship between poverty reduction and child mortality rates, it would also be prudent not to have expectations that are too high. First of all, it should be noted that the death of a child is an extreme and relatively rare event, at least compared to child morbidity. Many children get sick; only a few of them actually die, even in high mortality regimes. Second, a review of the literature reveals very weak relationships between participation in the *Bolsa Família* program and a range of health indicators including vaccination rate, pre-natal care and child height. Sonia Rocha writes,

demographic studies carried out in the 90's show a sustained drop in mortality rates due to progresses in medicine, in particular preventative measures such as vaccination coverage, and in the infrastructure of basic sanitation, not depending, therefore, strictly on socio-economic improvements as measures of the income. (2008: 106)

What then are the factors that affect child mortality rates? Vaccination coverage, access to health clinics, proper nutrition and safe-drinking water are all factors that the government can improve for the people without necessarily improving their situation of poverty (as defined by insufficient per capita income). Rocha goes on to analyze the correlation between the reason for mortality and extreme poverty (assuming that extreme poverty would be correlated more with mortality than slight poverty). She states,

observe that the correlation for the country as a whole is elevated, incidentally as was expected, but the result of 0.71 is far from indicating that the proportion is an excellent proxy for infant mortality. The results by region provide evidence that, the same in the Northeast and the North, the poorest regions and where infant mortality is also more elevated, there exists a great diversity of explicative situations for infant mortality, which results in relatively weak correlations between the two variables. (Rocha 2008: 118)

Thus, I would caution that the results of a study of the relationship between participation in the *Bolsa Família* program and child mortality rates are not likely to provide a definitive answer to the relationship between poverty reduction and child mortality. Studies should also consider the strong impact that public health policies have made in reducing the child mortality rate. I was not able to find any studies that specifically attempt to analyze the effects of program participation on child mortality rates.

### **Health Outcomes in Other CCT Programs**

As previously mentioned, other countries in Latin America have conditional cash transfer programs that have had positive effects on the health outcomes of program participants. Two such programs are the *Familias en Acción* program in Colombia and the *Oportunidades* program in Mexico. CCTs are effective at increasing the use of preventative healthcare services. The authors of a World Bank policy research report calculated that participation in Colombia's Families in Action program had a 22.8% positive impact on the health center visits by children aged 0-1 (Fiszbein et al. 2009: 137). Similarly, the impact for children aged 2-4 was 33.2% and both were significant at the 1% level (Fiszbein et al. 2009: 137). Almost every other Latin American country included in the report exhibited the same positive correlation between program participation and the number of visits to health centers. Notably, only Mexico exhibited a slightly negative correlation for children from 0-2 years old (Fiszbein et al. 2009: 138).

Other studies contradict the findings in Mexico. Gertler (2000) documents a significant increase in the demand for preventative healthcare services among program participants in rural areas (Levy 2006: 49). The same study found a 30 to 60% increase of “visits to monitor nutritional status” for children younger than 2 years old in the Opportunities program (Levy 2006: 49). However, simply visiting a health center does not result in better health outcomes for program participants. Women who participate in the program are required to visit a health center, but visits alone do not improve their health. What matters are the lectures participants are required to attend, which encourage behaviors that improve their health in the long run.

Studies reach various conclusions about whether participation in a CCT program is associated with taller children. For example, numerous studies (including Gertler 2004) found a generally positive impact of program participation for child height in Mexico (Fiszbein et al. 2009: 147). Attanasio et al. (2005), also found a positive impact for program participation in Colombia’s Families in Action program (Fiszbein et al. 2009: 146). However, Morris, Olinto et al. (2004) found a negative effect among children in Brazil participating in the *Bolsa Alimentação* program (Fiszbein et al. 2009: 146). The conflicting results indicate that, with respect to the height-for-age indicator, the findings are inconclusive.

For Mexico’s *Oportunidades* program, receiving appropriate pre-natal care is one of the conditions for receiving the cash transfer. It serves to remember that Skoufias (2000) and Hernández and Huerta (2000) found positive correlations between program participation and pre-natal care in Mexico. Also, using municipal administrative data, Barham (2005) found an 11% decrease of infant mortality rates among *Oportunidades*

participants (Levy 2006: 51). Overall, the studies cited seem to conclude that participating in the Opportunities program in Mexico has positive health benefits in terms of prenatal care and infant mortality rates. Prenatal care is especially important because pregnant women are more vulnerable to health complications than other individuals, and a lack of proper care could result in problems for the development of the child or a failure to detect potential problems.

Because of conditional cash transfer programs' focus on developing human capital for young members of society, many studies address the health effects for children in participating families. Morbidity, or the incidence rate of disease, is an important indicator for determining the prevalence of disease and determining the health of a community. Paul Gertler (2000) determined that children who participated in *Oportunidades* developed more disease resistance than children who did not participate in the program. These findings are reflected in the fact that "specifically, the incidence of disease among children aged zero to two years dropped 12% compared with the incidence among non-program children; that figure was 11% for children aged three to five" (Levy 2006: 52). Several reasons could contribute to an effective explanation of these findings. First, program participants might have a more nutritionally balanced diet due to their family's participation. Also, they are required to go to health clinics for regular check-ups that should be successful in preventing more disease. Later studies, specifically Bautista and others (2004), substantiate these results.

### **Implications**

The existing literature and studies show a significant increase in the probability that parents who participate in certain conditional cash transfer programs use educational and healthcare services. Studies of Mexico's Opportunities program

suggest that program participation is responsible for a decrease in infant mortality rates, decreased child morbidity rates, increased child height for age measurements, and increased prenatal care. These results are certainly encouraging that CCTs are able to achieve their stated goals, at least to some degree. However, evaluations of *Bolsa Família* do not show the same encouraging results. *Bolsa Família* does not appear to be associated with any positive outcomes on child health indicators thus far studied.

Where does that leave us in relation to the overall status of *Bolsa Família* as a policy that is supposed to improve child health indicators? First of all, it is necessary to remember that *Bolsa Família* is designed primarily as a poverty alleviation program and secondarily as a human capital development program. Yes, better child health outcomes are certainly desired outcomes, but not finding the results that we would like does not indicate that the program is a total failure. There are still many areas of health indicators to explore in connection to *Bolsa Família*. For example, does program participation increase usage of public health services or visits to health clinics? Also, are there institutional factors, such as limited access to health clinics that impede or make it difficult to comply with program requirements? Negative findings do not mean that we should simply write the program off. Perhaps, an analysis of Mexico's program and the differences of implementation could benefit policy-makers in Brazil and allow them to make some changes to help *Bolsa Família* comply with its stated objectives.

## CHAPTER 5

### CHILD MORTALITY IN BRAZIL

#### Determinants of Child Mortality

For the purposes of mortality studies, demographers typically define the child maturation process as the years from birth to age 5. This is because the majority of child deaths occur within the first year of life, and by the age of 5, mortality rates typically are closer to the rate of the 5-9 age category (Chen 1983: 204-205). There are many different factors that influence a child's health during the early stages of life. These factors can be categorized into four main groups of the proximate determinants of child mortality, including 1) parental factors, 2) nutrition and diet, 3) infections and infestations, and 4) childcare factors (Chen 1983: 200). Proximate determinants are variables that have a direct impact on the mortality of a child. More specifically, according to Chen there are generally "three direct causes of most childhood mortality: infections, protein-calorie malnutrition, and trauma" (1983: 205).

Chen's work has done much to clarify the factors that influence child survival. The key insight is the notion that, as the term indicates, a proximate determinant is a variable that is most closely associated (in a causal sense) with the probability of death. This means that other variables that can influence child mortality must necessarily operate through one or more of the proximate determinants. Common sense can tell us that, say, greater income is associated with lower mortality. However, a moment's reflection is sufficient to recognize that income *per se* has no direct effect on child health, but operates only through its effect on other variables. Chen's conceptual contribution was to identify a finite and exhaustive set of such proximate determinants.

Poverty is therefore a factor that indirectly has an effect on child mortality by having an impact, to one degree or another, on almost all of the proximate determinants. Other indirect variables are socio-economic variables, such as education level, which could affect the knowledge a female has about how to best care for her newborn child. However, a mother not knowing about the importance of a healthy maternal diet does not directly predispose her child to health problems at an early age. Socio-economic factors that impact child mortality operate through proximate determinants. Therefore, when analyzing the data from Brazil, I will attempt to control for socio-economic variables, as much as possible given the constraints of the dataset. Theoretically, if one were able to control for all conceivable indirect variables, any observed effect from participating in the program would have a direct impact on the proximate determinants.

With respect to the proximate determinants of child mortality, it is necessary to note a few of the factors that lead to a higher incidence of child mortality. Parental factors are the physical factors of the child's parents that affect the child; typically the child is heavily influenced by the mother's characteristics. Research shows that a woman having a child at very young (under 17) or very old (over 35) ages leads to a greater risk of child mortality (1983: 208). For this reason, in the analysis of the PNAD data, I will restrict the sample size to women aged 18-34, bearing in mind that older women are more likely to have children that were born and matured to the age of 5 before the family was ever incorporated into the *Bolsa Família* program. Other parental factors that greatly impact child mortality are premature births and maternal nutritional status. If the mother does not consume sufficient nutrients for herself and the baby while

she is pregnant, the child will be born underweight, which also raises the risk of child mortality.

The fact that nutritional and diet factors are proximate determinants of child mortality seems self evident. If a child does not receive proper nutrition, he/she could become malnourished, which in turn leaves the body weak and sometimes unable to defend against infections. Infections and infestations constitute a third group of proximate determinants. According to Chen, “the most common infectious causes of childhood deaths are diarrheal diseases (due to shigella and E. coli bacteria and rotavirus); respiratory diseases (such as pertussis, diphtheria, tuberculosis, and bacterial and viral pneumonias); and other infections (such as measles)” (1983: 213). Children can pick up infections in numerous different places either through direct contact with bacteria, airborne exposure or consumption of contaminated food and water (Chen 1983: 213). The final group of proximate determinants of child mortality is childcare factors. These include vaccinations, access to medicine and healthcare. Childcare factors are thus easily impacted by the development of new technology/medicines, which has played a critical role in reducing child mortality rates across the globe.

### **Child Mortality in Brazil**

Brazil has made advances in reducing child mortality, especially in the post-WWII period. Due in part to access to better technology and better understanding of the diseases that affect children, Brazil and other developing countries were able to catch up to more developed countries and drastically reduce their child mortality rates.

Eduardo Arriaga is quoted in a study of the Brazilian Institute of Geography and Statistics, saying

these countries (including Brazil) do not have to develop and maintain a major medical establishment of their own; rather they can import new techniques, discoveries, or drugs from more advanced nations, as well as receive international financial and material aid. Hence the public health variable is almost independent of the country's economy; it depends a great deal on medical progress and development in other countries. In other words, assuming that most new medical discoveries occur in the most advanced countries, the public health program of an underdeveloped country is related more to the economy of the advanced countries than it is to its own economy. (Simões 1999: 14)

However, not all authors agree that developing countries can simply reduce the child mortality rate by importing technology and new medicine. Some authors, including Susan Scrimshaw (1974), argue that it is really better nutrition that causes a drop in the child mortality rate.

Either way, the post-war period of Brazilian history witnessed a dramatic drop in child mortality rates. From 1945 to 1990, the infant mortality rate for all of Brazil fell from 144 deaths per 1,000 children to 48.3 deaths per 1,000 children (Simões 1999: 20).

Table 5-1 was composed using census information and results from the PNAD. Observing Table 5-1 shows sustained and significant decreases in the infant mortality rate in each region of Brazil. Some regions made more progress than others during the period from 1930 – 1990. For example, the North and the Northeast regions each began at approximately 193 deaths per 1,000 children in 1930 but the North ended with 44.6 deaths per 1,000 children whereas the Northeast had 74.3 deaths per 1,000 children in 1990 (Simões 1999: 20). What could have caused the Northeast to lag behind other regions in controlling the infant mortality rate? Could it be due to the pervasiveness of poverty in the Northeast?

Figure 5-1 shows the same information but in a different format. Figure 5-1 visually highlights the dramatic advances Brazil achieved in reducing infant mortality rate after WWII. As of 1990, the Northeast was registering the highest infant mortality rate with 74.3 deaths per 1,000 children and the South was registering the lowest infant mortality rate with 27.4 deaths per 1,000 children.

### **Recent Child Mortality Statistics**

Since that time, Brazil has continued to make advances in reducing the child mortality rate. The World Bank releases data known as the World Development Indicators every year to track the progress of developing countries in combating the problems that they face. According to these data, Brazil has been providing more of its citizens with access to sanitation facilities and has also witnessed a decline in malnutrition (World Bank Online). Overall, this has helped contribute to a dramatic decline in the infant mortality rate and the under-5 mortality rate. As shown in Figure 5-2 the infant mortality rate has fallen over the past decades and is now approximately 17 deaths per 1,000 live births (World Bank Online).

Figure 5-2 shows the sustained decline of the infant mortality rate even into the new millennium. Similarly, the mortality rate for children under the age of 5 has also been reduced drastically. The under-5 mortality rate is approximately 20.6 deaths per 1,000 children (World Bank Online). Figure 5-3 highlights these findings. Overall, Brazil has made tremendous progress in combating infant and child mortality. Nonetheless, there is still room for improvement, and programs such as *Bolsa Família* have the potential to help reduce the infant and child mortality rates even further.

## **Leading Causes of Child Mortality in Brazil**

Over time, the leading causes of death in Brazil have changed. While diarrhea and respiratory infections used to account for the largest percentage of child deaths in Brazil, perinatal conditions now account for more than half of all child deaths. According to Cesar Gomes Victoria and Fernando Celso Barros, perinatal conditions accounted for 56.8% of all infant deaths in Brazil from 1995-1997 (2001: 36). The perinatal period refers to the period of time from the 22<sup>nd</sup> week of gestation to the 7<sup>th</sup> completed day after birth. The term “perinatal conditions” refers specifically to any condition or problem that originates during the perinatal period and leads to child death after birth.

Perinatal causes can be further subdivided according to the problem that occurs within the given perinatal period. Gomes Victoria and Celso Barros state, “of all perinatal-cause infant deaths in 1996-7, 60.7% were due to respiratory or cardiovascular conditions specific to the perinatal period, 8.4% were due to problems affecting fetal growth and/or duration of the pregnancy, 6.9% due to perinatal problems related to pregnancy complications, 0.3% due to birth trauma and 23.7% due to the remaining problems originated in the perinatal period” (2001: 36). Approximately 21% of infant deaths due to perinatal causes are due to respiratory distress syndrome, 11% are due to hypoxia or anoxia and 28.7% are due to other respiratory conditions (Gomes Victoria 2001: 37). Together, these respiratory and cardiovascular conditions account for approximately 3/5 of all infant deaths due to perinatal causes. Figure 5-4 shows the distribution of infant deaths in Brazil due to perinatal causes.

The second leading cause of infant death in Brazil is congenital malformations. These malformations include physical defects present at birth due to genetics, exposure of the fetus to toxic substances (including drugs and alcohol), and other unknown

reasons. Malformations accounted for 11.2% of all infant deaths in Brazil from 1995-1997 (Gomes Victoria 2001: 36). Examples of malformations include heart defects, Down syndrome and spina bifida. Congenital malformations are very difficult to prevent. The use of vaccines and medicines makes it easier to reduce the number of deaths due to infections and disease. Therefore as the number of deaths due to infections and disease decreases, the relative percentage of deaths due to malformations increases.

Acute respiratory illnesses are the third leading cause of infant death in Brazil. The majority of these deaths are caused by pneumonia. Finally, diarrhea and other infections are the fourth leading cause of infant mortality in Brazil (Gomes Victoria 2001: 36).

### **Connecting *Bolsa Família* with Child Mortality**

Theoretically, it is logical to expect a correlation between *Bolsa Família* and child mortality rates because several of the factors that influence mortality rates should be impacted by program participation. Most importantly, children could potentially die from a number of different diseases. *Bolsa Família* requires participating families to follow the standard vaccination schedule for their children which should help protect them against these diseases. Furthermore, *Bolsa Família* participants should follow the guide for growth and development. To do so requires regular visits to a local health clinic which should help keep children healthy and increase the knowledge of the availability public health services for participating families. In the event of an emergency, *Bolsa Família* participant families should at least be more familiar with getting help from the local health clinic. Finally, nutrition certainly impacts a child's overall health and the child's susceptibility to disease. According to a study by Marco Aurélio Weissheimer, 76.4% of the families interviewed spent the money received from the *Bolsa Família* program on

food for the family (2006: 94). Also encouragingly, 11.1% of the families bought school supplies and 5.4% bought clothes (Weissheimer 2006: 94). Furthermore, over 80% of the families studied in the *Bolsa Família* program responded that they ran out of food before they had the financial means to buy more food. Therefore, it is clear that *Bolsa Família* is very important for families to buy the food they need to survive and stay healthy.

Food insecurity is still a problem in Brazil because extremely poor families cannot guarantee that they will always have enough food to eat. The Brazilian Institute of Geography and Statistics uses a scale to measure food insecurity that includes four categories: nutritional security, slight nutritional insecurity, moderate nutritional insecurity and severe nutritional insecurity (Weissheimer 2006: 43). Weissheimer states that of the participating families that were interviewed, before entering the *Bolsa Família* program, 58.3% reported that in the past three months, a family member had to forgo eating or eat less due to a lack of food (2006: 96). This represents a situation of at least moderate nutritional insecurity. However, after joining *Bolsa Família*, the percentage was reduced to 48%, representing a more stable food situation for many families (Weissheimer 2006: 96). Further data to support the better nutritional outcome for program participants includes 85.6% reporting an improvement in alimentation after joining the program, 59.2% reporting an increase in the quantity of food consumed and 73.3% citing an increase in the variety of food (Weissheimer 2006: 96).

Figure 5-5, shows a conceptual framework of how *Bolsa Família* indirectly impacts child mortality through the proximate determinants of parental factors, nutrition and diet, infections and infestations, and childcare factors. Although there are many

causes of child mortality, some are easier to solve than others. Take for example the proximate determinants of child mortality: parental factors, nutrition and diet, infections and infestations and childcare factors. Conceptually we can also group the determinants of child mortality in two groups: exogenous and endogenous factors. Exogenous factors are external factors that cause child mortality including nutrition and infection or infestation. Endogenous factors, on the other hand, are internal factors such as parental factors or birth trauma. This distinction is important because it is easier to reduce child mortality due to exogenous factors. Over the past decades, Brazil has effectively reduced the child mortality rate by providing better vaccination coverage and ensuring that children have access to better food. The fact that perinatal causes and malformations have replaced diarrhea and infections as the leading causes of child death evidences the fact that the Brazil has been successful in combating exogenous causes of child death. However, it remains to be seen if in recent years, *Bolsa Família* has contributed to a reduction of child mortality. Given Chen's framework of the proximate determinants of child mortality and the potential for *Bolsa Família* to affect both endogenous and exogenous causes of child death, Chapter 6 analyzes the effect of *Bolsa Família* on the child mortality rate in Brazil.

Table 5-1. Infant mortality rate in Brazil by regions, Brazil 1930-1990

Year	Brazil	North	Infant Mortality Rate (%)			
			Northeast	Southeast	South	Central-West
1930	162.4	193.3	193.2	153.0	121.0	146.0
1935	152.7	170.0	188.0	145.0	120.0	133.0
1940	150.0	166.0	187.0	140.0	118.0	133.0
1945	144.0	156.0	185.0	130.0	113.0	123.0
1950	135.0	145.4	175.0	122.0	109.0	119.0
1955	128.2	127.5	169.6	108.0	94.7	114.0
1960	124.0	122.9	164.1	110.0	96.0	115.0
1965	116.0	111.3	153.5	96.0	84.0	99.0
1970	115.0	104.3	146.4	96.2	81.9	89.7
1975	100.0	94.0	128.0	86.0	72.0	77.0
1980	82.8	79.4	117.6	57.0	58.9	69.6
1985	62.9	60.8	93.6	42.6	39.5	47.1
1990	48.3	44.6	74.3	33.6	27.4	31.2

Sources: Demographic Censuses 1940-1991. Rio de Janeiro: IBGE, 1950-1997; Pesquisa nacional por amostra de domicílios (PNAD) 1992-1993, 1995. Rio de Janeiro: IBGE, v. 15-17, 1997.  
 (Simões 1999: 20)

## Infant mortality rate and relative variation according to region: Brazil 1930 - 1990

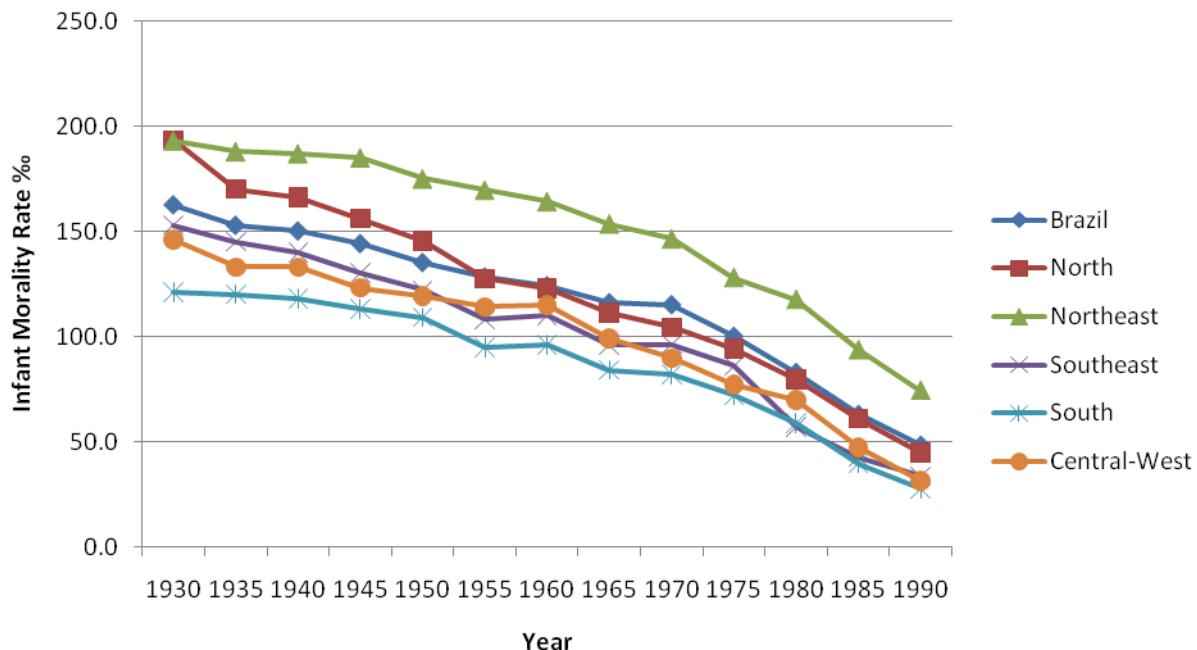


Figure 5-1. Infant mortality rate and relative variation according to region: Brazil 1930-1990

Sources: Demographic Census 1940-1991. Rio de Janeiro: IBGE, 1950-1997; Pesquisa nacional por amostra de domicílios (PNAD) 1992-1993, 1995. Rio de Janeiro: IBGE, v. 15-17, 1997.

(Simões 1999: 21)

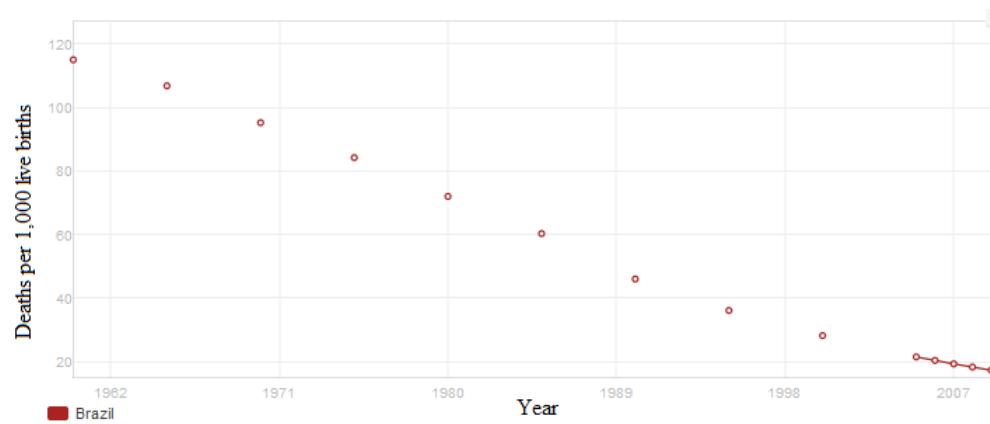


Figure 5-2. Infant mortality rate (per 1,000 live births): Brazil (1962-2009)

Source: Source: World Bank Online.

<http://data.worldbank.org/indicator/SP.DYN.IMRT.IN/countries/BR?display=graph>

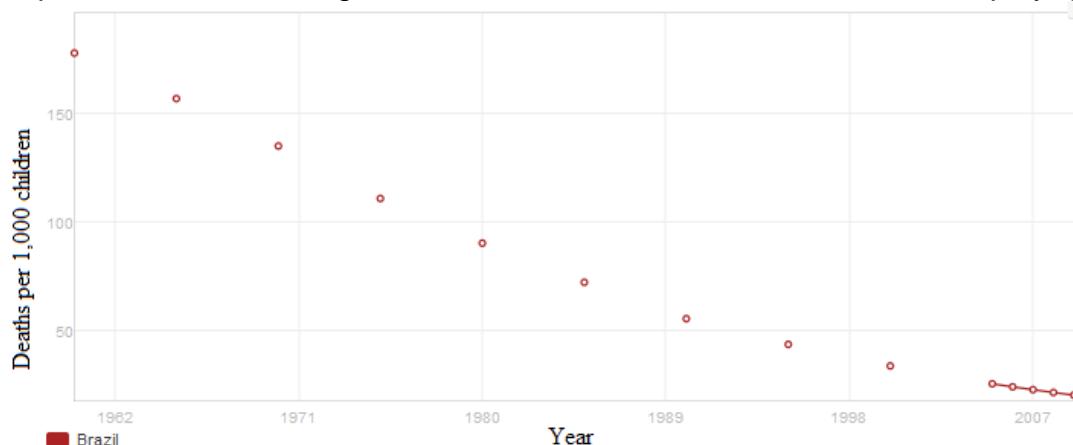


Figure 5-3. Under-5 mortality rate (per 1,000): Brazil (1962-2009)

Source: World Bank Online.

<http://data.worldbank.org/indicator/SH.DYN.MORT/countries/BR?display=graph>

#### Distribution of infant deaths in Brazil (1995-1997) due to perinatal causes

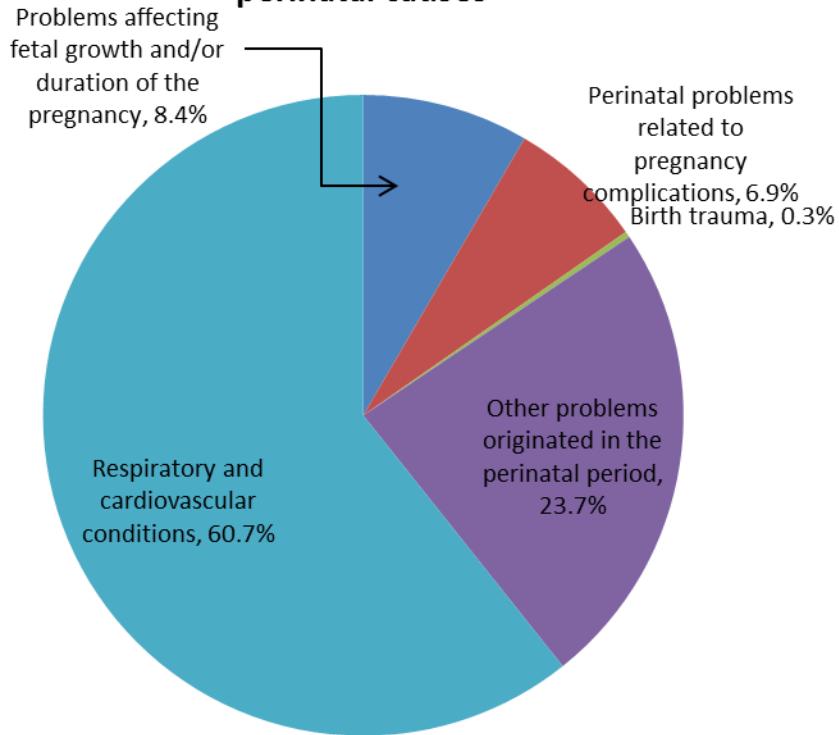


Figure 5-4. Distribution of infant deaths in Brazil (1995-1997) due to perinatal causes

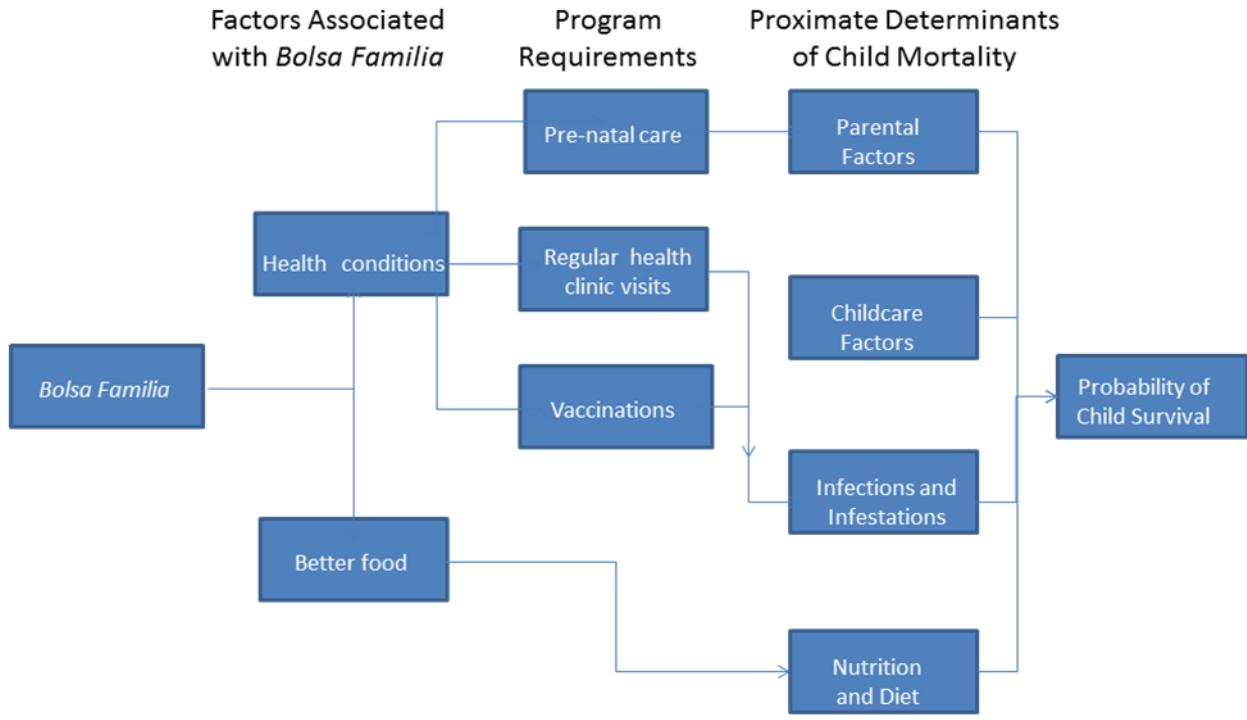


Figure 5-5. Conceptual Diagram of the Pathways through which *Bolsa Familia* Affects Child Mortality

## CHAPTER 6

### DOES BOLSA FAMILIA REDUCE CHILD MORTALITY?

The purpose of Chapter 6 is to test the hypothesis that, net of other independent variables that influence child survival, families who participate in the *Bolsa Família* program have lower rates of infant and child mortality compared to families that do not participate in the program. The first section describes the data that I will use, specifically the 2006 *Pesquisa Nacional por Amostra de Domicílios* – PNAD (the National Survey of Household Samples). The second section presents the design and methods of the analysis by addressing three main issues: it describes the dependent and independent variables, it summarizes the rationale for using logistic regression techniques, and it justifies the reasons for limiting the sample to a targeted sub-population. The results of the analysis appear in the third section, followed by interpretations and conclusion.

#### **PNAD 2006**

National health institutions typically use data collected in the official vital registration system in order to estimate infant and child mortality rates. To calculate the conventional rate, the denominator of the ratio is the total number of children born during a year. The numerator is the total number of children who died during the same period. The ratio is then multiplied by 1,000 in order to produce a standardized estimate.

The conventional method of estimating infant and child mortality is fraught with a number of limitations, especially in countries with a weak vital registration system. In Brazil, parents do not always register children who are born to them, nor do they always register the children who have died. The magnitude of the error is generally larger in the case of the numerator (deaths) compared to the denominator (births) of the ratio. Moreover, the relative magnitude of both errors varies geographically, such that the vital

registration system is more accurate in the more developed regions and less accurate in the less developed regions of the country. In addition to the questionable accuracy of official data on births and deaths, the vital registration system is also limited, at least for the purposes of analysis, by the fact that the records contain very little additional information beyond the date of the event and the age of child.

In the face of these problems, demographers estimate infant and child mortality on the basis of census and survey data. Unlike the vital registration system, which continuously collects information, censuses and surveys are conducted at a point in time. For this reason and for many others, censuses and surveys are subject to their own limitations. The main drawback stems from the fact that the exact date of an event – a birth or a death – is not known. This limitation, as it turns out, is not fatal, provided there is information on the mother's age. Common sense, verified by sophisticated demographic techniques, confirms a close relationship between the age of mother and the age of her children: in the cross-section, younger women on average have younger children; older women on average have older children. If the age pattern of fertility is known, the exact age of children can be estimated with a high degree of precision.

For the purposes of this study, the important point is that the PNAD household surveys include information on the mother's age, as well as information on the number of live births and the number of children who are still alive at the time of the interview. This information makes it possible to identify parous mothers who have experienced at least one child death (coded 1; 0 otherwise). Similarly, it also makes it possible to narrow the analysis to young women, 20-24 years of age, thereby ensuring that the risk of death is to younger rather than older children. With the individual-level indicator of

infant/child death in hand, I can model the outcome variable using the wealth of information contained in PNAD 2006. The *Pesquisa Nacional por Amostra de Domicílios* – PNAD (the National Household Survey – is administered in Brazil every year by the *Instituto Brasileiro de Geografia e Estatística* – IBGE (the Brazilian Institute of Geography and Statistics), an agency of the federal government. The PNAD surveys collect data on more than 400,000 respondents including living conditions, educational attainment, occupational status, migration and family status. Because the sample size is so large, it means that many findings will be nationally representative, but also contain sufficient cases for carrying out sub-national analyses.

The 2006 PNAD dataset was appropriate for this study because, added to the core question, is a supplemental questionnaire which specifically asks respondents if they receive program benefits from *Bolsa Família*. PNAD 2006 specifically asks, “Do you or anyone in your household receive benefits from the *Bolsa Família* program?” This information allows me to identify program participants. Other datasets ask respondents if they receive funds from a government funded social welfare program but do not refer to the specific program. Also, PNAD contains additional socio-economic and demographic information that allows me to control for variables that are known to influence child survival.

### **Weighting the Sample**

To ensure that every region of Brazil is represented properly and proportionately to its population, I weighted the dataset. The dataset includes a variable called “person weight” that is used to expand the sample of approximately 400,000 cases to the entire population of Brazil. However, to maintain the original size of the sample (because expanding the number of cases to the entire population of Brazil would likely make all

variables statistically significant), I created a new variable known as “weight factor”. It is equivalent to the original weight multiplied by the sample interval (.0022053496). Weighting the dataset with the variable “weight factor” produces a sample that is representative of the population yet is nonetheless the same size as the original unweighted sample.

### **Logisitc Regression**

The dependent variable in the analysis that follows is a dichotomy. Women who have experienced a child death are coded 1; women who have not experienced a child death are coded 0. The objective is to use multivariate techniques to model the probability of the outcome variable, in this case the probability of at least one child death.

When the dependent variable is a dichotomy, ordinary least squares regression is not appropriate. Using a dichotomous dependent variable in OLS regression violates the assumptions of normality and homoscedasticity (because a normal distribution is impossible with only two values). Also, when the values can only be 0 or 1, residuals (error) will be low for the portions of the regression line near  $Y=0$  and  $Y=1$ , but high in the middle. Hence the error term will violate the assumption of homoscedasticity (equal variances). Even with large samples, standard errors and significance tests will be in error because of lack of homoscedasticity. Furthermore, for a dependent variable which assumes values of 0 and 1, the OLS model will allow estimates below 0 and above 1, which are outside the range of possible outcomes.

Logistic regression is preferred because it enables the researcher to overcome many of the restrictive assumptions of OLS regression. Logistic regression does not assume a linear relationship between the dependents and the independents. The

dependent variable need not be Logistic normally distributed. Normally distributed error terms are not assumed, and logistic regression does not require that the independents be interval.

A logistic regression predicts the log of the odds of the dependent event. The natural log of the odds of an event is equal to the natural log of the probability of the event occurring, divided by the probability of the event not occurring. Specifically:

$$\ln(\text{odds}(\text{event})) = \ln(\text{prob}(\text{event})/\text{prob}(\text{nonevent}))$$

From a practical standpoint, logistic regression and least squares regression are almost identical inasmuch as both methods produce prediction equations, and in both cases the regression coefficients measure the predictive capability of the independent variables. However, in logistic regression, the b-coefficient is different. For every one-unit increase in, say, the number of years of school completed, we expect an xxx decrease in the log-odds of a child death. For dummy-coded independent variables – for example, when we code the presence of running water in the home 1 and its absence 0 – the coefficient is the expected increase or decline (depending on the sign) in the probability of a child death associated with belonging to the effect category (having running water). In order to make the findings easier to understand, the b-coefficients are converted to odds ratios, by exponentiation ( $\text{Exp}(B)$ ).

### Hypothesis

Given the fact that: 1) there are specific requirements for program participation that relate to child health, 2) evidence suggests that the majority of families use the *Bolsa Família* money to purchase food and 3) previous studies find a inverse relationship between income and child mortality rates, I hypothesize that participating in the *Bolsa Família* program will be associated with a lower likelihood of having a child

die. When analyzing whether the program has an impact on child mortality, it is necessary to try to control for other variables that could affect child mortality. Given Chen's proximate determinant framework, the goal is to identify variables contained in the dataset that work through the proximate determinants to influence the effects on child mortality.

It is not possible, at least with the data at hand, to know the precise proximate mechanisms by which a particular socio-demographic variable – maternal education, for example – influences child mortality. The proximate determinant scheme thus remains something of a “black box,” the internal mechanisms of which are beyond view. The framework nonetheless underscores the idea that the variables most often thought to affect the survival probabilities of children, such as income and education, do not have a direct effect on child survival but only operate through one or more of the proximate variables.

The socio-economic factors I chose are place of residence, region, age, ethnicity, education level (operationalized by literacy and years of school completed), socio-economic status (operationalized by monthly per capita income) and living conditions (operationalized by access to running water in the house). My research hypothesis is that, controlling for place of residence, region, age, ethnicity, literacy, years of school completed, per capita income and running water in the house, participants in the *Bolsa Família* program will be less likely to have a child die than non-program participants. Therefore, the null hypothesis is that program participants will not be less likely to have a child die than non-program participants.

## **Dependent and Independent Variables**

For this study, I develop a binomial linear regression model to test the null hypothesis. The dependent variable is a calculated measure of having a child die. The rationale of creating this variable is detailed below. The main independent variable is program participation in *Bolsa Família*. Program participation is a dummy variable whereby program participants are assigned a 1 and non-program participants are assigned a 0. The aforementioned control variables include dummy variables and continuous variables. The dummy variables in the model are place of residence (where 0 means urban and 1 means rural), literacy where 0 means illiterate and 1 means literate, and running water where 0 means no running water in the household and 1 means running water in the household.

Two of the independent variables, ethnicity and region, are set up to be dummy variables with reference categories. The variable used to measure ethnicity allows for 3 different categories, white, black and brown (the dataset also includes categories for yellow and indigenous but these individuals were excluded due to the small number of responses for those categories). I chose white Brazilian as the reference category to try to visibly demonstrate the disadvantage of being Afro-Brazilian (either brown or black) in accordance with the literature on child mortality and race. I created two new variables that measure the effect of being black or brown as opposed to being white. The final dummy variable I used is region, which I created in much the same way as ethnicity. For the region variable, I use the Northeast as the reference category and the analysis measures the effect of being in any given region instead of being in the Northeast. For the dummy control variables, the effect found only shows the effect due to being part of the group assigned a 1 or not being part of that group (assigned a 0).

The other control variables – income and years of school completed – are continuous variables. In a logistic regression analysis, the b-coefficient for continuous variables is an indicator of the effect of each increment in the independent variable on the dependent variable, in this case the probability of a child death. Both age and years of school are measured in years such that in the predictive model the effect found by the variable will be multiplied by the number of years. Monthly per capita income is measured in *reais* (the Brazilian currency) and it is continuous and represented by an increase in 1 real for each increase of 1 in the data set.

To calculate the dependent variable I first filtered the PNAD 2006 dataset to include only women with at least one live birth. This was done in order to limit the sample to mothers at risk of a child death, and to eliminate stillbirths from the equation. Determining which women experienced the death of at least one of her children was not straightforward, given the nature of the PNAD 2006 questionnaire. Using the procedures described in Appendix A, it was nonetheless possible to create a dichotomous (0-1) indicator, which could be used in a logistic regression framework.

## Results

The frequency distribution of the dependent variable shows that child mortality is not as common in Brazil as in the past. Of the women between the ages of 20 – 34 who gave live birth to a child, 389,112 have not had a child die. 19,441 women have had a child die. That means that in the PNAD 2006 dataset, 4.76% had a child die whereas 95.24% have not had a child die. Therefore, the sample does not have a high incidence rate of child mortality.

Table 6-1 shows that households with running water are less likely to have a child die than households without running water. Of the households surveyed that have

not had a child die, 10.65% do not have running water. 89.35% of the households surveyed that did not have a child die, do have running water. In contrast, of the households surveyed with a child that died, 16.13% do not have running water while 83.87% do have running water. This demonstrates the fact that having running water in the home is beneficial for the health of the family and reduces the likelihood of having a child die at a young age. The Chi-Square value is 570.705 and the statistical significance is 0.000. This indicates that there is less than a 0.001% chance that the observed relationship is due to chance. Although it is general knowledge that having running water in a home is better for health outcomes, Table 6-1 shows the importance that the government should place on providing running water for all poor neighborhoods and homes in Brazil.

For the analysis, I developed 5 different models with different conditions to determine if *Bolsa Família* has different effects for different groups of people in different regions of Brazil. The results of each model can be seen in Table 6-2. Model 1 limits the sample size to women between the ages of 20 – 34 who gave live birth to a child. I chose this age range because demographers typically use this age range (or something very similar such as 18-34) for child mortality studies.

Table 6-2 presents the findings of the likelihood of having a child die for all parous women in the sample aged 20 – 34. Many of the variables exhibit the expected relationship. For example, respondents from households with running water are less likely to have a child die at a young age. The Exp (B) is a value that shows the effect of the b-coefficient on the dependent variable. Thus it should be multiplied by the likelihood of having a child die to determine the magnitude of the effect. If the Exp (B)

value is equal to 1.0 then it has no effect. If it is less than 1, it has a reductive effect on the probability of having a child die. Conversely, if the Exp (B) value is greater than 1.0, the variable increases the probability of having a child die, net of the other variables in the equation.

The Exp (B) value for homes with running water is 0.714, meaning that the likelihood of having a child die would be reduced. Similarly, being literate and attaining a high level of education is associated with a reduced likelihood of having a child die. The Exp (B) value for literacy 0.698 is and the Exp (B) for level of education is 0.878. In contrast, being black or brown is associated with a greater likelihood of having a child die. Black Brazilians are 1.393 and brown Brazilians are 1.254 times more likely than white Brazilians to have a child die at a young age. Furthermore, being older also slightly increases the likelihood of having a child die at a young age. The age variable has an Exp (B) value of 1.069.

The variable of interest does not exhibit the hypothesized association with likelihood to have a child die, however. Participants of the *Bolsa Família* program are more likely than non-program participants to have a child die. The odds ratio is 1.190, which indicates that, other things being equal, the probability of a child death is 19% higher among participants in the program compared to non-participants.

Most of the variables are statistically significant at both the 0.10 and 0.05 levels of significance, meaning that it is unlikely that these results were found due to chance. Interestingly, some are not statistically significant, such as per capita income and some of the regional categories. That means that we cannot draw any conclusions about the effect of these variables on the likelihood of having a child die. Being literate and having

access to running water in the home appear to be the 2 variables that have the strongest impact on reducing the probability of having a child die at a young age.

### **Focus on Eligible Families**

The previous model gives us an idea of how all of the independent variables affect the likelihood of having a child die. However, the prior model contains data from wealthy women who do not qualify for the *Bolsa Família* program. To attempt to eliminate this bias, I made another model and filtered the sample to eliminate the cases of any individuals who do not qualify for *Bolsa Família*. For the purposes of this analysis, I define having a monthly per capita income of R\$ 140 or less as constituting eligibility for program participation. For Model 2, the dataset was filtered to include only women ages 20 – 34 who gave live birth and are eligible for *Bolsa Família*. Some of the women are enrolled in the program and receive benefits, whereas others do not. Note, I removed the monthly per capita income variable from the analysis in Model 2 since the entire sample was reduced to “eligible women” for program participation.

The findings for Model 2 are very similar to Model 1. Again, homes with running water ( $\text{Exp} (B) = 0.751$ ), and respondents who are literate ( $\text{Exp} (B) = 0.697$ ) and have obtained a higher level of education ( $\text{Exp} (B) = 0.886$ ) are less likely to have a child die. Moreover, being older and being black or brown is associated with a higher probability of having a child die (  $\text{Exp} (B)$  values of 1.088, 1.299 and 1.296 respectively). Finally, the program participation variable for *Bolsa Família* has an  $\text{Exp} (B)$  value of 1.015, but it is not statistically significant.

### **Focus on Younger Women**

Models 1 and 2 may not capture the effects of *Bolsa Família* due to the nature of the sample. In the PNAD 2006 data we can know whether a woman had a child die and

whether she receives benefits from *Bolsa Família* but we cannot know if the child died before the family began participating in *Bolsa Família*. The timing problem is larger among older women if only because, on average, their children are older. As a consequence there is a greater chance that a woman who reports a child death may be referring to an event that took place 5 or 10 years ago.

In an attempt to make sure that the beginning of participation in *Bolsa Família* and the experience of mortality are as close as possible, I restricted the sample to women aged 20 -24 who are eligible for *Bolsa Família* for Model 3. That way I am more likely to capture children who were born into a family already participating in *Bolsa Família*, or at least have spent the majority of their first 5 years in the program. Therefore, the intent is to examine if the program has a stronger or a weaker effect on the likelihood of having a child die for a more restricted age group of women.

From Model 3, it can be observed that the Exp (B) value for the *Bolsa Família* variable is now 0.916, but the result is not statistically significant. However, the fact that the Exp (B) value in Model 3 is reduced suggests a possible association between program participation and a lower likelihood of having a child die. The other variables demonstrate the expected association with the probability of having a child die at a young age and some are statistically significant. Strikingly, neither one of the categories for ethnicity (black in comparison to white and brown in comparison to white) is statistically significant.

## **Focus on Regions**

Based on the history of child mortality in Brazil (Chapter 5 contains further details), the country can be separated into 2 regions that vary in terms of child mortality rates: a Northern region, which would consist of the North and the Northeast, and a

Southern region which consists of the Southeast, the South and the Central-West regions. Figure 6-1 visually represents these two conceptual mortality regions of Brazil.

Traditionally, the Northern region has had higher child mortality rates than the Southern region. Models 1, 2 and 3 all examined the likelihood of having a child die for the entire country of Brazil while controlling for region. Models 4 and 5 however, carry out the analysis within the Northern “High Mortality” region (Model 4) and within the Southern “Low Mortality” region (Model 5).

There are two competing hypotheses that justify the analysis based on regional differences that are potentially relevant to the *Bolsa Família* effect. The first is based on the observation that, small increases of income lead to large declines in mortality in high mortality populations. Conversely, in low mortality populations, small increases in income do not have much effect. This is due to the predominant causes of death differ in high and low mortality groups. In high mortality populations, a large proportion of children die of diseases and infections such as dysentery, pulmonary disorders, diarrhea and a variety of other “exogenous” causes of death. Exogenous causes of death are relatively easy to control, given technology and medical advances. Hence, small increases in living standards lead to sharp declines in mortality.

Conversely, when mortality is low the main causes of death tend to be “endogenous,” that is, death due to genetic abnormalities and other endogenous factors, because the majority of deaths due to exogenous factors have already been prevented to reach the status of a “low mortality population.” Unlike exogenous factors, endogenous factors are difficult to control, and therefore reducing the mortality rate any

further is unlikely. Under these circumstances, increases in income do not have much effect.

Differences in the causes of death in high and low mortality populations are relevant to this study because they suggest reasons for regional differences. Specifically, the exogenous/endogenous distinction leads me to anticipate that *Bolsa Família* may be more likely to have an effect in the North, where mortality is high and sensitive to economic status, and may be less likely to have an effect in the South, where mortality is low and less sensitive to economic status.

A competing hypothesis predicts the opposite – that *Bolsa Família* would have a larger impact in the more developed regions of the country. This line of reasoning focuses, not on the structure of cause of death, but on the institutional differences in the quality of health care services. The healthcare infrastructure and access to technology is more widely available in the Southern region of Brazil. Furthermore, the quality of services is an important consideration because one of the main channels through which *Bolsa Família* can influence child survival is through the specified health-related conditionalities. Women who are *Bolsa Família* recipients are required to have pre-natal examinations. Children are required to be immunized and visit a health clinic for check-ups. But the effectiveness of these activities – in terms of reducing mortality – may be contingent on the quality of the health services available, which are much better in the more developed regions of the country. Put another way, *Bolsa Família* recipients in the Northern and in the Southern regions may both adhere to program requirements, yet the benefit of adhering to the health-related requirements would be greater in the more developed regions of the country. Given this logic, it is conceivable that *Bolsa Família*

would have a more positive impact on child mortality in the Southern region than in the Northern region. Table 6-3 shows the same logistic regression for two additional models that separate respondents by region.

The sample for Model 4 is limited to women ages 20 – 24 who are eligible for *Bolsa Família* and live in the High Mortality region (the North and the Northeast). The Exp (B) value for *Bolsa Família* is 1.101 which indicates that program participants are slightly more likely to have a child die at a young age, but the results are not statistically significant.

Surprisingly in Model 4, many variables do not display the expected relationship. For example, for the different ethnic categories, brown and black Brazilians (with Exp (B) values of 0.682 and 0.888 respectively) are slightly less likely to have a child die at a young age than white Brazilians (the reference category). Yet these findings are not statistically significant. Only two variables are statistically significant, age (Exp (B) value of 1.198) and literacy (Exp (B) value of 0.303) and they continue to represent the same thing they have in previous models. An increase in the age of the mother is associated with an increase in the likelihood of having a child die at a young age, while being literate is associated with a decreased likelihood of having a child die. Based on the results of Model 4, we cannot accept the hypothesis that *Bolsa Família* is most likely to have a reductive effect on child mortality rates in high mortality regions.

Model 5 in turn provides the most positive results of any of the models. The sample for Model 5 is limited to women ages 20 – 24 who are eligible for *Bolsa Família* and live in the Low Mortality region (the Southeast, South and Central-West regions). For the first time, the model finds that *Bolsa Família* has a statistically significant

mortality reducing effect. For this model, the *Bolsa Família* variable has an Exp (B) value of 0.244 meaning that in the South region *Bolsa Família* reduces the probability of a child death by around 75% ( $1 - .244 = .756$ ).

How then can we best interpret the results of Model 5? Remember that because the “low-mortality” region already has a more developed healthcare infrastructure; it stands to reason that this infrastructure plays a significant role in determining the child mortality rate. PNAD data are not capable of measuring what is responsible for the association between *Bolsa Família* and the child mortality rate, but we can conclude that the health conditions of program participation might make a difference for many program participants. Perhaps it is the fact that pregnant women are receiving better pre-natal care and are thus giving birth to healthier children. Or perhaps the money from the cash transfer is being used for better food which in turn augments the child's nutritional status. Either way, it is clear that *Bolsa Família* is having a positive impact on the lives of young children in the low-mortality, Southern region of Brazil. In accordance with the research hypothesis, net of the effects of place of residence, age, race, educational attainment, literacy and access to running water, in Southern Brazil *Bolsa Família* participants are less likely to have a child die than non-program participants.

### **Interpretation**

The results of Model 5 do support the research hypothesis. However, similar to much of the literature examined about the effects of program participation on health outcomes, it would appear that *Bolsa Família* is not 100% successful in having the intended impact on child mortality rates in Brazil. The findings that *Bolsa Família* has a reductive effect on the child mortality in the Southern “low-mortality” region suggests that healthcare infrastructure is important, and that program conditions cannot be

properly met without a well-developed infrastructure. For the underdeveloped North and Northeast regions of Brazil, building a better healthcare infrastructure would require a large amount of money. It would be premature to conclude that investment in healthcare infrastructure is the answer to the problem of child mortality in the “high-mortality” Northern region.

In regards to the negative findings for Models 1 – 4, bear in mind that *Bolsa Família* was not designed as a program to reduce child mortality rates. Many different factors contribute to the child mortality rate of a country. These factors include access to running water, access to health clinics and medical services, and nutritious foods. All of these factors are controlled outside of the *Bolsa Família* program. The Brazilian government has many other public health programs that are more specifically targeted to tackling health problems.

Furthermore, these findings could suggest that *Bolsa Família* is properly targeted to serve the most vulnerable population of Brazil. If families are poor and more likely to have a child die because they are living in poverty and cannot provide nutritious food or proper healthcare for their children, these are the families that should be enrolled in *Bolsa Família* and receiving the benefits. This justification does not quite explain the slight advantage of non-program participants at the same per capita income level of program participants found in Models 2, 3 and 4. However, the data do not tell us if some respondents qualify to participate in the program yet still have a greater per capita income than the average *Bolsa Família* participant. We cannot know for sure if there is a source of bias that we are missing.

To improve the models further, I could continue adding explanatory variables but that would only further complicate the model without adding much strength to it. The explanatory variables already included do a good job of covering socio-economic and demographic indicators that act through proximate determinants to impact child mortality. Either way, it is clear that there is still room for improvement in the *Bolsa Família* program.

Table 6-1. Having a child die by running water in the home, Brazil 2006

Running Water in the Home	Have you had a child die?	
	No	Yes
No	41,577 (10.65%)	3,136 (16.13%)
Yes	348,686 (89.35%)	16,310 (83.87%)
Total	390,263 (100.00%)	19,446 (100.00%)

Chi-square = 570.705, ss = 0.000

Source: PNAD 2006

Table 6-2. Odds ratio of having a child die by participation in *Bolsa Família*, age, ethnicity, educational attainment, literacy, per capita income, running water, place of residence and region: Brazil 2006

		Model 1: Women ages 20-34		Model 2: 'Eligible' women ages 20-34		Model 3: 'Eligible' women ages 20-24	
		b-coefficient	Exp (B)	b-coefficient	Exp (B)	b-coefficient	Exp (B)
<i>Bolsa Família</i>		0.174*	1.190	0.014	1.015	-0.088	0.916
Age		0.067**	1.069	0.084**	1.088	0.218**	1.243
Ethnicity	White (ref)	-	-	-	-	-	-
	Black	0.332**	1.393	0.262	1.299	0.129	1.138
	Brown	0.226**	1.254	0.259*	1.296	0.038	1.038
Years of School		-0.130**	0.878	-0.121**	0.886	-0.103*	0.902
Literacy		-0.359**	0.698	-0.361**	0.697	-0.961**	0.383
Per Capita Income		0.000	1.000	-	-	-	-
Access to Water		-0.336**	0.714	-0.286*	0.751	-0.337	0.714
Place of Residence	Urban (ref)	-	-	-	-	-	-
	Rural	0.008	1.008	-0.009	0.991	0.110	1.116
Region	Northeast (ref)	-	-	-	-	-	-
	North	0.115	1.122	0.092	1.097	-0.075	0.928
	Southeast	-0.450**	0.638	-0.379**	0.684	-0.778*	0.459
	South	-0.187	0.829	-0.160	0.852	0.099	1.104
	Central-West	-0.420**	0.657	-0.381*	0.683	-0.631	0.532

Source: PNAD 2006

Notes: Model 1:  $R^2 = .094$ ; Model 2:  $R^2 = .087$ ; Model 3:  $R^2 = .107$

Statistical significance: \* = 0.05, \*\* = 0.001

'Eligible' indicates having a monthly per capita income  $\leq \$R 140$

Table 6-3. Odds ratio of having a child die by participation in *Bolsa Família*, age, ethnicity, educational attainment, literacy, running water and place of residence: Brazil 2006

		Model 4: High-Mortality Region, 'Eligible' women ages 20-24		Model 5: Low-Mortality Region, 'Eligible' women ages 20-24	
		b-coefficient	Exp (B)	b-coefficient	Exp (B)
<i>Bolsa Família</i>		0.096	1.101	-1.409*	0.244
Age		0.180*	1.198	0.461*	1.585
Ethnicity	White (ref)	-	-	-	-
	Black	-0.383	0.682	1.226	3.407
	Brown	-0.118	0.888	0.240	1.272
Years of School		-0.056	0.945	-0.307**	0.736
Literacy		-1.193**	0.303	-0.195	0.822
Access to Water		-0.198	0.820	-1.565*	0.209
Place of Residence	Urban (ref)	-	-	-	-
	Rural	0.175	1.192	0.066	1.069

Source: PNAD 2006

Notes: Model 4:  $R^2 = .082$ ; Model 5:  $R^2 = .218$

Statistical significance: \* = 0.05, \*\* = 0.001

'Eligible' indicates having a monthly per capita income  $\leq \$R\ 140$

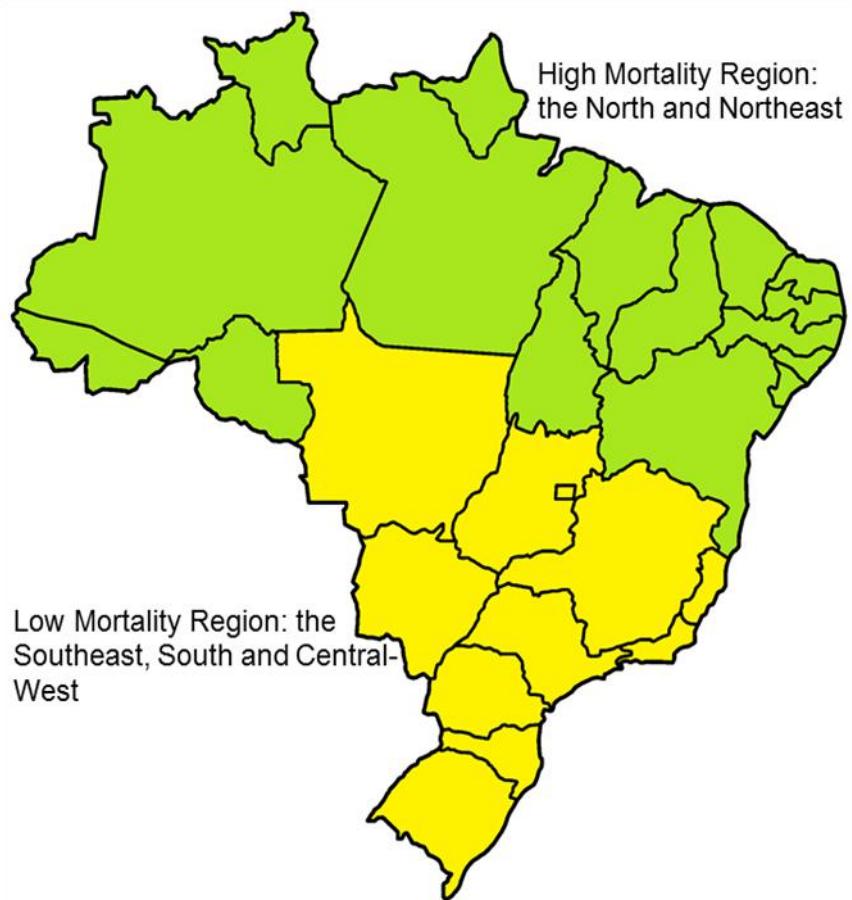


Figure 6-1. Map of Brazil with conceptual comparative regions of high child mortality and low child mortality

## CHAPTER 7

### CONCLUSIONS AND FUTURE WORK

As this study demonstrates, *Bolsa Família* is a unique poverty alleviation program that provides the incentive for participants to develop their own human capital, while providing them with cash stipends to give them some additional income. Because of its required health conditions and the demonstrated correlation between income and child mortality rates, it was hypothesized that net the effects of other factors including age, race, level of education, etc., participating in *Bolsa Família* would reduce the likelihood of having a child die at a young age. The results, based on logistic regression analyses, showed that the anticipated mortality reducing effect was observed only among eligible women, 20 to 24 years of age, living in the Southern, low-mortality region. The same reductive effect was not found for the Northern, high-mortality region or for Brazil on a national level. However, this does not necessarily mean that the *Bolsa Família* program is a failure. The problem might not be in the program itself, but rather in the data used for the analysis and the inability of the data to truly capture the program's effect on child mortality. Also, finding positive results in the Southern region is encouraging and suggests that *Bolsa Família* can still be improved to have a similar effect on child mortality in all regions of Brazil.

One of the main differences between the Northern, high-mortality region and the Southern low-mortality region is that the healthcare infrastructure is more developed in the Southern region. That is to say that the Southern region contains the country's largest and wealthiest cities. Therefore, it follows to reason that the hospitals and health clinics in the cities of the Southern region would have the best access to technology and

medicines. Furthermore, it is also conceivable that the states in the Southern region have invested more in healthcare infrastructure than states in the Northern region; however, we cannot be certain without researching the healthcare infrastructure in Brazil. An analysis of the Brazilian healthcare infrastructure would examine several indicators including, but not limited to, number of hospital beds per 1,000 people, number of doctors per 1,000 people, amount of money invested in healthcare per capita, etc. On a regional basis such an analysis could reveal if the healthcare infrastructure in the Southern region is truly more developed than the Northern region. Such a study would be very intensive, but could help lend support to the hypothesis that *Bolsa Família* seems to be more effective at reducing child mortality in the Southern region due to a better developed healthcare infrastructure.

Remember that the leading causes of infant death in Brazil are problems originating during the perinatal period. Some of these problems occur due to improper or lack of pre-natal care. One suggestion for improving the *Bolsa Família* program and its effects on child mortality, is to insure that pregnant women receive proper pre-natal care. As the program currently stands, pregnant women could be going to receive pre-natal care, but are not receiving adequate attention. We have no way of knowing if each hospital and health clinic in Brazil is adequately equipped with the staff and the tools that it needs to properly care for pregnant women. However, devoting more attention to pre-natal care could lead to a reduction of child mortality due to perinatal causes.

An overview of the literature reveals that many authors could not find the correlation they were hoping for between *Bolsa Família* and positive health outcomes. Does this indicate that there is a flaw in the *Bolsa Família* program design? Not

necessarily. *Bolsa Família* is but one of many different programs from the Brazilian federal government. Many other programs specifically target health outcomes and might be more suited to bring about the desired changes in child healthcare in Brazil. Since the 1930s, Brazil has made progress in reducing the infant mortality rate and it continues to do so, approaching the same levels observed in many developed countries. However, regional disparities remain. The Northeast region has the highest infant mortality rate compared to the South, which has the lowest. Regional inequality in Brazil extends far beyond health inequalities and also includes income inequality.

There are many areas for future research concerning *Bolsa Família* and conditional cash transfer Programs in general. Due to the election of Dilma Rousseff, the Worker's Party will continue to be in power in Brazil and *Bolsa Família* will continue to be a central part of Brazil's poverty alleviation strategy. Two needed areas of research are the political implications of *Bolsa Família* and its possible use as a clientelistic policy. Is *Bolsa Família* a form of a political patron-client system? If so, what does future expansion of the program mean for the PT and politicians in Brazil?

Another area of research is the coverage of the program. *Bolsa Família* appears to be fairly well targeted, yet does not include all people who are eligible. Some studies suggest that program expansion would effectively cover all poor families. But what are the consequences of expanding *Bolsa Família* and would it be worth the price to greatly increase program coverage? Finally, how can *Bolsa Família* be better adapted to meet its goals with regard to health and educational outcomes? Specifically, is there any change that can be made to program requirements or implementation to increase compliance with program requirements? What can be learned from other conditional

cash transfer programs to help adapt *Bolsa Família* to achieve specific health goals? All of these questions, and many more, still need to be answered to fully understand the implications and the possibilities of the *Bolsa Família* program.

## APPENDIX

### EXPLANATION OF CREATING A VARIABLE IN PNAD 2006 TO MEASURE THE EXPERIENCE OF CHILD DEATH

One of the fundamental variables for the analysis is whether or not a woman has had a child die. This variable can be used to determine if participants in the *Bolsa Família* program are more or less likely than program non-participants to have a child die. However, PNAD does not measure whether or not a woman had a child die directly. Instead it can be calculated by using the responses from some of the other questions in the survey.

The PNAD questionnaire asks, “How many male children do you have living inside the home?” and “How many female children do you have living inside of the home?” Additionally, it asks “How many male children do you have living outside of the home?” and “How many female children do you have living outside of the home?” Using the responses to these questions, I was able to first calculate the number of children living inside the home by summing the number of male and female children living inside the home for each female respondent. In so doing, I created a new variable labeled “kidshere.” I repeated the same process for children living outside of the home and I calculated the number of children living outside the home by adding the number of male children to the number of female children living outside of the home. I created a variable denoted “kidsthere” which measured the total number of children per female respondent that live outside of the home. Note that this is not to imply that these children are homeless. It is possible that they live with another relative or that there is another explanation for the fact that they live outside of the home. Regardless, the dataset does not afford us enough information to know why these children live outside of the home.

Then, I proceeded to create a new variable that is called “totalkids” and is equal to the sum of “kidshere” and “kidsthere”.

I followed the same process to calculate the number of children that the respondent had given a live birth to but who had already died. PNAD includes questions for “How many male children have you had that died?” and “How many female children have you had that died?” By summing the responses of these two questions, I calculated a new variable that I denoted “kidsdead” which represents the total number of live children that the woman had who have died. I then recoded, “kidsdead” into “kidsdead01” which assigned every woman who gave live birth and did not have any children die a 0. It also assigned every woman who gave live birth and had at least 1 child die a value of 1 (even if the woman had more than 1 child die). Thus, when examining the “kidsdead01” variable, a 0 represents that all of the children born alive who are still living, and a 1 represents that at least 1 child born alive to the respondent has died.

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