WHERE’S THE DOCTOR? TARGETING, ADOPTION, AND DECENTRALIZED GOVERNANCE OF THE MAIS MÉDICOS (MORE DOCTORS) PROGRAM AND HEALTH POLICY IN BRAZIL

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ABSTRACT

Championed by its supporters as a program for the underprivileged and criticized by its opponents as an electoral program, the Mais Médicos program aimed to provide primary care doctors to lacking regions of Brazil and is a major social policy of the Dilma Roussef (PT) presidency. This thesis assesses how political factors influenced the distribution of resources of this program in two manners: (1) it examines the distribution of doctors among all Brazilian municipalities and (2) evaluates where these doctors were allocated at a micro-level in the cities of Fortaleza, led by the center-left Roberto Claudio (PSB) administration, and Salvador, led by the right-wing ACM Neto (DEM) administration. There are several findings in this analysis. Employing matching methods, I find that mayors of the PT (d = .36 SD) and a high representation in city councils of the PT (d = .14 SD) led to a higher number of program doctors. Other left parties not including the PT did not lead to a significant increase in program doctors, regardless of nationality, compared to non-left parties. Panel regression analysis indicates that program resources correlated with municipalities of greater “need”, as determined by poverty levels and territorially protected populations, and there is no evidence that the national government distributed doctors to benefit their electoral chances in the 2014 Presidential elections. The evidence of association between
program resources and greater subnational electoral competition, as measured by the margin of victory in the 2012 municipal elections, is weak - the magnitude of this relationship is very low and only significant at the 10% level for municipalities with 25,000 inhabitants or more. There is the strong negative correlation between ESF Coverage Rates and private insurance rates, respectively, and program doctor rates. This suggests that mayors in areas with a higher percentage of their population with private insurance avoided program resources and areas with low ESF Coverage rates received doctors. In the comparative analysis of Fortaleza and Salvador, I find that both cities aimed to distribute doctors to health centers in poor neighborhoods, although Fortaleza was more successful in doing so due to the legacy of the Family Health Strategy being stronger there than in Salvador. This legacy is largely attributable to the past presence of the PT in Fortaleza, which expanded the Family Health Strategy program.
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# LIST OF ABBREVIATIONS

ANS - National Health Agency (Agência Nacional de Saúde)
CFM - Federal Council of Medicine (Conselho Federal de Medicina)
CNES - National Registry of Health Establishments (Cadastro Nacional de Estabelecimentos de Saúde)
DEM – Democratas
ESF - Family Health Strategy (Estratégia Saúde da Família)
FUNAI - National Foundation of the Indian (Fundação Nacional do Indio)
IBGE - Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística)
INCRA - National Institute of Colonization and Agrarian Reform (Instituto Nacional de Colonização e Reforma Agraria)
MM – Mais Médicos (More Doctors)
MDB - Brazilian Democratic Movement (Movimento Democrático Brasileiro)
NOB - Basic Operational Norms (Normas Operacionais Básicas)
PAB - Primary Care Spending Floor (Piso de Atenção Básica)
PACS - Community Health Agent Program (Programa Comunitário de Saúde)
PAHO - Pan-American Health Organization
PCB - Partido Comunista Brasileiro
PCdoB - Partido Comunista do Brasil
PDT - Partido Democrático Trabalhista
PHS - Partido Humanista da Solidariedade
PMDB - Partido do Movimento Democrático Brasileiro
PMN - Partido da Mobilização Nacional
PP - Partido Progressista
PPL - Partido Pártio Livre
PPS - Partido Popular Socialista
PRB - Partido Republicano Brasileiro
PROVAB - Programa de Valorização do Profissional da Atenção Básica
PRP - Partido Republicano Progressista
PSB - Partido Socialista Brasileiro
PSC - Partido Social Cristão
PSD - Partido Social Democrata
PSDB - Partido da Social Democracia Brasileira
PSDC - Partido Social Democrata Cristão
PSOL - Partido Socialismo e Liberdade
PSTU - Partido Socialista dos Trabalhadores Unificados
PT - Partido dos Trabalhadores (Worker’s Party)
PTB - Partido Trabalhista Brasileira
PTC - Partido Trabalhista Cristão
PTdoB - Partido Trabalhista do Brasil
PTN - Partido Trabalhista Nacional
PV - Partido Verde
SGTES - Secretaria de Gestão de Trabalho e Educação de Saúde (Secretary of Administration of Labor and Education of Health)
SUS - Unified Health System (Sistema Único de Saúde)
TSE- Supreme Electoral Tribunal (Supremo Tribunal Eleitoral)
UDH - Health Development Units (Unidades de Desenvolvimento Humano)
UNDP - United Nations Development Program
CHAPTER 1 - INTRODUCTION

The Mais Médicos (More Doctors in English) program was announced by the Brazilian federal government immediately following and partially in response to the massive street protests of Brazil in 2013 before the World Cup that demanded improvements for public services in areas such as education and healthcare.¹ This federal program provides doctors to municipalities lacking primary care doctors for them to insert into Family Health Strategy (Estratégia Saúde da Família in Portuguese - ESF) teams and aims in particular to improve access to primary care for the most vulnerable and poor. Despite the continuing focus on primary healthcare since the return to democracy and the subsequent establishment of the Unified Public Health system in 1988, the need for better health care coverage has remained one of the main complaints of the population. The government led by Dilma Rousseff (2010-2016) of the progressive Worker’s Party (PT) that enacted the program has argued that the necessity of more doctors and more even distribution of these professionals are problems that have never been solved and ones that this program seeks to correct. In geographical terms, the program has focused on improving access to healthcare in the urban peripheries and rural contexts, and in lacking regions such as the Northeast, which in 2001 had 16.50% of all doctors in Brazil despite having 28% of the population (Póvoa & Andrade 2006).

¹ The World Cup protests began on June 23, 2013, initially emerging as a result of an increase in bus fares in the city of Porto Alegre. Protests eventually spread throughout Brazil as outcry for greater improvements in public services such as transportation facilities, hospitals and education. These were also spurred due to large investments being made in soccer stadium modernization and construction projects in preparation for the 2014 World Cup, and allegations of corruption between Brazilian government and FIFA officials. For more, see: Holston (2014)
Mais Médicos has come under scrutiny for several important reasons: first, political opponents of the leftist PT government have argued that the use of doctors of other nationalities, particularly Cuban ones, violates national medical association norms. Program detractors also voiced concerns regarding the arrangement with the Cuban government and Pan-American Health Organization (PAHO) to receive payment for the doctors, which was understood as a nod to a dictatorial government and its practices. Further to this point, they have stated that the program was done to satisfy ideological concerns of the federal government, and has primarily been used to advance their electoral interests by distributing doctors to municipalities governed by leftist parties and to regions where they can gain votes. Finally, critics have argued that although there is a deficit of doctors in lacking regions, efforts should be made on reforms that will improve the efficiency of the system so that existing doctors can provide care to more people.

These accusations prompted this thesis’s primary question: what were the political factors that influenced the distribution of doctors of Mais Médicos? I explore this question in two ways. First, I examine the distribution of doctors among all municipalities and how political factors may have influenced this process along with targeting criteria. Secondly, I evaluate where these doctors were allocated at a micro-level in the cities of Fortaleza and Salvador, while paying particular attention to access for the urban poor and the policy legacy of primary healthcare in urban Brazil.

There are several findings in this analysis. Employing matching methods, I find that mayors and a high representation in city councils of the PT led to a significantly
higher number of program doctors and Cuban doctors. Other left parties not including the PT did not lead to a significant increase in program doctors compared to non-left parties, Cuban or otherwise. Panel regression analysis indicates that program resources correlated with municipalities of greater “need” as determined by poverty levels and territorially protected populations, and there is no evidence that the national government distributed doctors to benefit their electoral chances in the 2014 Presidential elections. There is also evidence that greater electoral competition at the subnational level, as measured by the margin of victory in the 2012 municipal elections, was associated with higher doctor receival rates, although the magnitude of this relationship is very low and only significant at the 10% level for municipalities with 25,000 inhabitants or more. Perhaps more notable is the strong negative correlation between ESF Coverage Rates and National Health Agency (ANS - Agência Nacional de Saúde in Portuguese) private insurance rates, respectively, and program doctor rates. This suggests that mayors were sensitive to their constituents – areas with a higher percentage of their population with private insurance avoided program resources and areas with low ESF Coverage rates received doctors. In the comparative analysis of Fortaleza and Salvador, I find that both cities aimed to distribute doctors to health centers in poor neighborhoods, although Fortaleza was more successful in doing so due to the legacy of the Family Health Strategy being stronger there than in Salvador and thus having a stronger existing infrastructure of public primary care at its disposal.
Theoretical Framework – Literature and Justification

This study draws heavily on theories regarding the political economy of the welfare state and decentralized governance in developing countries. Theories on the political economy of the welfare state have focused on political factors that have shaped and structured social policy at the national-level in different variations. These studies have emphasized the importance of leftist parties (Huber & Stephens 2012), democratic rule (Segura-Ubiergo 2007), and economic development trajectories (Kaufman & Haggard 2008) to explain cross-national differences and in what manner welfare states have expanded to incorporate and exclude certain sectors of the population.

These theories help to understand the context in which Mais Médicos emerged, in which a leftist government used their executive authority as a means of expanding public healthcare provision. However, the incomplete understanding on how and where social policy resources are distributed within large federalist systems justifies the need for examining multilevel governance and the relations between lower and national levels of government. As such, this study contributes to the literature on the politics of health policy in a decentralized context such as Brazil. In the specific case of Mais Médicos, there are three major claims in the literature that are relevant to assessing resource distribution that will be examined in this section: 1. the rise and importance of leftist parties in expanding social policy; 2. the role of electoral competition in a decentralized context; and 3. policy legacy, or the historical legacy of a policy that influences subsequent policy decisions. A greater understanding of how these factors influence social policy at the national level and in urban centers will provide a greater understanding of the problem at hand. While discussing the major claims of the
literature, I also articulate how they apply to Mais Médicos and justify its relevance and contribution to research in this area.

The Role of the Left and Brazil’s Institutions

The emphasis on the role of leftist parties in the expansion and universalization of social policies originates from Esping-Andersen's (1990) groundbreaking work on the classification of welfare states in advanced Western nations. By classifying welfare states as liberal, conservative and universalist, he finds that the role of leftist and social democratic parties was the key variable among countries that developed universalist social protection systems and policies that are inclusive to all with non-hierarchical benefits. In the context of Latin America, the concept of “basic universalism” has been developed to classify recent leftist governments that have aimed to ensure massive and equal access to basic benefits and the provision of “health and education as a right of citizenship” with a limited tax base (Stephens & Huber 2012). The left-wing PT government, which has occupied the Presidency since 2002 under Luiz Ignacio ‘Lula’ da Silva (2003-2010) and Dilma Roussef (2011-2016), established their mandate to address inequality through social policy and tend to the historic regional inequalities that left the North and Northeast regions less developed. With this in mind, Mais Médicos fits their approach to governing on focusing on the poor and the regions in which they are located. Other social policies such as Bolsa Familia and Minha Casa Minha Vida are

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2 Luiz Ignacio da Silva (Lula) was President from 2002-2010 and was succeeded by Dilma Roussef, who was first elected in 2010 and then reelected in 2014. In 2016, she was impeached due to budget irregularities.

3 Bolsa Familia is a conditional cash transfer that provides cash to families provided that they meet certain requirements related to children’s health and education. For more, see: http://siteresources.worldbank.org/INTLACREGTOPLABSOCPRO/Resources/BRBolsaFamiliaDiscussionPaper.pdf
examples of national programs aiming to address inequality that have received significant attention from international scholars and media.

Nevertheless, how may the relevance of the left and advent of the PT affect the distribution of resources of Mais Médicos, or tell us why certain municipalities receive more doctors than others? The heavy decentralization of health policy, particularly primary care, following the establishment of the Unified Health System (SUS - Sistema Único de Saúde in Portuguese) in Brazil means that municipalities have unmatched autonomy in the hiring of primary care doctors. Although the Ministry of Health of the federal government determines which municipalities receives doctors of Mais Médicos – and how many – it is the responsibility of the municipal mayor to request them. In order to assess the role of the left in resource distribution of Mais Médicos, the political party of the municipal mayor is a key variable to determine if PT-led municipalities and other leftist parties receive more doctors than others.

Several studies on Latin American countries and Brazil have concluded that ideology does not shape implementation of policy in non-programmatic party systems (Miguel & Machado 2010). The causal mechanisms for this are twofold. First, the structure of federalism in Brazil conditions municipalities to cooperate with the federal government in areas such as health policy due to fiscal restraints. Thus, while municipalities have autonomy in a certain sense, limited funds hinder their capacity to create their own programs and many find it more cost effective to implement the program led by the federal government. This poses obstacles to the ability of parties to

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4 Minha Casa Minha Vida is a public housing program for middle and low-income individuals and families. For more, see: https://publications.iadb.org/bitstream/handle/11319/7879/Slum-Upgrading-and-Housing-in-Latin-America.pdf?sequence=1
innovate at the subnational level and compete with the party in control of the federal government, ultimately giving the federal government enormous power to expand their political programs (Fenwick 2016). However, given the greater capacity of cities with larger populations to collect funds via taxation and their higher visibility to the public, mayors of major cities are more predisposed to create their own program or refuse those of the federal government that do not meet their ideological or programmatic vision. This necessitates a closer look at how cities reacted to Mais Médicos and allocated their resources. Secondly, the electoral system and the party system in Brazil encourage coalition forming, in which parties of different ideologies tend to place pragmatic concerns such as gaining power over ideological ones when considering their allies (Figueiredo & Limongi 2000). This is particularly true at the municipal level, where coalitions have enormous variation.

The rise of the PT has placed it as the hegemonic force of the left, although it is worth noting that many parties in its coalition base are not leftist and several leftist parties have left the PT’s side in the last decade. The left does not act uniformly in Brazil, although there is evidence that the PT has great party discipline within its own structure. The PT has been described as the first “organic” party of Brazil, one that developed roots at the local level and created a unifying political ideology based on progressive values (Donaghy 2013). Focus on how the PT is different from other parties has highlighted their uniform emphasis on universal social policies created at the national level to break the vicious cycle of poverty, their focus on deepening civil society and public participation measures and their origins as a grassroots party (Baiocchi et al.
2011; Donaghy 2013; Power 2014). These factors may contribute to a greater propensity for increasing the public provision of goods and services and greater party discipline to adopt programs created by their own party at the national levels.

**Targeting, Clientelism, and Electoral Competition**

This study also evaluates the incentives of the national government. A top-down approach to assessing the allocation of doctors calls into question the PT vote for President in the previous election as well as the technical criteria utilized for prioritizing populations and regions. Targeting, or how governments extract resources from their population via taxation and other mechanisms and redistribute them to certain populations, can be utilized by the federal government in the form of social programs to improve the welfare of those in greatest need, to foster electoral support among specific populations, or a combination of both (Mares & Carnes 2009). Analysis on conditional cash transfer programs, which give direct cash to individuals meeting certain poverty criteria provided that they meet educational and health conditions, suggest that programs with stricter eligibility requirements are more likely to target resources to the population in greatest need and reduces the ability for federal governments to use programs to form clientelistic networks, or relationships based on the exchange of goods or services for political support (de la O 2015). Although there are criteria for targeting the distribution of Mais Médicos doctors to priority regions, the distribution of health professionals differs from conditional cash transfer programs in the sense that doctors are public, non-excludable goods from which the entire population within vicinity of the health center can benefit. In other words, politicians cannot prevent an
individual from visiting a doctor based on their voting record in the same way they can with a direct cash benefit or specific goods such as food or building supplies. Given this reality, politicians wishing to utilize resources for political gain will calculate where resources have the largest electoral impact based on the context of the election in which they find themselves. They will either target core supporters, defined as areas where they enjoy strong support, or peripheral supporters, where the vote is more competitive (Schady 2000). The ability of subnational governments to determine whether to request doctors from Mais Médicos allows them to influence where doctors are successfully distributed, although the federal government’s has the ultimate say in who gets approved or rejected.

Whether the PT government uses this program to distribute doctors to certain areas for electoral gain, adopts criteria such as extreme poverty or poor health indicators, or a combination of both is difficult to disentangle given the high correlation between the Worker’s Party vote at the national level and extreme poverty rates. Nevertheless, utilizing a squared term in regression analysis allows for distinguishing between core and peripheral supporters to evaluate this relationship at the national level. Specifically, introducing a quadratic allows for seeing if the receiptal rates of doctors changes at 50% vote totals and takes on a curvilinear bell-shaped curve in which resources are maximized in “competitive” districts where the national vote was near 50% in the previous election. Ultimately, this will tell us if there is any evidence that Mais Médicos is in fact an “electoral program” as their opponents claim or a program in a similar vein to Bolsa Familia in which those who needed it benefitted most.
One principal theory on how to reduce the dependence on national governments’ incentive to target social policy on party loyalists for electoral gain is to introduce electoral competition at the subnational level. Municipal electoral competition is found by several studies to be a key factor in increasing the provision of goods and services. Municipal mayors may face added pressure to request program resources because they face a greater risk of losing their office if a certain public good or service is not being adequately provided according to public perception. Proponents of decentralization suggest that enhancing autonomy creates a fairer distribution of resources for this very reason – in addition to weakening the motives of the federal government to use program resources for electoral gain, mayors are incentivized to increase the provision of public resources in competitive electoral environments since not requesting resources heavily demanded by the population could have electoral consequences (Díaz Cayeros et al. 2016).

**Evaluating Policy Legacy**

Most studies that focus on the historical development of policies and how past decisions condition succeeding ones originate from Pierson's (1994) seminal work. On examining the processes of welfare retrenchment in the United States and United Kingdom during the Reagan and Thatcher administrations, he found that policy feedback, or the fact that previous policy choices influence present political processes, is the most important variable in explaining welfare reform. Regionally, many studies have focused on the legacy of institutions of authoritarian regimes and their influence on the development of institutions during the transitions to democratic rule. As for Brazilian
healthcare, many researchers have focused on the attempts of state governors and municipal mayors to obstruct decentralization reforms of health policy in the 1990’s in order to preserve the patronage systems of the highly centralized healthcare system developed during the military dictatorship (Draibe 2004; Arretche 2004).

Similarly, policy legacy heavily influenced the politics of program adoption of the ESF program in its initial years. Politics played an enormous role in program adoption, with the ideology of the governing party at the municipal and state levels influencing the timing and number of doctors requested (Rocha & Soares 2009). Leftist parties in addition to the PT, including the PSB and PDT, quickly adhered to the program, while many conservative politicians refused it and even ended the program when entering office in municipalities where it had been implemented by the prior administration.

These movements to refuse program adoption were motivated not only by ideology but also by pressure exerted by medical lobbies that can be divided into two main categories, associations of doctors and private health care providers. Such groups had benefitted under the previous corporatist health policy that emphasized private health insurance and more expensive secondary hospital-centric care and systematically opposed the program (Sugiyama 2013). Also, ESF adoption coincided with decentralization reforms, which many governors resisted as to preserve previously existing patronage structures in the hospital-focused system that was developed during the military era (Sugiyama 2013). This seems to contradict theories on federalism weakening partisan ideology. However, the context of Mais Médicos is different from the ESF, since the ESF coincided with reforms that aimed to take away power from
governors and place it in the hands of municipalities. Mais Médicos aims to achieve universality of primary healthcare by inserting doctors into the previously established ESF program. Prior to Mais Médicos, there were no massive efforts to reform health policy or correct the problems and limitations of ESF expansion. This study provides an opportunity to consider Mais Médicos based on the prior development of primary healthcare in Brazil and how it fits within the Family Health Strategy (ESF), the principal primary public healthcare program in which Mais Médicos doctors are placed.

By analyzing where doctors of Mais Médicos were distributed and the difference in preferences among national and subnational governments, this thesis aims to build upon theories on the behavior of partisan actors in multilevel governance and the political factors that influence the distribution of resources of social policy. Evaluating the generosity of the federal government in distributing resources to their coalition partners will allow us to understand where Mais Médicos was enhanced and the incentives of the federal and subnational government bodies in targeting program resources. This analysis aims to explore whether resources of Mais Médicos were allocated where they were most needed based on program criteria and how these compare to political factors and historical policy legacies. In doing so, the behavior of subnational actors in program adoption, such as prioritizing doctors based on nationality or allocating doctors and new health centers to certain populations will be assessed.
Mais Medicos – Policy Specifics

The Mais Medicos program was created by Executive order MP 621 on July 8th 2013, and was converted into Law 12.871 on October 22nd, 2013.\textsuperscript{5} The program objectives are the following: (1) to provide greater access to healthcare in priority regions, especially urban peripheries and areas affected by the unequal distribution of doctors nationally; (2) prioritize primary healthcare attention, and; (3) to incentivize education and research in medicine and in the public Unified Healthcare System (SUS). Achieving these objectives is to be done through three separate activities. First, the federal government hired doctors, foreigners and nationals, to work in ESF teams on 3-year contracts in priority regions.\textsuperscript{6} Secondly, a requirement to work for a minimum of two years in Basic Health Units (UBS) or SUS emergency areas was put in place and made legally binding for medical students in all Brazilian public universities beginning residency after 1/1/2015. Finally, a goal was established to create 11,500 additional openings by 2017 and 12,000 more by 2020 in private and public medical schools nationally (Pereira Duarte 2015). Although each of these areas present unique changes to the future goals of public health policy in Brazil, the main focus of this study relates to the first line of activities, in which foreign and national doctors trained in Brazil or overseas are hired to work in priority regions.

There are several characteristics of the Mais Medicos program that have implications on targeting and the ability of politicians to utilize the program for political

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\textsuperscript{5} MP – Provisionary measure, or medida provisória, is an executive action to be utilized by the Executive office in relevant and urgent cases. When enacted, they become law and have immediate validity. See here: Carey & Shugart (1998).

\textsuperscript{6} The Family Health Strategy is a program designed by the Cardoso administration to place primary care professionals in areas where access is lacking. Teams generally consist of general practitioners along with nurses, community health agents (PACs), technicians and sometimes dentists. This program will be analyzed in greater detail in Chapters 1 and 3.
gain. First, program hiring is taken out of the hands of the municipal government and placed in those of the federal government. Since the municipal government is not in charge of hiring practices, it has to “adhere” to the MM program each time an edital, or call for applications, is released by the Ministry of Health. As such, the municipality may or may not decide to participate in the program even in the case where doctors are needed.

The criteria that the federal government takes into account for determining program need are the same utilized to classify priority health regions (Portaria 1.377 - CONASS). These criteria have remained constant for the duration of program implementation that this analysis takes into account. Municipalities are placed in at least one of the following categories according to certain indicators:

1. Municipality with **20% (or more) of population in extreme poverty** based on data available in *Combate a Fome*” of the Ministry of Social Development;
2. Areas relating to the 40% (forty percent) of census sectors with the highest percentages of population in extreme poverty of the municipalities that are among the **one hundred (100) Municipalities with more than 80,000** (eighty thousand) inhabitants, with the lowest public income levels *per capita* and high social vulnerability of its inhabitants (G-100).
3. Areas relating to 40% (forty percent) of census sectors with the highest percentages of population in extreme poverty in the **Capitals** in accordance with the Brazilian Institute of Geography and Statistics (IBGE).
4. Areas relating to 40% (forty percent) of census sectors with the highest percentages of population in extreme poverty of the municipalities located in the **metropolitan region** in accordance with the Brazilian Institute of Geography and Statistics (IBGE).
5. Areas relating to 40% (forty percent) of census sectors with the highest percentages of population in extreme poverty of **other municipalities (PAB Fixo I, II, III and IV)**, according to the Brazilian Institute of Geography and Statistics (IBGE).

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6. Other municipalities classified as **vulnerable areas** – with low human development index, those situated in the Special Indigenous Sanitary District (DSEI/SESAI/MS) (an integrated region of the Regimented Structure of the Ministry of Health), municipalities with quilombos\(^8\), others.

Any municipality wishing to receive doctors must send a proposal that justifies the number of doctors requested during the call for proposals.\(^9\) The Ministry of Health handles proposal evaluation and can decide to approve, approve with alterations or reject municipal requests.

Regarding the selection of doctors, the federal government prioritized Brazilians and those with permission to work legally in Brazil for openings. In the second phase, foreign doctors were hired to occupy positions that remained unfilled.\(^10\) For placement, the following aspects were taken into consideration: the doctor’s location preference, age, and prior experience in the Family Health Strategy to prevent removing doctors already working in primary care. Foreign doctors are only eligible if they come from countries with a rate of doctor density superior to 1.8 per 1000 inhabitants, which was the rate in Brazil in 2013 at the time of program formulation (Pereira Duarte 2015). Doctors were hired on 3-year contracts to work 32 hours per week in Family Health Strategy teams and dedicate 8 hours for studies and professional development.\(^11\) For

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\(^8\) Afro-Brazilian communities whose origin dates back to semi-autonomous communities established by runaway slaves. For more information, see: Flory (1979).

\(^9\) Another aspect of Mais Médicos was the accompanying Requalifica (Requalify) component. Requalifica provides a means through which municipal governments could apply for federal funds to use in renovations or construction of new health centers and hospitals. In this sense, the federal government provided incentives to municipal governments to utilize Mais Médicos in different ways, including expanding coverage to areas where populations were excluded through the acquisition of new doctors and new health facilities, focusing on where improvements are needed through the hiring of new doctors and renovations of existing centers, or both.

\(^10\) Brazil is not the first country to employ a strategy of recruiting migrant doctors and health professionals to work in primary care in vulnerable regions, as Australia and the United States have implemented similar programs (Oliveira et al. 2015).

\(^11\) To this end, all medics were equipped with tablets to view educational material and were given periodic examinations on material covered.
the first cycle, a total of 14,462 medics were hired to work in 3,785 municipalities, 1,846 of which were Brazilians.

One of the most controversial aspects of the program is the large presence of doctors from Cuba, which represent the largest number of nationalities in the program (Oliveira et al. 2015). This corresponds to 10,947 Cuban doctors and 67.68% of all program doctors during the timeframe of this analysis. The concerns related to the presence of Cuban doctors in the program stem from the payment arrangement organized by the Pan-American Health Organization, in which half of the doctor salary was given to the Cuban government (Pereira Duarte 2015). This means that Cuban doctors are paid substantially less than those of other nationalities in Mais Medicos, whose base salary is R$10,000/month. The concern behind this arrangement was in great measure that the Brazilian government was financing Fidel Castro’s regime and there was also a diffuse sentiment fueled especially by right wing parties that Cuban doctors would spread communist ideas in Brazil.

To ensure effective institutional support, the federal government required that state governments work in cooperation with federal entities, higher education and international organization institutions, commit to establishing State Commissions for regulating Mais Médicos and adopting necessary measures for program execution.¹² Municipalities had to commit to inserting doctors into their places of work, providing

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¹² Before engaging in professional activities, foreign doctors and Brazilians trained overseas worked for the first 3 weeks in trial periods under specialist supervision at a university. A selection process of higher education institutes was carried out by the federal government to provide this support, in which selected institutes selected supervisors and tutors to oversee the work of participating doctors during their three years, as well as to serve as a reference point on issues relating to medical conduct and educational and research opportunities. Involved universities and education institutes also had to commit to monitoring activities of supervisors, tutors and doctors, coordinating the academic development and ongoing specialization programs and research activities of Mais Médicos and partaking in the greeting of participants (Portaria 2921 - CONASS).
adequate work conditions, registering participating doctors in the National Health Establishment System (CNES – Cadastro Nacional de Estabelecimentos de Saúde in Portuguese), accompanying training opportunities and working together with university supervisors in program administration. For foreign doctors, the municipalities were required to pay allowance for housing and transportation costs. This requirement was not necessary for Brazilian doctors participating in Mais Médicos.

**Decentralized Health Governance and the Medical Labor Force in Brazil**

Mais Médicos fits within a larger healthcare system that has three separate sectors: (1) the Unified Healthcare System (SUS), which is the publicly-financed component that provides free and universal entitlement to all Brazilians and foreigners; (2) a supplementary healthcare system, in which individuals or enterprises receive access to treatment through subscribing for insurance plans, and; (3) a private healthcare market, financed entirely by individual out-of-pocket payments. These systems are not mutually exclusive, as many individuals do not rely exclusively on one system for care (Arretche 2004). In addition to that, doctors are permitted to work in all three systems and often times dedicate their time separately between health clinics and centers that pertain to different providers. However, Mais Médicos stipulates that all doctors participating in the program must work full-time in the SUS system.

Established by the 1988 Constitution upon return to democratic rule, SUS was created based on the need for a public healthcare that was universal, integral and free of charge. It recognized health as a right of citizenship and as a component of social welfare, in which healthcare would be administered in a hierarchical and decentralized
manner. Local administration would implement health policy and foster social control and participation through the establishment of local health councils required to include members and leaders of civil society as well as public officials and medical authorities (Lobato & Burlandy 2000). Many of the important decisions that shaped SUS and Brazilian health policy as a whole into its current form occurred during the 1990’s. The first of these are the Basic Operational Norms (NOB) of 1994 and 1996, which institutionalized the gradual process through which municipalities would gain autonomy. The federal government financed health service provision for municipalities until they reached a semi-complete stage of financial autonomy through local tax mechanisms and other means of generating revenue. Furthermore, it established minimum percentage of expenditure of the total budget to be spent in public health at each level of government: 5% of Federal, 12% of the State and 15% of the municipal budget (Lobato & Burlandy 2000). Another important minimum was set for municipalities that required them to dedicate at least 30% of total health expenditure to primary healthcare (Pinto et al. 2014).

Financial transfers from the federal government constitute the largest portion of municipalities’ budget for primary care. Such transfers are done through two different mechanisms. The PAB Fixo, which is a fixed transfer amount per inhabitant, is transferred on the condition that information on the national database on healthcare is updated and employees and service providers are paid regularly. The PAB Variavel is

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13 As Lobato & Burlandy (2000) state, “the 1993 NOB classified the degree to which a municipality had assumed responsibility for health service provision (including contracting with and supervision of the private sector) as incipient, partial, and semi-complete. At the maximum level of autonomy (semi-complete), the municipality no longer received resources from the federal government that were linked to providing services, but did receive a lump sum, based on historical expenses, to support health care.”
determined by the overall performance of the municipality across certain indicators and was instituted as a means of incentivizing municipalities to maximize the use of health resources.\(^\text{14}\)

The establishment of fiscal mechanisms for each level of government also entailed defining their responsibilities and roles of action. The NOBs provided municipalities with the autonomy to administer and handle the hiring of health professionals and doctors with coordination and oversight provided by the state and federal governments. The decentralization process also coincided with deregulation of labor markets, which had a large impact on health professionals. In this context, the federal government created the Family Health Strategy (ESF) in 1996 during President Fernando Henrique Cardoso’s term (1996-2001). The program allowed municipalities to hire doctors in primary healthcare and to place doctors in regions lacking coverage. ESF teams involve a general practitioner (generalist or specialist in family health or family and community health), one nurse, one auxiliary or technician, and several community health agents of the PACS program (Programa Comunitário de Saúde – Community Health Agent Program). The ESF continues to be the main program through which the Brazilian population receives primary care. Although the selection process of doctors of Mais Médicos is done by the federal government, they are inserted into ESF teams administered at the municipal level.

\(^{14}\) For more, see: http://meuprontuario.net/pab-fixo-e-pab-variavel-atencao-basica-recursos/
1: Research Questions and Objectives

Shortly after the Roussef administration presented the Mais Médicos program, the President of the Federal Council of Medicine (CFM - Conselho Federal de Medicina in Portuguese) suggested that it was an “electoral program”. As mentioned before, this accusation was also the primary criticism levied by political leaders of the opposition parties PSDB and DEM, and even members of parties allied to the coalitional base of the Rousseff government such as the PMDB. As it concerns this thesis, the accusations seem to be twofold. First, the reliance on Cuban doctors served the PT as a means of returning the favor to an allied leftist government with scarce economic resources that had helped them previously. The second accusation is that the PT was only interested in distributing doctors to regions where they had strong electoral support and municipal leaders that were part of their national party coalition.

How do these accusations fit within the primary theories discussed in the literature and apply to the design of this research? The principal question of this research is to ask what were the political factors that influenced the distribution of resources of Mais Médicos. In the literature review, I highlight the importance of the left, electoral competition, and policy legacy as potential explanatory factors of the politics of social policy. Given the relevance of partisan politics to the narrative of Mais Médicos, the main focus is placed on the role of the left at the national and subnational levels. As such, the subquestions to this research are twofold. First, how did the power of the left affect the receiving rates of doctors of Mais Médicos? Secondly, how did the

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15 These comments were made in a report on the Provisional Measure done by the CFM. For more information, see the following link: https://oglobo.globo.com/brasil/apos-acordo-presidente-do-cfm-volta-dizer-que-mais-medicos-eleitoreiro-10325722
policy legacy of the ESF shape the improvement of doctors to poor areas nationally and at the neighborhood level in urban municipalities? Given these questions, the goals of this research are (1) to understand political factors, particularly the role of the left, in the provision of doctors of the Mais Médicos program; (2) to evaluate if healthcare doctors were allocated to those in greatest need, as measured by the extreme poverty rate, and (3) to explore how the prior adoption of the ESF explained the allocation of doctors and increasing of access to primary care to the poor in urban areas.

**Research Design and Methodology**

This section is divided in two parts. In the first, I test the importance of the left, the policy legacy of the ESF, and electoral competition at the municipal level to determine which explanatory factors influence why certain municipalities received more doctors than others. The second focuses on a comparative case analysis of the allocation of doctors to health centers and its relationship with levels of extreme poverty rates. The two cases selected are Fortaleza, capital of Ceará, and Salvador, capital of Bahia, both in Northeast Brazil. Mathematical representations of models and assumptions are presented in Appendix 1 and discussed in further detail within each chapter. In the sections below I merely describe how the models are constructed.

**1: Assessing Receival Rates at the National Level**

To evaluate the distribution of doctors in Brazilian municipalities I utilize descriptive data analysis, regression models, and quasi-experimental statistical matching methods to assess the primary political determinants that influenced receival rates of doctors during the first three years of Mais Médicos. The advantage of using these
matching procedures is that they allow for isolating principal variables of interest and assessing their overall explanatory power while controlling for other variables of interest. In this case, it will allow for analyzing the left’s explanatory power in determining where doctors were distributed among municipalities that have alike socioeconomic indicators used for targeting criteria such as initial ESF coverage levels, human development and extreme poverty rates.

Specifically, I use the descriptive analysis to provide a general profile of the municipalities where doctors ended up and to explore the timing of resources, the average level of doctors received by political party, and receival rates when segmented by differing targeting criteria. The regression analysis is used to assess which principal variables influenced the distribution of resources, namely the variables related to the power of the left, electoral competition, the policy legacy of Brazilian healthcare system. Finally, I utilize statistical matching methods to assess whether variables describing the power of the PT and left at the municipal level led to more or less doctors and how ESF coverage changes.

The regression analysis can be divided into two parts. First, I use multi-variate panel regression analysis on the distribution of participating doctors among all Brazilian municipalities. Municipalities are segmented by population size to avoid issues with heteroskedasticity of the dependent variable. Municipalities with 25,000 or more inhabitants are placed in one group and municipalities with fewer than 25,000 are placed in another. For the former group, I utilize the rate of MM doctors, which is the number of program doctors divided by the municipality population and multiplied by
100,000, as the dependent variable. I use a “between” panel regression model to assess the distribution of doctors of the first group of municipalities. For the second group, I utilize the absolute count of MM doctors received by the municipality as the dependent variable and a negative binomial regression panel model to determine the distribution of doctors for small sized municipalities. For each of these regressions, I include models for each group of municipalities in which the dependent variable is all MM program doctors and exclusively Cuban program doctors.

The primary independent and control variables in these regressions are the same in each model. The primary variables of interest are binary variables indicating PT municipal rule, the percent of councilmen (*vereadores*) that represent the PT, left or right ideological position of the governing party at the municipal level, and the presence of the PT in the governing municipal coalition. In order to account for policy legacy factors, I utilize the ESF coverage rate before each program cycle of Mais Médicos, ANS Plans Rate, a proxy for the private insurance rate (the total number of ANS plans divided by population), and the year in which the ESF was first implemented in the municipality. I include variables to assess electoral competition at the municipal level by measuring the margin of victory for the mayor and the total number of parties competing in the municipal elections, while also including the overall vote for the PT in the presidential elections in 2010 and its squared term to separate core and periphery voters to assess if doctors were targeted based on national vote totals. These variables will be tested alongside the indicators utilized for program criteria, including the rate of health transfers, extreme poverty rate, human development index, and territorial indicators for
specific regions such as the Semi-Arid and Amazon regions and populations in need including quilombo and indigenous territories. A complete list of these variables along with the mathematical representations of them can be found in Appendix 1.

The second part of this regression analysis includes statistical matching models to assess whether certain variables of interest, namely variables related to the power of the left, explain the distribution of doctors. The advantage of using a matching method is that it allows us to draw more precise inferences on the principal variable in question by matching variables based on similarities in other specified indicators. The purpose of any good matching technique is to approach a blocked experiment, in which the treatment effect (TEi) is obtained provided the difference between treated and non-treated units (Ti = 1|0) on a set of observations (i) (TEi = Y(1) – Y(0)). Before this average effect of treatment on the treated is calculated, observations are matched on a set of covariates (X) that serve to pair treated and non-treated units based on similarities between the defined covariates. I utilize the mahalobonis matching technique, which calculates the Euclidean distance between observations provided a set of covariates (King et al. 2017).16

For this, the separation of municipalities into the two groups previously mentioned remains, and the independent variables are the same with the addition of the overall change in ESF coverage from the start of Mais Médicos to the endpoint for which there is data (July 2016). There are four primary treatment variables upon which

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16 Propensity score matching (PSM) has particularly been used for such purposes, although recent methodological discussions have centered on more approximate uses of matching methods including coarsened exact matching (or matching across categorical variables), genetic matching, and mahalobonis matching. For a more in-depth review on this subject, please refer to: King et al. (2017)
the municipalities are matched: the left/right dichotomous variable, a PT municipal mayor, and a binary variable representing a high and low number of PT councilmen (separated at the mean). For the latter two treatment variables I remove all PT-led municipalities to consider the importance of these variables when the PT is not in power. In terms of matching variables to construct the matching frontier, I utilize the ESF coverage levels at the start of MM implementation, the extreme poverty rates, human development rates, income per capita, and federal transfer per inhabitant to reach primary healthcare spending minimums (PAB Fixo), the private insurance rate (ANS plans rate), region and the log population. In using these variables, I attempt to compare municipalities for which socioeconomic, healthcare, territorial, and demographic conditions are similar in order to better understand the overall impact of the variables in question.

All data used in this section was collected from secondary sources. The data on doctor allocation of Mais Médicos was provided by the Ministry of Health and includes totals on 11 Cycles from September 2013 to July 2016. The data utilized for the independent variables is based on health indicators from DataSUS, a database of the Brazilian Ministry of Health, demographic and socioeconomic variables are taken from IBGE (Brazilian Institute of Geography and Statistics - Instituto Brasileiro de Geografia e Estatística), political variables are from the Supreme Electoral Tribunal (Supremo Tribunal Eleitoral – TSE), and territorial variables on quilombos and indigenous settlements are taken from INCRA (Instituto Nacional de Colonização e Reforma Agraria) and FUNAI (Fundação Nacional do Indio).
2: A Comparative Analysis of Fortaleza and Salvador

This thesis comparatively explores the overall distribution of doctors at the micro-level within Fortaleza and Salvador. Particular focus is placed on the overall ability of mayors to expand access to the ESF for neighborhoods with higher levels of extreme poverty rates. In doing so, I aim to assess if the left and right differ in allocating doctors to the urban poor and how the prior development of the ESF impacted their ability to achieve this.

Indicators for the neighborhood level data are taken from the Atlas of Human Development of Brazil of the United Nations Development Program (UNDP). These neighborhood units are called UDHs (unidades de desenvolvimento humano), which takes micro-level data from the IBGE 2010 census and groups neighborhoods into units with common patterns. For the data on ESF teams and Mais Médicos doctors, I use webscraping to obtain data from the CNES public online database. The cutoff for this part of the analysis is earlier from the previous section as to avoid the municipal elections that took place in September 2016. For this reason, the timeframe analyzed is from September 2013 to August 2016.

The criteria utilized for case selection was based on mahalobonis matching in which cases are paired based on their similarity in a set of defined covariates (Nielsen 2016). I divide the municipalities into two groups based on the left/right variable given the goal of assessing the role of the left in increasing provision of public healthcare. I

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18 Webscraping is a technique utilized for obtaining data on websites. This was done using the rvest package in the R software. For more information on this package, see here: https://cran.r-project.org/web/packages/rvest/rvest.pdf
19 The CNES online database is open to the public. For more information on the CNES database, see here: http://cnes2.datasus.gov.br
produce a set of potential pairs by matching on a set of covariates: total population, extreme poverty rates, income per capita, PAB fixo, ESF coverage rates at the beginning of Mais Médicos, region and log population (2013). Beyond controlling for socioeconomic factors and ESF coverage rates, I take geographic region into consideration. Population serves as an important covariate given that needs in healthcare depend heavily on the overall size of the city.

As a result of this procedure, I present the list of possible matches and select the pairing of Fortaleza and Salvador given their proximity and for two additional reasons beyond the matching criteria. First, its presence as major capital cities in the Northeast, the most unequal region of Brazil with the highest rates of extreme poverty, provides an opportunity to assess the implementation of Mais Médicos in areas of major importance to the PT’s goals of reducing inequality and improving the quality of life for the poor. Secondly, the cases of Fortaleza and Salvador provide an additional area in which they differ – Fortaleza has a policy legacy of encouraging the growth and development of the ESF whereas Salvador has been on the opposite path of obstructing the ESF. Whereas Fortaleza had a medium level of ESF coverage (35%) at the start of MM implementation, Salvador had one of the lowest levels of coverage among major cities at 17%.

In order to isolate the separate effects of the left and right and the impact of the ESF, I begin my analysis by focusing on the existing network of health centers in each city. For this, I make use of spatial data analysis techniques such as nearest neighbor analysis (NNA) and measuring the minimum distance between the area of highest density of each neighborhood and the closest health center. After this, I utilize count
data regression models to assess the allocation of Mais Médicos and OLS regression models to assess the overall change in the number of ESF teams in which the neighborhood is the unit of analysis. I do not use spatial regression models due to a lack of spatial dependency in each of the models according to Moran LM tests. In each model, the main independent variable of interest is extreme poverty rate, while I utilize the log population, population density rate, ageing rate, the rate of pregnancy of women between 10-17 years of age as control variables. In order to assess whether these mayors aimed to target the urban poor, I include an interaction variable of extreme poverty rate multiplied by the number of health centers in the neighborhood. For these models, the count of Mais Médicos doctors and change in ESF teams serve as the dependent variables of interest.

**Hypotheses**

The principal objective of this work is to assess how political factors affected the distribution of resources of Mais Médicos. The hypotheses are formulated based on a combination of conclusions derived from literature and empirical testing. The role of the left in social policy, electoral competition and policy legacy are the three main theories that determine the overall provision of public goods and services. As I discuss in the literature review of Chapter 2, ideology does not appear as an important determinant in the implementation of social policy in Brazil, where party discipline is low, coalition forming varies at different levels of government and federalist policies in healthcare incentivize municipalities to cooperate with the federal government and permit implementation of its programs. In contrast, the PT, which controlled the national
government and formulated Mais Médicos, is a party with ideological foundations that has expansion of public goods and services among its core values. As such, I differentiate between the left and the PT in my analysis and I argue that although the left as a whole did not lead to higher receival rates, the PT did.

**Hypothesis 1:** PT-led municipalities will be associated with a greater level of MM doctors. Where the PT is not in power, a higher percentage of PT councilmen will be positively associated with higher receival rates.

**Hypothesis 2:** PT-led municipalities will be associated with a greater amount of Cuban doctors. In municipalities without a PT mayor, Cuban doctors will be positively associated with the proportion of PT councilmen.

Another set of hypothesis centers on the comparative analysis of Fortaleza and Salvador. By distinguishing between poor areas and poor areas with health centers, I am able to detect whether mayors targeted the poor based on the network of health centers that was available to them. I argue that while both aimed to expand access to the urban poor, the mayor of Fortaleza was able to increase the net change in ESF doctors for the urban poor due to the policy legacy of the ESF, as this city had a greater infrastructure to work with. Based on this, hypotheses are as follows:

**Hypothesis 3:** Extreme poverty rates will be positively associated with the allocation of Mais Médicos doctors in both Salvador and Fortaleza.

**Hypothesis 4:** a policy legacy of greater prior adoption of the Family Health Strategy (ESF) will allow Fortaleza to increase health access, as measured by the change in ESF teams before and after Mais Médicos, to the poor more than Salvador.
Thesis Outline
Chapter 2 expands upon the principal theories of the power of the left and electoral competition. Chapter 3 provides an assessment of the historical legacy of health policy in Brazil, describing the development of public healthcare and the adoption of the ESF and Mais Médicos programs in major cities. In Chapter 4, I analyze the distribution of Mais Médicos among all 5,565 municipalities in Brazil from September 2013 to July 2016. Chapter 5 is focused on the comparative analysis of the distribution of Mais Médicos to the urban poor in the cities of Fortaleza and Salvador. In Chapter 6, I present the main findings of this research and discuss its overall contribution to the literature on the provision of public goods and services and the politics of social policy in Brazil and Latin America.

CHAPTER 2 – THE POWER OF THE LEFT AND ELECTORAL COMPETITION IN BRAZIL
This Chapter focuses on two of the three main explanatory theories central to the distribution of resources of Mais Médicos - the power of the left and electoral competition – to provide context on the variables utilized to measure their impact on the distribution of resources of social policy and public services. The Chapter is divided into the following sections. First, I provide a deeper assessment of the power of left in increasing the provision of public services and goods. This analysis begins by outlining the rise of the PT and the political climate in which it controlled the presidency from Lula to Dilma. I pay particular attention to the dynamics between the PT and other leftist parties and how it managed its status as a hegemonic force on the left with a strong ideological approach to governing while catering to non-leftist parties in its coalition. Following this, I examine how institutional factors, namely federalism and
open-list proportional representation electoral system, weaken ideology in Brazil and
give political parties a more pragmatic approach to governance. Finally, I analyze the
impact of electoral competition on increased provision of public goods, highlighting the
difficulty of utilizing these variables in the context of Brazil. This is due to the
characteristics of its political system and the ambiguous results that previous research
on the impact of electoral competition on the provision of public goods and services has
provided.

The Power of the Left and Public Goods and Services

1: The Rise of the Worker’s Party, the Ideology of Political Parties in Brazil and the
Implementation and Adoption of Social Policy

The place of the PT as the hegemonic force of the left in Brazil that won four
consecutive presidential elections was a long path. After having the 6th largest
percentage of seats in the House of Deputies in 1990 with 7.0%, the PT occupied the
largest percentage with 17.7% in 2002 when Lula was elected (Kinzo 2004). What has
their emergence meant for the advancement of progressive policies in Brazil and how
have institutions structured the implementation of progressive policies pushed by the
PT such as Mais Médicos?

Following the return to democratic rule in the 1980’s, the PT began as a fringe
left party formed as an alliance between progressive social movements linked to the
Catholic church, industrial worker unions of the ABC region of São Paulo, politicians
aligned to the Brazilian Democratic Movement (MDB), college professors, intellectuals,
artists and Trotsky-inspired groups (Secco 2011). The PT aggressively targeted the poor
and built a strong grassroots movement based on its progressive platform of land
reform, political transparency, and mechanisms such as the participatory budget for municipalities to promote greater participation of civil society. For this reason, the PT has been labeled an “organic” party in the sense that it developed from the bottom-up and aimed to promote the involvement of civil society, an unprecedented development in Brazilian politics (Power 2014).

Despite having low representation in Congress in the early years, the PT won several important municipal elections and consistently performed well in the national elections during the 1990’s, losing in the 2nd round to the conservative populist Fernando Collor in 1990 and twice to Fernando Henrique Cardoso of the PSDB in both 1994 and 1998. The candidate in each of these elections, Lula, gained a popular following due to his charismatic persona and his ability to represent the marginalized of Brazilian society given his background as a metallurgical worker and union leader without a college degree who came from a family that left the impoverished Northeast region in search of better life conditions in the industrial centers of São Paulo (Singer 2010).

The main competing parties in presidential elections since the return to democratic rule are the PT and PSDB, both of which have won each election since 1994 and combined have obtained at least 75% of the total vote in the first round of each election from 1994 to 2014. At the same time, the centrist “catch-all” PMDB has established its position as a key player: both parties have relied on the PMDB to be its main coalition partner, and even had longtime Deputy Michel Temer serve as Vice President for Roussef. The pull of the PMDB is partially because of its status as the
The largest party in the legislature, which makes it an important ally in order to effectively secure votes in the legislative chambers and pass the agenda of the President (Fernandez & Henrich 2016).

Progressive policies such as Mais Médicos and Bolsa Familia have also emerged in another countries of Latin America ruled by leftist parties during the same timeframe. The association of the PT-led Brazil with the “pink tide” of Latin America, in which leftist parties and leaders came to power in countries such as Venezuela, Argentina, Ecuador, and Bolivia, has largely been due to their alike minded leftist ideological orientation, aggressive policies to combat poverty and inequality, and their dependence on charismatic leaders (Stephens & Huber 2012). Such a characterization, however, overlooks important differences between the political systems of each of these countries. Although many of these governments have advocated for greater inclusion and promoted universalist policies, one specific difference is how their respective governments distribute public goods and services. In Brazil, evidence suggests that the PT has not relied on provision of these services along voting lines in order to maintain power in the way that some other regimes in Latin America have. While the recipient population has rewarded the PT with its electoral support, parties rewarded for creating beneficial policies for sectors of the population is different than parties rewarding supporters with policies for the purpose of ensuring support on the electoral ballot, as has occurred in some other leftist countries, most notably Venezuela under the leadership of Hugo Chavez (Díaz Cayeros et al. 2016). For example, Bolsa Familia
incorporates 25% of the population and accurately targets resources at those who need them most, with 94% of recipients classified as poor (Lindert et al. 2007).

Do the ideological stances of the left and right in Brazil help us understand how they may react to adoption and implementation of progressive policies such as Mais Médicos? Analyses that have focused on the emergence of left-wing parties in Brazil and its impact on the incentives of politicians of center and right parties in Brazil provide some insight in this respect. Ames (2001) argues that only politicians from the left act based on ideological concerns regarding decisions on supporting certain policies, while those of center and right parties will support policies and programs from which they stand to benefit electorally. In the case of the PT, it has been found that the party has greater cohesion among local leaders in the types of policies that it supports (Donaghy 2013). This seems intuitive given the fact that the PT has occupied the federal government since 2002, which has given them the benefit of a platform from which to innovate policy and diffuse it at the local level.

The vision of the PT to use progressive policies to benefit the working class and poor has also had an impact on the strategy and incentives of the PSDB. While beginning as a center-left party centered on the ideals of social democracy, it has notably moved away from the left during the presidency of Fernando Henrique Cardoso (1994-2001) who advocated fiscal austerity and economically liberal reforms as a means of establishing economic stability. The electoral competition at the national level since the ascension of the PT has pushed them further to the right, as measured by votes in Congress (Power & Zucco Jr. 2009).
This movement towards the right as a means of differentiating themselves from the PT has also taken policy into account. The PSDB’s programmatic vision on healthcare has called for the use of social organizations and public-private partnerships (PPPs) to administer basic health centers as a means of cost-effective administration and greater efficiency in health management (Medici 2010). Nevertheless, they continue to support the expansion of ESF teams as a means of resolving primary care and argue that greater involvement of the private sector through these mechanisms will allow for greater efficiency gains, which would then in turn allow for more budget to hire more teams. Following this discourse has also led to criticism of the PT’s own policies, arguing that their focus on universalist policies have gone too far and ultimately led to inefficient use of resources and corruption in the public sector. In this sense, Díaz Cayeros et al. (2016) argue that the presence of a relevant center-right opposition in Brazil has also served to create greater accountability for the PT, which has ensured a responsible approach to targeting of social policies and other forms of responsible government.

Beyond the PT and PSDB divide and thinking of how the behavior of political parties influences the distribution of programmatic resources, it is important to note that in Brazil there are multiple political parties of diverse ideologies that frequently find themselves in the position of needing to form coalitions.
Table 1: Parties by Ideology and Coalition Support in 2010 and 2014 Presidential Elections.

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<tbody>
<tr>
<td>PPL</td>
<td>NA</td>
<td>PSB</td>
<td>NA</td>
<td>PSOL</td>
<td>PSOL</td>
<td>PSOL</td>
<td>1.1</td>
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<tr>
<td>PSOL</td>
<td>PSOL</td>
<td>PSOL</td>
<td>1.1</td>
<td>PPS</td>
<td>PSDB</td>
<td>PSB</td>
<td>4.0</td>
</tr>
<tr>
<td>PSTU</td>
<td>PSTU</td>
<td>PSTU</td>
<td>1.2</td>
<td>PMDB</td>
<td>PT</td>
<td>PT</td>
<td>4.2</td>
</tr>
<tr>
<td>PCB</td>
<td>PCB</td>
<td>PCB</td>
<td>1.5</td>
<td>PMN</td>
<td>PSDB</td>
<td>PSDB</td>
<td>4.4</td>
</tr>
<tr>
<td>PCdoB</td>
<td>PT</td>
<td>PT</td>
<td>2.3</td>
<td>PHS</td>
<td>NA</td>
<td>PSB</td>
<td>4.5</td>
</tr>
<tr>
<td>PT</td>
<td>PT</td>
<td>PT</td>
<td>2.3</td>
<td>PSDB</td>
<td>PSDB</td>
<td>PSDB</td>
<td>4.6</td>
</tr>
<tr>
<td>PSB</td>
<td>PT</td>
<td>PSB</td>
<td>3.0</td>
<td>PTdoB</td>
<td>PSDB</td>
<td>PSDB</td>
<td>4.7</td>
</tr>
<tr>
<td>PDT</td>
<td>PT</td>
<td>PT</td>
<td>3.3</td>
<td>PTB</td>
<td>PSDB</td>
<td>PSDB</td>
<td>5.0</td>
</tr>
<tr>
<td>PV</td>
<td>PV</td>
<td>PV</td>
<td>3.5</td>
<td>PRB</td>
<td>PT</td>
<td>PT</td>
<td>5.1</td>
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<td>PTC</td>
<td>PT</td>
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<td>5.1</td>
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<td></td>
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<td></td>
<td>PSC</td>
<td>PT</td>
<td>PSC</td>
<td>5.2</td>
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<td></td>
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<td></td>
<td>PTN</td>
<td>PT</td>
<td>PSDB</td>
<td>5.3</td>
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<td></td>
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<td></td>
<td></td>
<td>PRP</td>
<td>NA</td>
<td>PSB</td>
<td>5.4</td>
</tr>
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</table>
Table 1 provides a classification of political parties as Left and Non-left and shows their place along the ideological spectrum according to a survey completed by specialists in Brazilian political parties. Other columns include the presence of the party in the national coalition of the PT in 2010 and 2014. From the beginning of Lula’s first mandate in 2002 until Roussef’s second mandate in 2014, the PT had been gradually losing their grip on their dominant position as a uniting force of the left. This process continued...
between 2010 and 2014. This erosion of power began when the PV (Partido Verde) left the PT national coalition following the mensalão scandal\(^{20}\), and slower economic growth and greater dissention within the left further weakened Dilma’s governing capacity. This was manifested by the departure of the PSB (Partido Socialista Brasileiro) from the governing coalition in July 2013, which coincided with the sanctioning of Mais Médicos.\(^{21}\) The loss of the PSB was also a blow to the PT’s power in the Northeast region due to their strong presence at the subnational level. Other fringe left parties formed by dissenting politicians of the PT, such as the PTSU and PSOL, criticized the party due to their involvement in corruption scandals but were supportive of their social policy agenda.

The gradual deterioration of the power of the PT and their slipping control on the direction of the left in Brazil were products of spending a long period in power. What this means for support of policies such as Mais Médicos indicates that the left will not act as a collective unit. Instead, individual mayors will support these policies based on other factors such as political pressures from key constituencies and need to increase ESF coverage regardless of party platform. The literature also suggests that non-leftist parties will adopt and enhance policies implemented by the left as long as they stand to gain from them. Furthermore, both non-leftist and leftist parties other than the PT had strong motives to support these policies: they enjoyed strong popular support. In the case of Mais Médicos, public opinion polls suggested a rising trend in program support,

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\(^{20}\) The mensalão scandal was a vote buying scheme between the federal government and members of Congress to ensure the passage of priority legislation of the federal government. For more, see: [MICHENER & PEREIRA 2016].

\(^{21}\) The center-left PDT also reportedly debated departing Dilma’s coalition but ultimately supported Dilma in 2014. For more information, see here: [http://politica.estadao.com.br/noticias/geral,dona-da-maior-coalizao-desde-1988-dilma-ve-risco-de-desmanche-no-ano-pre-eleitoral,1050913]
going from 49.7% in July 2013 to 73.9% in September 2013 when the program was first implemented.\textsuperscript{22} What is certain, however, is that given the sheer number of parties and multiple agendas that they carry, the analysis will require an examination of specific parties to go beyond the typical binary classification of “left” and “non-left.”

2: The Causes of Party Fragmentation and Weak Parties in Brazil and their Impact on Ideology

This section examines how institutional structures such as federalism and open-list proportional representation elections provide incentives for parties to overcome ideological divides in the implementation of policy.

2.1: Federalism

The structure of federalism in Brazil has been found as a principal factor to explain the lack of strong political parties. Literature has considered Brazilian parties non-programmatic with low levels of participation and citizen involvement (Mainwaring & Scully 2010). Prior to the Constitution of 1988, Brazil never developed strong national parties along ideological lines due to the strong concentration of power in state politics, in which governors served as power brokers that could form regional alliances and assert their interests in the legislative arena, even at the expense of the interests of the federal government.\textsuperscript{23} Following the Constitution of 1988, parties remained weak due to the design of federalist power although for different reasons. The president’s governing agenda depends on ensuring broad consensus among actors in the national legislature and across levels of executive government among parties that may be outside of its


\textsuperscript{23} The \textit{política dos governadores}, in which governors are given large autonomy to control their regions by the president in exchange for political support, started during the 1st Republic (1889-1930) and continued largely intact during Brazil’s changes from democratic to authoritarian rule. This includes the military rule from 1964-1985 that preceded the recent return to democracy For more information, see: Leal (1977)
ideological spectrum. Due to this institutional attribute, Brazil has become a case study in coalition presidentialism (Figueiredo & Limongi 2000).

Therefore, how do presidents ensure that their programs reach the population among subnational actors of opposing parties and what does this imply for the power of political parties? The answer to this question has been to force municipalities into cooperation with the federal government at the expense of partisan politics and concentration of decentralized power in the hands of state governors. The reforms of decentralization that the Constitution envisioned and were later implemented during Cardoso’s administration concentrated a great deal of power in municipalities at the expense of state governors. Effectively, this process allowed municipalities to be freed of the power tools that state governors exhibited and reduced their ability to control funding sources. The federal government encouraged municipalities to cooperate with their policies by establishing minimum spending floors in areas of social policy such as healthcare and education, as highlighted in Chapter 1 on the establishment of the PAB Fixo and PAB Variavel. Effectively, municipalities were given the option of either innovating their own policies or adhering to the ones that the federal government had created (Fenwick 2016). Budget constraints play a role in outcomes since the incentive of municipalities to reduce poverty and provide to their constituents is counteracted by the lack of capacity to generate sufficient funds required to create their own programs for many municipalities.

This mechanism of governance suggests that non PT-led municipalities will have incentives to receive doctors from Mais Médicos, especially given that the federal
government is paying doctors’ salary. However, is it possible that the PT will still receive more program resources, or doctors, than other parties? This brings up the question of whether alignment of parties at the national and subnational level leads to a greater amount of program resources received. The case of the United States suggests that alignment between the subnational and national governments leads to a higher rate of program adoption and resources (Cox & McCubbins 1993). Nevertheless, the evidence in the case of Brazil is not as clear. Adoption of the Bolsa Escola/Bolsa Familia programs during the PT and PSDB-led federal administrations indicates that program adoption in Brazil is not associated with party alignment between the subnational and national governments. Coêlho (2012) finds that socioeconomic indicators rather than partisan alignment or subnational competition at the electoral level determined program adoption. On the other hand, given the PT’s status as an organic party with many sanitaristas working in public health areas eager to finally have a health program such as Mais Médicos to expand the ESF, the networks of public healthcare and connections between party members working at subnational and national levels may lead to an increased rate of doctors in municipalities led by the PT.

Decentralization also brings into question the concept of credit claiming. In the context of Brazil, Niedzwiecki (2014) finds that municipalities of the opposition will adopt federal programs that are not easily identifiable with the federal government. This is clearly the case of Bolsa Familia, which implementation by opposing subnational actors was met with difficulty due to its strong identification with PT. In response to that, state governors of an opposition party created their own program similar to Bolsa
Familia. The presence of Cuban doctors in Mais Médicos became one of the most recognizable aspects of the program for the electorate. The same can be stated about the association of the Cuban doctors with a policy sponsored by the PT. On the contrary, the ESF never had a public “face” that could be used for credit claiming. In this sense, non-PT or non-left municipalities may wish to avoid hiring Cuban doctors. Conversely, PT mayors may wish to receive Cuban doctors given the visibility it may bring to their party. Secondly, the aforementioned fiscal constraints on municipalities that enforce cooperation with the federal government may impact municipalities of differing sizes. Mayors in cities have greater fiscal resources and higher visibility to the public than mayors of smaller municipalities, hence those wishing to gain loyalty from citizens opposed to the federal government can use their resources to refuse program resources of the federal government. For these reasons, we must consider the PT separately from the left as a whole and also consider the size of municipalities and the nationality of the doctor.

2.2: Open-list Proportional Representation System

Brazil has a two-level legislative body in which the lower level Chamber of Deputies is elected by an open-list proportional representation system. Parties form coalitions and present a list of candidates that are elected based on the proportion of votes that the coalition as a whole collects. This exact formula is also utilized to elect state deputies and municipal councilmen at the subnational legislative levels. This type of electoral system ensures a large number of parties are represented since smaller parties gain greater representation than they would under single member districts elected by simple majority. This system has an important effect on Brazilian politics and
policy adoption: executive power almost always have minority support at the legislative level. The need for coalition forming and the promise of pork in order to accomplish policy goals becomes an essential part of the political game. It also has an impact on the coalitions formed by municipal mayor candidates – typically candidates offer cabinet positions to parties in areas important to their agenda in exchange for joining the coalition (Nicolau & Stadler 2016).

Although Mais Médicos was approved via executive order and did not require legislative approval, its overall success depends on the adoption of the program by political parties other than the PT. Ultimately, this weakens partisan ideology in favor of horse-trading and reaching consensus across party lines (Melo & Pereira 2013). It frequently leaves the coalitions formed at the executive level with many inconsistencies in terms of ideological standing: the Rousseff governing coalition in 2010 included other center-left parties such as the PDT, P C do B and PSB, but also included centrist “catch-all” parties such as the PMDB and the socially conservative PR and PRB. Coalitions are typically formed due to a myriad of factors related to overall presence and power, competition, ideological proximity, and electoral competition.

2.3: Party Fragmentation in Municipal Elections

These factors also carry over to the subnational levels, where parties unite based on the regional circumstances present. The principal consequence of this is it leads to an extremely fragmented government at the municipal level, in which many parties of diverse ideological leanings are represented. How do these factors affect the distribution of resources of federal programs and policies? On the one hand, municipal mayors do not face the same pressures of party discipline that occur within legislative
bodies, where parties have incentive to ensure that their representatives act in a cohesive manner on certain issues (Melo & Pereira 2013). At the municipal level, mayors face direct pressure from the demands of the public to provide services and goods under their autonomy. Therefore, their greatest incentive is to retain office.

**Table 2: Percentage of Municipalities Controlled by Each Party - 2012**

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</thead>
<tbody>
<tr>
<td>PC do B</td>
<td>0.97%</td>
<td>PPL</td>
<td>0.18%</td>
<td>PSC</td>
<td>1.47%</td>
<td>PT</td>
<td>11.51%</td>
</tr>
<tr>
<td>PDT</td>
<td>5.50%</td>
<td>PPS</td>
<td>2.24%</td>
<td>PSD</td>
<td>8.91%</td>
<td>PT do B</td>
<td>0.43%</td>
</tr>
<tr>
<td>PFL/DEM</td>
<td>5.08%</td>
<td>PR</td>
<td>4.87%</td>
<td>PSDB</td>
<td>12.54%</td>
<td>PTB</td>
<td>5.35%</td>
</tr>
<tr>
<td>PHS</td>
<td>0.29%</td>
<td>PRB</td>
<td>1.42%</td>
<td>PSDC</td>
<td>0.18%</td>
<td>PTC</td>
<td>0.36%</td>
</tr>
<tr>
<td>PMDB</td>
<td>18.28%</td>
<td>PRP</td>
<td>0.41%</td>
<td>PSL</td>
<td>0.43%</td>
<td>PTN</td>
<td>0.23%</td>
</tr>
<tr>
<td>PMN</td>
<td>0.75%</td>
<td>PRTB</td>
<td>0.29%</td>
<td>PSOL</td>
<td>0.04%</td>
<td>PV</td>
<td>1.83%</td>
</tr>
<tr>
<td>PP</td>
<td>8.49%</td>
<td>PSB</td>
<td>7.94%</td>
<td></td>
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</table>

Source: Data from TSE. Own elaboration.

Table 2 demonstrates the fragmentation of parties in Brazil in 2012, when a total of 26 parties held at least one municipal mayorship and the three largest parties (PT, PMDB and PSDB) only represent 42.33% of all total mayor seats. Beyond the three largest parties, there are roughly nine mid-sized parties (PFL/DEM, PP, PDT, PSB, PTB, PR, PRB, PPS, PV, PSC) with control of at least 1% of the total number of municipalities and the remaining ten parties have less than 1%.

What does this mean for Mais Médicos? The first implication is that the PT government must rely on other parties since its own only controls 11.51% of all
municipalities. If the objective of the national government is to implement universalist policies that have a wide net, it will have further incentives to work with parties of other ideologies and those outside of their national coalition – only 27.98% of municipalities are classified as “left” based on the ideological scale outlined in Table 1 and 52.56% are parties of the Rousseff’s PT coalition.

How may coalitions influence the distribution of program doctors? This requires differentiating between parties aligned with the PT at the national level and those aligned at the subnational level. Regarding the former, Brollo & Nannicini (2012) find that mayors of parties aligned with the party controlling the Presidency receive approximately one-third larger discretionary transfers for infrastructure spending in preelection years. However, healthcare is more insulated than infrastructure from transfers for discretionary spending given the formulaic manner in which transfers for healthcare are calculated. Nevertheless, given the importance of interactions between different levels of government in assessing Mais Medicos, the beneficial relationship for municipalities led by parties of the governing coalition in terms of financial transfers may carry over to receival rates of doctors. Conversely, it is unclear how municipalities with the PT in the governing coalition will react to Mais Médicos. Parties typically join coalitions based on the formation of regional power, which is an attractive option for parties such as the PT in more conservative areas where they have less strength and can gain control of important areas such as the Municipal Secretariat of Health (Krause et al. 2010).
Regarding the impact of the power of the left on expanding social policy, the institutional mechanisms provide important disincentives for municipal mayors to exclusively act along the ideological lines of their party and the federal government has no other choice other than to work with mayors of parties different from their own and their ideological position. Most specifically, the structures of federalism, fragmented party systems due to open-list proportional representation systems and coalition forming for municipal elections provide high incentives for cooperation between the different levels of government despite partisan differences. The PT’s ideological vision and the disenchantment of other leftist parties with their rule provide potential explanations as to why a higher distribution of doctors occurs in PT-led municipalities than other municipalities led by a leftist party, but it is not possible to distinguish between greater enthusiasm of PT mayors for the program and greater encouragement from or positive intergovernmental relations with the federal government that led to this difference.

**Electoral Competition**

In this section, I expand on the theory of the importance of increased electoral competition expanding public goods and services. This includes a review of common measures of electoral competition, what prior studies have found in Brazil and elsewhere, and their application to this study.

The theory that electoral competition leads to greater provision of goods and services suggests that politicians will provide what their electorate demands when they have autonomy of the policy area or service in question and there is a viable alternative
that may threaten his or her chances of reelection (Flanagan & Zingale 1974). In other words, the ability of voters to punish or reward politicians for outcomes can be a powerful motivating factor in forcing elected officials to improve governance and produce better outcomes of services concerning the electorate.

In cases where the median voter is poor in mid-income countries with high inequality such as Brazil, local mayors will have the incentive to expand goods to services such as public healthcare since the average voter depends so heavily on these services. In the case that voters dependent on services under municipal control such as education and healthcare find these services inadequate or do not see progress, they may decide to cast their vote for another politician. Thus, electoral competition may provide the greatest incentive yet for mayors to receive doctors from Mais Médicos.

There are several measures for determining the overall level of electoral competition. This analysis uses two principal measures: the margin of victory and the total number of competing candidates in the most recent election of 2012. Other common measures of electoral competition or overall strength of democracy include the number of times of party alternation or number of years before first party alternation since a given time period. Although this could be used to measure alternation in municipalities of Brazil since return to democratic rule, it is purposefully disregarded in this study due to the high number of effective parties and frequency of party switching of politicians in Brazil. In contexts where there are a high number of effective parties, these measures are misleading at the local level given the high regional variation in alliances between parties.
The most common measure to assess the impact of electoral competition on provision of goods and services is the margin of victory, or the percentage by which the mayor won in his or her most recent election. Unlike the legislative arena, all executive offices in Brazil, including municipal mayors, are elected with a simple majority. In municipalities with over 200,000 inhabitants, there is a runoff between the top two candidates provided that no candidate wins a majority. Given this institutional feature, the margin of victory will provide the most precise measure of the degree of pressure a mayor faces from their electorate.

The number of candidates (or parties) participating in a given election is an effective way to evaluate electoral competition. Several indicators have been developed to measure the effective number of candidates, which factor in the vote shares of each candidate alongside the total number to provide an estimate of the share of the vote that other candidates beyond the runner-up obtain (Cavalcante 2013). Nevertheless, I simply use a measure of the total number of candidates in municipal elections in order to see the effect of voters having more options has on the incentives of mayors on receiving program doctors (Boulding & Brown 2015).

Electoral competition has been found to have a positive association with increasing public goods provision in diverse countries with different electoral systems by several studies. Utilizing instrumental variables, Díaz Cayeros et al. (2016) find that greater subnational electoral competition, as measured by an index of indicators including margin of victory, alternation in party leadership, and the number of

\[ \text{margin of victory} = \frac{\text{votes for winning candidate} - \text{votes for losing candidate}}{\text{votes for winning candidate} + \text{votes for losing candidate}} \]

candidates, was a crucial explanatory factor to explain increased service coverage in Mexico. In the case of Tanzania, more competitive districts have more public goods and a greater allocation of funds even in one-party dominant regimes (Rosenzweig 2015).

Nevertheless, there are signals that subnational electoral competition may not have any impact, and in several cases there are conflicting results on the same policy being evaluated. In the same case of Mexico, another study using OLS regression models found that electoral competition did not lead to greater provision of water sanitation (Moreno-Jaimes 2007). In other cases, subnational electoral competition has been found to even have malignant effects on the implementation of policy because it has moved politicians towards favoring short-term incentives and even political capture of public utilities. This can be detrimental to provision of services that require long-term and incremental development such as in the state of West Bengal, India, where it was found that areas that maintained one-party dominance ultimately had greater service provision (Chatterjee 2018).

What have the results of studies on the impact of electoral competition on public service provision in Brazil shown and what do they indicate about Mais Médicos? At the subnational level, evidence that electoral competition leads to either greater service provision or more efficient use of resources is ambiguous. No evidence was found that the margin of victory or effective number of parties are associated with greater efficiency, both in terms of better use of fiscal resources and better outcomes, in the areas of education, healthcare and social protection (Cavalcante 2013). One potential explanation for this is the fact that voter preferences are simply more nuanced than
indiscriminately demanding more spending on healthcare, education, and other such goods. For example, there is evidence that uninsured voters demand that mayors make investments in resources and inputs of public healthcare and will vote for the candidate who prioritizes this. While having wealthier constituents in one’s district increases the overall amount of tax revenues available to the government, it does not follow that the rich will necessarily favor the expansion of the public healthcare system. As such, mayors’ willingness to provide doctors to their electorate may be an interaction between the overall competitiveness of elections in the district and the number of uninsured that depend on the provision of doctors of the public health system (Mobarak et al. 2011). Furthermore, actors of the private health system, including the medical lobby, pharmaceutical industry, and private insurance companies, have a legacy of obstructing the expansion of public health programs and policies (Sugiyama 2013; Baird 2017). This may suggest that a high level of insured could lead to obstruction of program doctors. Secondly, all public goods and services are not created equal in the minds of voters. Experimental survey research shows that poor voters in Brazil will prefer that mayors invest in goods that provide short-term immediate benefits such as cash transfers than in public education. Given the high marginal utility of income for the poor, their preference for immediate financial goods suggest that their greater concern is having sufficient money in the immediate present and will support politicians who deliver on this need rather than improvement in public services (Bursztyn 2016).
Conclusion

This Chapter traces the political factors central to the analysis of Mais Medicos. Two separate theories, the power of the left and electoral competition, are outlined as well as the variables central to measuring their impact on the provision of goods and services. Results of analysis based on these theories are inconclusive in the case of Brazil and Mais Medicos.

With regards to the power of the left, the current dynamics of the left in Brazil suggest why the left will not be associated with higher receival rates of Mais Medicos doctors. Although the PT is the exception to the rule that parties lack ideology in Brazil in the sense that it has a clear ideological foundation, it has not been able to maintain its status as a hegemonic force on the left. However, the PT being considered as separate from the rest of the left is important in the case of Mais Médicos, given its strong ideological foundations, party unity, and proximity to the sanitaristas movement. Even if the left were united behind the PT at the time of policy adoption, institutional structures still help explain why the distribution of federal program resources do not succumb to partisan factors. Cooperative federalism and the structure of intergovernmental transfers in areas such as healthcare create incentives for parties to collaborate across different levels of government despite being on opposite ideological ends and coalitions. Furthermore, legislative elections decided by a proportional representation system necessitate the formation of coalitions, for which parties frequently do not take ideological leanings into consideration.

Electoral competition as a potential explanatory factor in increasing the provision of goods and services is particularly relevant to the case of Mais Medicos,
given the pressure that mayors in more competitive races face to increase access to healthcare for the poor. Nevertheless, prior evidence on the importance of electoral competition at the subnational level is mixed in other countries and heavily lacking in Brazil. The evidence also suggests that if electoral competition has an impact then mayors in competitive districts may not necessarily automatically request many program doctors, but rather will react to the program according to the perceptions of the electorate. This calls into question the behavior of voters based on their socioeconomic status and the overall likelihood that a given mayor’s constituency depends on SUS services. Additionally, it is also unclear if the poor and uninsured will make demands for program doctors. As previously mentioned, these voters may prefer that resources be used on goods other than services such as healthcare or education that have positive long-term benefits for population. At the very least, it is possible that they prefer goods such as cash transfers or other excludable private goods that provide immediate benefits given that the positive impacts associated with healthcare provision are not as immediate.

**CHAPTER 3 - BRAZILIAN HEALTHCARE REFORM AND POLICY LEGACY**

This Chapter examines the historical development of the modern healthcare system in Brazil. Understanding this period will provide greater insight of the variables related to policy legacy that may influence the distribution of resources of Mais Médicos. I pay attention to the creation and development of the Unified Health System (SUS), the legacy of a dual healthcare system of private and public care, and political factors such as electoral competition and the power of the left that shaped these
processes. In the first section, I highlight how conservative politicians concerned with electoral competition allowed space for the sanitaristas movement, which then created a public system focused on primary care. Focus is then placed on the diffusion and adoption of the Family Health Strategy as the point of entry and main provider of primary care of SUS. In this context, I note the importance of leftist parties in expanding this program and also stress why the context of Mais Médicos is different. Emphasis is placed on the role of Mais Médicos within the ESF and its potential implications on municipalities based on population size. After this, I discuss how these factors determine coverage levels in urban areas. I conclude by drawing attention to how this policy legacy has created a dichotomy between poorer individuals depending on the public system and wealthier ones with health insurance, and what this means for variables related to the power of the left and electoral competition.

The Politics of Health Policy in Brazil in Historical Perspective

In Brazil, primary health provision has taken the opposite path of many other countries in the region that aimed to privatize their public systems since the restructuring reforms beginning in the 1980’s (Kaufman & Nelson 2004). Instead, the Brazilian health system experienced an initial great expansion prompted by mass privatization starting in the 1930’s and since the 1980’s it has moved towards the creation of a universal and integral public system. Health policy in the pre-1988 period had two crucial developments: the expansion of private health insurance originated during initial industrialization during the Vargas era (1930-1945) and the subsequent rapid expansion of private hospitals and corporate medicine during the military regime
Brazil’s transformation into an urban-based society occurred during the 20th Century, beginning when the import substitution industrialization plans in the Vargas era took place in the 1930’s and continued until the military dictatorship that ended in the early 1980’s (Filho 2007). Workers were coopted into industrial-based labor in part with state-organized social protection that was largely focused on pensions and health insurance schemes provided as benefits to the formally employed. Although this expansion of social protection incorporated a large part of the Brazilian population and benefitted many, it neglected large amounts of the population and especially negatively impacted the rural poor. This led to huge imbalances in quality of life in urban and rural areas and also led to massive-scale internal migration. As a result, many ended up in the informal sector and suffered in precarious living conditions to this day (Bitrán et al. 2005).

During the transition towards democratic rule that started in 1984, new political forces began to shape healthcare policy. Ewig (2015) demonstrates that electoral competition rather than the power of the left at the national level led to the path departing reforms that ended the corporatist healthcare system towards the universal SUS system that emphasized primary care. The sanitaristas movement gained prominence in the public debate and their criticisms of the corporatist model focused on the woes of underfunding, duplication as a result of a fragmented public system and favored private system, lack of coordination and unequal access to healthcare. Conservative politicians seeking electoral support in the return to democratic rule appointed many individuals of this group to key advisory positions in the drafting of the
1988 Constitution. This allowed them to take a center role in creating path departing reform, pushing towards consensus on establishing a unified health system (Cornwall & Sankland 2008). As such, the Unified Healthcare System (SUS) had three overarching principles: (1) universal access to health services, with health as a citizen’s right and an obligation of the state; (2) equality of access to healthcare, and; (3) integrality and continuity of care (Arretche 2004).

Upon entering office in 1996, Fernando Henrique Cardoso inherited a very similar healthcare system to the one that the Constitution of 1988 proposed to transform, largely due to political scandal and lack of action taken by previous presidents as priority was given to economic reform. During this time, policymakers began to define the norms and rules of system organization and the transfer of financial resources and responsibilities to the municipal level, however little had been done to move towards the aforementioned principles of ensuring greater equity and universal access (Couttolenc et al. 2013). To resolve this, the Cardoso administration aggressively targeted these areas through the combination and expansion of the previously established Family Health Strategy (ESF) and Community Health Agent (PAC) programs, both of which were policy innovations at the subnational level led by sanitaristas with the aim of establishing multi-professional health teams in regional areas to provide primary care to families.25 The PAC program was brought to scale at the state level in the northeastern state of Ceará, based on a successful pilot program in rural areas

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25 Teams involve a general practitioner (generalist or specialist in family health or family and community health), one nurse, one auxiliary or technician, and several community health agents of the PAC program. Basic health units (UBS – Unidade Básica de Saúde) are the treatment centers where FHS teams are typically located, although these units may not have FHS teams and other health workers instead, namely general specialists including pediatricians, obstetricians, family and community health specialists, general and clinical medicine specialists, and others (Figueiredo 2012).
created in the 1980’s by PSDB governors Tassio Jeraissati and Ciro Gomes, while the ESF program was modeled after the initiative from the PC do B administration in Niteroi, a suburb of Rio de Janeiro (Tendler 1997; Weyland 2006; Couttolenc et al. 2013). Both programs mainly target mothers and children, but also seek to control communicable and chronic diseases, promote outreach activities and prevention measures (Lima et al. 2005).

An important takeaway from the expansion of the Family Health Strategy is the importance of political factors. The early stages of program development suggest that certain governors played an enormous role in expanding coverage. Although Ceará previously had the infrastructure in place given its prior expansion of the PAC program, high coverage rates in other states such as Santa Catarina and Minas Gerais suggest that program expansion was also related to other factors, such as the level of encouragement that the governor gave to decentralization. This allowed municipalities to have financial autonomy for program adoption and thus implement the ESF program. While relatively poorer regions such as the North and Northeast have large coverage gaps, it cannot be assumed that this is entirely related to economic development since richer states such as São Paulo and Rio Grande do Sul have some of the lowest coverage rates. To this end, (Soares & Rocha 2009), find that political ideology played an important role in program adoption through hazard estimations. Specifically, leftist parties such as the PT, PSB, and PDT along with Cardoso’s then center-left PSDB had much higher rates of adoption, while conservative parties in Cardoso’s national coalition such as the PFL had negative rates.
Figure 1: The Progression of ESF Coverage at the Municipal Level prior to Mais Médicos.

Source: Own elaboration, data from DATASUS.

The ESF continued to expand during the Lula administration, while adding to it the Smiling Brazil (Brasil Sorristente) program for dental care and Popular Drugstores (Farmacia Popular) program for inexpensive access to pharmaceuticals (Couttolenc et al. 2013). As the map in Figure 1 shows, expansion occurred at a less rapid pace. Much of this had to do with saturation, but the PT also suggested a larger problem of retention and attraction of ESF doctors to remote and poorer areas of Brazil. Part of this argument tied into a larger strategy to move health policy away from the high-cost flexerian-based model that emphasizes secondary care and a large dependence on hospitals and
towards one that emphasized primary care and a community presence of doctors supported by *sanitaristas*.26

In 2003, the Secretary of Administration of Labor and Education of Health (SGTES) was created within the Ministry of Health, which served to open dialogue on reform related to education standards for medical schools and preparation of healthcare physicians (Dias et al. 2013). The Ministry manifested its support for training medical students in areas of specialization through medical residencies in 2005 and the Pro-Residencia program was created in 2009. The program has favored the formation of specialists in priority areas, with particular attention to the Northeast and North regions. It offered 788 openings for five specialty areas related to basic care such as family and community-based medicine (Rodrigues et al. 2013).

The reforms of the Lula era contributed to greater polarization between public health advocates and *sanitaristas* of the PT versus medical associations and corporate interests that tended to side with the PSDB during its move towards the center-right. Medical associations were highly critical of the Pro-Residencia program, citing doubts regarding the quality of instruction at newly established residency programs in the North and Northeast regions. They defended not only autonomy in choosing their region of work but also the right to choose their area of specialization. Their arguments also center on the need to earn high salaries following the high costs of medical school,

26 The Sanitarista reform consisted of groups of doctors and professionals of public healthcare who were critical of the movement towards hospital-centric secondary care that the military government focused on, arguing that this model left many individuals uncovered, made healthcare more expensive and did not lead to optimal outcomes. Their movement gained prominence in the 1970’s and their opposition to the dictatorship gave them a seat at the table when the Constitution of 1988 was formulated. For more, see: Filho (2007) & Arretche (2004).
which would discourage less lucrative career paths such as working in primary care in deficient regions (Feuerwerker 1998).

Key projects such as Pro-Residência and PITS had little immediate impact on changing the distribution of doctor density.27 In 2012, two years after Dilma had won the election, coverage only increased to 54.84%, despite a 9.66% increase in the number of ESF teams from 2011-2012. The PROVAB program, which was adopted in 2011, provides financial and education incentives to recently graduated Brazilian doctors to work in primary care on one-year contracts in underserved municipalities (Petta 2013). Despite the fact that over 3,000 municipalities requested a total of 13,000 doctors, only 4,392 doctors entered into the program and only 3,800 signed in 2013. Only 55% of municipalities that adhered to the program received doctors and the program satisfied only 29% of the national demand in its first two years.28

**Mais Medicos**

Although the CFM (Conselho Federal de Medicina in Portuguese) had frequently criticized the Lula and Rousseff administrations for previous programs, their harshest criticisms came with the establishment of Mais Médicos. The President of the CFM publicly accused the program of being used to serve the electoral interests of the Roussef administration and denounced the analysis of the Ministry of Health as

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27 The Pro-Residencia program, which was adopted in 2007, aims to strengthen the training of medical specialists through the creation of residency programs in priority regions in the Northeast, North and Center-West and priority specializations focused on primary health. PITS is a program from 2005 which sought to bring doctors to lacking regions but failed due to lack of institutional support. For more on these programs, see: Petta 2013; Min. de Saúde 2013; Filho 2007.

incompetent and corrupt. Conservative parties followed suit, given that they have important allies in the medical associations and health insurance companies. The minimum requirements of undergraduate degree in medicine to become an ESF team doctor infuriated medical associations who cater to doctors that have completed residency programs and viewed this as a threat to their autonomy. Similarly, Mais Médicos reliance on foreign doctors and Brazilian doctors with credentials from overseas institutes to fill out ESF teams in lacking municipalities caused a similar controversy.

Much of the reaction from the strongest opposition parties to the PT, which includes the PSDB despite their involvement in the development of the ESF, has been to side with the medical associations. The reaction from these parties was extremely strong at first, as PSDB and DEM members of Congress both requested investigations regarding what they viewed as illegal contracts with the Cuban government through the Pan-American Health Organization (PAHO). Several municipal mayors claimed that they would accept doctors from Mais Médicos provided that they were Brazilian doctors with their studies completed at an accredited Brazilian university.

1: The Legacy of the Family Health Strategy (ESF) and its Implications for Mais Médicos

It is noteworthy how political factors such as partisan ideology influenced expansion of the ESF program. What may this mean for the politics of Mais Médicos? The influence of partisan ideology seems to contradict the institutional incentives of

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29 The CFM is an independent public agency of the Ministry of Work and Employment. They have regional branches in each state and all councilors are doctors elected by their peers. They control professional regulation and medical licensing for doctors in Brazil and have huge influence on health policy. See: http://portal.cfm.org.br/index.php?option=com_content&view=article&id=25435:2015-04-07-15-17-04&catid=46:artigos&Itemid=18
subnational governance in Brazil, but one important difference between the politics of ESF expansion and Mais Médicos is that ESF expansion coincided with decentralization. Many of the fiscal mechanisms by which the federal government coopts municipalities into cooperation were being implemented at the same time. In this sense, the resistance to the ESF was part of a larger battle over decentralization, in which the influence that state governors had on program adoption was larger and had greater mechanisms to discourage ESF implementation (Sugiyama 2013). Once decentralization of responsibility of primary care was fully handed over to municipalities, the trajectory of the ESF changed as well.

The expansion of the ESF produced an important dichotomy between the insured and uninsured. There are many with health insurance plans that depend on SUS for services that their plans don’t cover but typically this does not entail primary care services such as the ESF (Medici 2010). Meanwhile, individuals who have no form of insurance either pay out of pocket or depend on SUS to receive healthcare, which makes the ESF that much more important. This implies that in areas with greater rates of uninsured, there is greater political pressure on mayors to fund public healthcare and provide doctors in the ESF. It is also possible that while wealthier individuals with ANS plans do not actively oppose the expansion of the ESF, the historical development of public healthcare suggests that groups of the medical lobby, insurance companies included, will oppose the development of SUS and the expansion of ESF and support politicians with preference for private healthcare (Sugiyama 2013; Baird 2017).
Table 3: ESF Coverage and ANS Plans Rates by Municipality Size, 2013.

<table>
<thead>
<tr>
<th>Municipality Size</th>
<th>ANS Plans Rate</th>
<th>ESF Coverage Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 1 million</td>
<td>39.89%</td>
<td>52.75%</td>
</tr>
<tr>
<td>250,000 - 1 million</td>
<td>32.55%</td>
<td>55.37%</td>
</tr>
<tr>
<td>50,000-250,000</td>
<td>17.95%</td>
<td>66.4%</td>
</tr>
<tr>
<td>25,000-50,000</td>
<td>9.86%</td>
<td>78.17%</td>
</tr>
<tr>
<td>-25,000</td>
<td>6.23%</td>
<td>93.25%</td>
</tr>
</tbody>
</table>

Source: Own elaboration. Data from IBGE, ANS, and DATASUS.

The table above displays the coverage rates of both private insurance (ANS Plans Rate) and the ESF Coverage Rate by population size in 2013 before the enactment of Mais Medicos. The ANS Plans Rate and ESF Coverage Rates have almost a perfect negative correlation. One would expect the ANS Plans Rate to be higher in areas with larger population sizes and where income is higher. There are possible explanations for the negative correlation between ESF Coverage Rates and population size. Firstly, ESF coverage rates in larger sized municipalities are harder to sustain given the sheer number of doctors that must be employed to cover a substantially larger number of people. Given that the ESF Coverage Rates are a simple calculation of the number of ESF teams multiplied by 3,500 (the expected number of individuals that the ESF can cover) and divided by the total municipal population, these coverage rates do not imply that more populous municipalities have fewer resources but rather that they are underfunded relative to the overall size of the population they must cover. In this sense, the higher average incomes in larger municipalities produce greater tax revenues that allow for a larger public health system in absolute terms, but still insufficient to alleviate
the stress on the public system to accommodate the large quantities of individuals without health insurance (Mobarak et al. 2011). Secondly, there may be less political pressure on mayors from larger municipalities to expand the system provided that a higher percentage of the population has private insurance. Finally, there might also be incentives for these politicians to discourage the development of public healthcare given evidence of medical lobbying groups actively organizing to discourage it (Baird 2017).

In justifying the existence of Mais Médicos, the Ministry of Health stated that one of its objectives is to provide greater security to municipalities in areas that struggle to retain health professionals. More specifically, they highlighted coverage gaps in peripheral areas of cities and towns located faraway from urban centers. The data suggests that coverage rates are better in smaller municipalities, as previously noted. It is unclear if they have greater difficulty retaining these professionals, as losing doctors in less populated municipalities has a greater impact on coverage rates. Remote municipalities also tend to depend more on the Family Health Strategy given that there are fewer private healthcare providers.
Figure 2: Average Number of ESF Doctors in Municipalities Segmented by Population Size – 1998-2010.

Source: Data from DATASUS. Own elaboration.

The total number of doctors distributed by the ESF overwhelmingly favored populations living in metropolis (+1 million inhabitants) and large cities (250K-1 million inh.) This is largely due to the availability of doctors, which are concentrated in urban areas. Since it is expected that doctors would concentrate where there are more patients in need and thus more available jobs, one of the principal justifications of Mais Medicos was to provide doctors to smaller sized municipalities, as they have struggled to attract and retain high-skilled professionals.
Although municipalities with smaller populations struggle to attract qualified professionals, the ESF coverage rates are considerably lower in larger municipalities due to large and increasing populations, a lack of reliance on the ESF by wealthier socioeconomic groups who tend to have private insurance plans, and the lack of access in marginal populations. The relationship between current coverage rates and year of adoption is clear for all municipalities of all population sizes except for the metropolis group – the earlier that the program was adopted, the higher coverage rates in 2013 before the implementation of Mais Medicos tend to be, as shown in Figure 3. This may also explain why ESF Coverage rates are higher as municipalities become smaller, since this and the PACs programs were targeted for lacking populations and more urban areas already had a large concentration of doctors in the private system. Although the tendency is decreasing for the metropolis group, this is likely due to increasing
population sizes during this time frame and a small total number of municipalities in this
grouping leading to greater variance.

**Table 4: Mais Médicos Receival Rates by Municipality Size.**

<table>
<thead>
<tr>
<th>Municipality Size</th>
<th>Aggregated Sum of Doctors Received</th>
<th>Average Number Received by Municipality</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 1 million</td>
<td>2,359</td>
<td>93.68</td>
</tr>
<tr>
<td>250,000 - 1 million</td>
<td>1,499</td>
<td>25.09</td>
</tr>
<tr>
<td>50,000-250,000</td>
<td>4,341</td>
<td>8.22</td>
</tr>
<tr>
<td>25,000-50,000</td>
<td>2,709</td>
<td>3.71</td>
</tr>
<tr>
<td>-25,000</td>
<td>5,265</td>
<td>1.25</td>
</tr>
</tbody>
</table>

Source: Data from DATASUS. Own elaboration.

The distribution of Mais Médicos doctors, as shown in Table 4, demonstrates the
priority given to small municipalities, as the Ministry of Health allocated the largest
number of doctors to these regions. Naturally, the average number of doctors received
by municipalities follows population size – municipalities with less than 25,000
inhabitants received 1.25 doctors on average while a municipality of the largest group of
municipalities (+1 million inhabitants) received on average 93.68 doctors from Mais
Médicos.

**Health Policy in Urban Brazil**

The prior section focused on the development of public healthcare, the ESF and
how Mais Médicos fits within it. With regards to the comparative analysis on urban
centers, there is still a remaining question: what did the development of the ESF in cities
with 250,000 or more inhabitants look like relative to their level of overall
development?
The health of the urban poor in Brazil and Latin America is an understudied topic with scant literature on issues related to access and coverage for primary care. Health indicators and statistics that average outputs tend to cast shadow on the difficulties of the urban poor, who are considered to be better integrated into markets and within greater proximity to hospitals and health centers than the rural poor. While attention has been focused on the movement of the poor from rural to urban areas and the subsequent transformation from communicable diseases to non-communicable ones and violence as the great sources of mortality for these groups, recent evidence suggests that the urban poor of Brazil are not even having their most minimal needs met. One World Bank study revealed that the urban poor suffer higher infant mortality rates than the rural poor in several Latin American countries, including Brazil (Bitrán et al. 2005).

There are 101 municipalities with 250,000 inhabitants or more and 16 with at least 1,000,000 inhabitants, according to 2013 estimates in Brazil. As previously mentioned, these cities have on average the lowest ESF coverage rates but also have the highest ANS (private) insurance rates. There are three principal perspectives that help understand why ESF coverage did not expand at the same rate in large cities and metropolises as smaller municipalities. First, there was a focus in large cities on providing ESF coverage to sectors of the population that were most vulnerable and at greater social risk. Based on this perspective, large municipalities with a lower proportion of poor people would have less incentive to expand coverage. The second explanation argues that financial incentives provided to by the federal government were
insufficient prior to the Constitutional Amendment (EC-29), which left too heavy of a burden on municipalities to fund the ESF for such a large number of people. Finally, the third line of research states that larger municipalities preferred to limit their spending due to legal restrictions that prevent the growth of expenditures by municipal governments as a whole (Costa 2012).

Table 5: Average ESF Coverage Rates, ANS Plans Rate and Municipal Human Development Index in Cities with 250,000 or more inhabitants by Region – 2013.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>North (N)</td>
<td>41%</td>
<td>17%</td>
<td>730</td>
</tr>
<tr>
<td>Northeast (NE)</td>
<td>55%</td>
<td>24%</td>
<td>728</td>
</tr>
<tr>
<td>Center-West (CO)</td>
<td>34%</td>
<td>24%</td>
<td>769</td>
</tr>
<tr>
<td>Southeast (SE)</td>
<td>29%</td>
<td>41%</td>
<td>770</td>
</tr>
<tr>
<td>South (S)</td>
<td>41%</td>
<td>35%</td>
<td>779</td>
</tr>
</tbody>
</table>

Source: Data from IBGE, DataSUS and National Supplemental Health Agency (ANS). Own elaboration.

The importance of political factors in ESF adoption among cities shows up in Table 5, which demonstrates the ESF Coverage Rate, ANS Plans Rate, and Human Development Index before the implementation of Mais Médicos in cities of 250,000 inhabitants or more. It is clear that ESF coverage rates share no correlation with the human development index of a city, whereas private health insurance does. The near perfect correlation between ANS plans rates and HDI is not surprising given that cities that benefitted from industrialization most focused on providing private health insurance plans to workers. These cities also experienced the greatest jump in the human development index due to their early industrialization.
Figure 4: Average ESF Coverage Rates, ANS Plans Rate and Municipal Human Development Index in Cities with 250,000 or more inhabitants – 2013.

Source: Data from IBGE, DataSUS and ANS. Own elaboration.

Figure 4 demonstrates the relationship between ESF Coverage Rates and ANS Plans Rates relative to the Human Development Index among all cities with 250,000 inhabitants or more. This graph tells a similar story to what has been outlined throughout this Chapter - the ANS Plans Rate and HDI are heavily correlated. Furthermore, ESF rates do not have a direct relationship with the ANS Plans Rate and HDI. Due to the fact that health insurance is stronger in certain areas there may be less pressure on policymakers to adopt ESF, especially for mayors from conservative parties, those who represent wealthier constituents, or both. Secondly, the resistance of the medical lobby and private insurance companies to the ESF was strong in the initial implementation years in these cities (Sugiyama 2013). As the map in the previous section displays, the development of the ESF was heavily determined by regional factors. This is why there are low rates in some of the more developed cities of the
Southeast, namely the state of São Paulo, as they reflect this resistance to decentralization and the ESF program given the concentration of the medical lobby in the state. In cities of the Southeast where the leadership was more progressive, such as Belo Horizonte, the ESF was more heavily encouraged.

**Mais Medicos and Cities – A Descriptive Look**

The right-left dichotomy among municipal administrations in cities roughly follows the following pattern: non-left parties will be more inclined to receive doctors from Mais Médicos only if their ESF coverage rates are low, whereas left parties will tend to receive a high level of doctors regardless of their ESF coverage rates. At the same time, left parties with high levels of ESF coverage will receive a similar level to municipalities with non-left leaders that have low existing levels of ESF coverage.

<table>
<thead>
<tr>
<th>Party Ideology of Mayor</th>
<th>ESF Coverage Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>Low (Q1)</td>
</tr>
<tr>
<td></td>
<td>High (Q2)</td>
</tr>
<tr>
<td>Left</td>
<td>Low (Q3)</td>
</tr>
<tr>
<td></td>
<td>High (Q4)</td>
</tr>
</tbody>
</table>

**Figure 5: Doctor Receival Rates from Mais Médicos by Party Ideology of Mayor and ESF Coverage Rate.**

Source: Data from IBGE, DataSUS and TSE. Own elaboration.

Figure 5 displays the receipt rates with the four quadrants outlined above. The average municipality in Q1 received 2.7 doctors per 100,000 and 59 total doctors, while in Q2 the average is .6 doctors per 100,000 and 6 total doctors. Among the non-left
municipalities in Q3, the average municipality received 5.0 doctors per 100,000 inhabitants and 94 total doctors in absolute terms. The average municipality in Q4 had a receiptal rate of 5.0 and 60 total doctors.

Figure 6: Doctors per 100,000 inh. Received from Mais Médicos by ESF Coverage Rates and Party Ideology.

Source: Data from IBGE, DataSUS and TSE. Own elaboration.

Figure 6 provides a visualization of this split. The average numbers of municipalities in the quadrants on the right side are less clear given the small size of the sample. There is also a great deal of variety among municipalities in each quadrant: municipalities led by the center-right PSDB with ESF coverage rates below 40%, such as Maceió, received 6 total doctors whereas Manaus received 95 total doctors. Ultimately, the pressures and incentives faced by each municipality leader differed and led to great variation. Nevertheless, it is clear that cities with leftist mayors had higher receiptal rates on average.
Conclusion

This Chapter builds upon the theories presented in the previous Chapter by contextualizing them in the policy legacy of the Brazilian healthcare sector. I highlight how political forces influenced the development of primary healthcare over time while assessing how Mais Médicos fits within this process that began based on a corporatist model that relied heavily on a private insurance schemed created during the developmentalist era. I followed the transition to SUS during the return to democratic rule in the 1980’s, a period when the politics of healthcare and specifically the role of the sanitaristas in pushing for a universal public system based on prevention and primary care, are extremely relevant. The sanitaristas were a group that gained influence in drafting the public system in the 1988 Constitution due to conservative politicians giving them important positions to gain legitimacy and approval from the public for upcoming elections. The expansion and development of the ESF shows the importance of leftist parties in program adoption. It also makes evident the dichotomy between private and public health systems, as both groups have become important constituencies for politicians. It also becomes clear how the prominence of each sector is stratified by municipality size. More specifically, urban areas are more likely to have higher concentration of individuals dependent on private healthcare while rural areas are more likely to have more uninsured and higher ESF Coverage rates. This Chapter concludes its analysis with a descriptive assessment of how ESF fits within the context of large cities of Brazil, and the influence of political factors in the receiveal rates of Mais Médicos in urban areas.
There are several important takeaways from this framework. Regarding the power of the left, I highlighted in Chapter 2 that the weak party system caused by federalism and the strong incentive to form coalitions due to the electoral system helps explain why political ideology is typically not found to be a determining factor in program adoption. Nevertheless, in this Chapter, the importance of the left is made evident in the expansion and development of the ESF. What does this imply for the distribution of resources of Mais Médicos? That assertion may seem contradictory to the evidence outlined previously but that is not the case. I argue that the expansion of the ESF and Mais Médicos are different because they occurred in different contexts. The partisan factors that shaped the ESF occurred for two main reasons: first, the development of the ESF coincided with the decentralization of the healthcare system. Many mayors of conservative parties were pressured by governors to obstruct the development of the ESF because they felt it would threaten their patronage systems at the state level. Since many of the funding systems have been put in place, governors have much less power over allied mayors on healthcare decisions. In the context of Mais Médicos, this implies that the cooperative mechanisms of federalism will sufficiently encourage non-left politicians to receive program resources when they are needed. The second reason is that the ESF was implemented without any other prior public primary care program existing. The diffusion of the positive effects of the ESF has occurred since and it is now a respected institutional aspect of SUS. On the other hand, Mais Médicos aims to expand upon this program in areas where its growth has stagnated. In this
sense, the analysis of Mais Médicos will likely take on the politics of current expansion rather than its initial implementation.

Finally, this Chapter sheds light on the understanding of electoral competition. As the ESF developed, mayors became more sensitive to the dichotomy between the public and private healthcare systems. Municipal mayors frequently find themselves being pressured from both sides to benefit their personal interests, regardless of political party. The high profile nature of Mais Médicos intensifies this. Mayors experiencing pressure from uninsured constituents to receive program doctors or the medical lobby to reject the program will find themselves calculating what position to take on the program. Electoral competition can add further pressure, as politicians in close districts will feel additional pressure to decide either way on Mais Médicos.

The descriptive analysis on Mais Médicos within cities provides an initial look at how politics shaped receival rates. Specifically, it can be observed that ideological considerations played a greater role. This makes sense given that these municipalities have greater fiscal resources, thereby reducing their dependency on cooperating with the federal government. The relatively higher rates of private insurance also imply fewer constituents that rely on the ESF. Nevertheless, it is interesting to observe that non-left politicians were still willing to receive doctors provided that initial ESF Coverage rates were low. This seems logical given the potential gains that these voters may bring.

The upcoming chapters will allow us to precisely examine the theories outlined in Chapters 2 and 3. Specifically, Chapter 4 will focus on the overall distribution of doctors in all municipalities. I will test the overall importance of the left as an
explanatory factor in receival rates, as well as the effects of electoral competition. This will allow us to understand exactly what political factors influenced the expansion of the program alongside the policy legacy of a dichotomous healthcare system and socioeconomic indicators. In Chapter 5, I will assess how politicians of differing ideologies allocated doctors among poor regions. Specifically, the neighborhood level analysis will allow us to understand how the ESF had developed within cities and how politicians of differing ideologies utilized Mais Médicos to improve access to the poor.

CHAPTER 4 – ASSESSING THE DISTRIBUTION OF DOCTORS OF MAIS MÉDICOS

This Chapter focuses primarily on the distribution of resources of Mais Médicos among all Brazilian municipalities. In doing so, political factors are assessed alongside poverty, health, human development indicators, and territorial designations, which were the main criteria for targeting. First, I briefly discuss the principal variables of concern in assessing resource distribution and how they relate to the relevant literature. Then I provide a descriptive assessment of resource distribution of Mais Médicos in order to assess the timing of resource distribution and how political factors may have interfered with that process. After this, I provide a descriptive assessment of resource distribution, while paying particular attention to the targeting criteria for municipalities. Then, I outline the methodology for my regression analysis. Finally, a presentation of the regression results is provided to assess why certain municipalities received more doctors than others. I find that for all municipalities, the rate of private insurance, poverty rates and the presence of the PT government were associated with higher receival rates. Municipalities led by centrist and right-wing parties were not excluded from receiving
doctors and there is no evidence that the PT allocated doctors more favorably to municipalities led by the party or to areas that had higher vote totals for Dilma Roussef in the 2010 Presidential election. In smaller municipalities, margin of victory is negatively correlated with receiving Mais Médicos doctors but the magnitude of this relationship is very small.

Examining Resource Distribution and Methodological Considerations

After the sanctioning of Mais Medicos, Senator of Minas Gerais and eventual Presidential candidate of the PSDB in 2014 Aécio Neves told O Estado de São Paulo, a major Brazilian newspaper, that the program was “an abuse without precedent” and simply was created to serve marketing and electoral purposes. Following suit, Senator of Goiás Ronaldo Caiado of the conservative opposition party Democratas (DEM) demanded that a federal investigation be made into the negotiations between the Ministry of Health and Pan-American Health Organization for payments of doctors participating in Mais Medicos, citing audio recordings that demonstrated the two institutions acted with the “central objective of financing the Cuban dictatorship with the program.”

Despite the hardline stances from some of the most high-profile politicians that oppose the PT, these comments were not backed up by their party colleagues at the subnational level – 64.75% of all PSDB and 57.46% of DEM-led municipalities received at least one doctor from Mais Médicos in the first 11 program cycles, which does not

30 Comments can be found here: https://www.youtube.com/watch?v=8pKZAnji68k
31 Caiado was one of the most outspoken critics of the program, citing the illegality of the contracts and the electoral interests of the PT by launching a program of this nature 10 months before the Presidential elections of 2014. More information can be found here: http://folhaz.com.br/politica/mais-medicos-do-governo-federal-tem-carater-eleitoreiro-diz-caiado/https://www.youtube.com/watch?v=es6C5qPQumA
deviate significantly from the overall rate of 66% of all municipalities that received at least one doctor. This background leads us to pose the following questions: why did certain municipalities receive more doctors than others and how were political factors involved?

As mentioned in Chapters 2 and 3, there are three central theories to the increase of public goods and service provision. In this section, I present data to analyze if and how they apply to the case of Mais Médicos. First, the power of the left, or the idea that political parties linked to worker’s rights support and social democracy will universalize access to public goods and services. This relates to Mais Médicos in the sense that the hegemonic party of the left in Brazil has created a program for which municipalities lacking qualified professionals can receive family and community health doctors to work in ESF teams. Whereas the dichotomy of left and right may lead to a split in receipt rates according to the ideology of the mayor’s party, the literature highlighted two principal reasons why this does not occur in Brazil – the incentives of federalism makes it extremely difficult for municipalities to refuse federal government resources, particularly in health policy, and the non-programmatic nature of coalition formation creates more interaction among actors of differing parties and thus weakens partisan ideology (Melo & Pereira 2013; Nicolau & Stadler 2016).
Figure 7: Extreme Poverty Rates in Left vs. Non-Left and PT-led vs. non PT-Led Municipalities.

Source: Own elaboration. Data from IBGE and TSE.

Figure 7 displays extreme poverty rates in both PT and non-PT led municipalities and municipalities in left and non-left municipalities. Observing voting patterns at the municipal level in Brazil, one notable aspect is that the average extreme poverty rate is almost equal in PT-led municipalities compared to non-PT municipalities. No discernable differences exist between other main socioeconomic indicators, whereas the average extreme poverty rate is almost 2% higher in left municipalities than non-left ones. Therefore, if the PT is associated with higher doctor receival rates alongside the targeting criteria, it is not due to lower relevant socioeconomic indicators, whereas many leftist parties do have slightly higher levels of poverty and thus greater “need” for provision of doctors. Although the PT vote at the municipal level may be correlated with other factors, the overall level of poverty of a municipality is not one of them.
Figure 8: Relationship between Proportion of Roussef Vote (2nd Rd) and Extreme Poverty Rate of Municipalities – 2010.

Source: Own elaboration Data from TSE and IBGE.

Part of the challenge in assessing the distribution of goods and services is the high correlation found between the PT Vote for Presidency in 2010 and extreme poverty rates among all municipalities. Figure 8 displays this relationship. Previous studies on the distribution of resources have differentiated between core and periphery voters. In competitive elections, politicians will tend to concentrate resources in areas where their support is tentative; the distribution of resources will tend to have a bell-shaped curve, where municipalities that had vote percentages in the 40-60% range will be targeted specifically. This would entail leaving out resources in areas where extreme poverty is lowest and highest, and therefore leaving out the municipalities with the higher poverty rates. In the regression models, I address this by using a squared term for the Roussef 2010 vote in the 2nd round. The use of a quadratic term tells us if this relationship takes
on this non-linear, bell-shaped curve and allows us to separate core and peripheral voters: a positive association with the Roussef 2010 vote and a negative association with the squared term would provide evidence that the national government sought to maximize the distribution of doctors in competitive districts surrounding the 50% vote percentage total. In contexts where resource distribution is targeted for electoral gain, the non-squared term is positive (measuring from 0% to 50%) and the squared term (measuring past 50%) is negative.

The second theory relates to electoral competition and states that elected officials who face greater levels of competition in elections feel greater pressure to improve access to public services and goods. It is argued that electoral competition at the municipal level can effectively break these patterns and cause politicians to distribute access to goods to non-loyalists, as well as providing distance from the federal government in determining where resources are distributed (Díaz Cayeros et al. 2016). In order to address this, I assess the margin of victory of the mayor and number of candidates competing in the municipal election while also including the rate of individuals with private insurance and the ESF Coverage rate. Analyzing these two factors alongside electoral competition is important given the possibility that political leaders react to the pressures they face from different sectors of the population.

The policy legacy of the ESF is measured by the existing coverage of the Family Health Strategy (ESF), initial year of adoption of the ESF and private insurance rates (ANS-approved plans rate). This will provide insight as to how prior health conditions and existing actors in health policy influenced doctor distribution of Mais Médicos.
These factors also serve as proxies for important constituencies: high rates of private insurance not only indicate the preference of individuals that depend on the private healthcare system, but also other parts of the medical industry such as pharmaceuticals, doctors working in the private sector, and insurance companies given that these industries tend to concentrate where their clients are. The medical lobby contains powerful groups that may pressure politicians to enact policies that benefit them. Meanwhile, early ESF adoption rates indicate the presence of sanitaristas and civil society activists who advocate for public health. In this case, these constituencies may prove more influential than party loyalty, electoral competition or even socioeconomic indicators.

Finally, given our overall interest in assessing how these factors influence resource distribution alongside the technical criteria outlined by the Ministry of Health, socioeconomic indicators highlighted will be included as well. Although the Mais Médicos program did not use extremely strict targeting procedures, the justification of providing more doctors to less well-off regions as defined by priority criteria for targeting will provide a manner to test if these criteria were influential in a decentralized context.

**The Timing of Mais Médicos**

The data utilized in this study includes 11 total cycles of Mais Médicos, the first one beginning in September 2013 and the final one on July 2016. The PROVAB program also had cycles that coincided with Mais Médicos for cycles six through ten. The count totals for these cycles only takes into consideration the initial placement of doctors and
does not consider whether doctors were removed from service, placed in other regions or renewed. I only consider the distribution of doctors from the Mais Médicos program.\textsuperscript{32}

\textbf{Table 6: Total Number of Doctors per Cycle - Mais Medicos and PROVAB.}

<table>
<thead>
<tr>
<th>Date</th>
<th>Cycle</th>
<th>Mais Médicos</th>
<th>PROVAB</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013/9</td>
<td>1</td>
<td>983</td>
<td>-</td>
</tr>
<tr>
<td>2013/11</td>
<td>2</td>
<td>5042</td>
<td>-</td>
</tr>
<tr>
<td>2014/2</td>
<td>3</td>
<td>2571</td>
<td>-</td>
</tr>
<tr>
<td>2014/4</td>
<td>4</td>
<td>4688</td>
<td>-</td>
</tr>
<tr>
<td>2014/6</td>
<td>5</td>
<td>172</td>
<td>-</td>
</tr>
<tr>
<td>2015/3</td>
<td>6</td>
<td>1537</td>
<td>2477</td>
</tr>
<tr>
<td>2015/8</td>
<td>7</td>
<td>72</td>
<td>142</td>
</tr>
<tr>
<td>2015/10</td>
<td>8</td>
<td>150</td>
<td>194</td>
</tr>
<tr>
<td>2016/1</td>
<td>9</td>
<td>237</td>
<td>740</td>
</tr>
<tr>
<td>2016/4</td>
<td>10</td>
<td>592</td>
<td>612</td>
</tr>
<tr>
<td>2016/7</td>
<td>11</td>
<td>129</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Own elaboration. Data from Ministry of Health.

Table 6 displays the total number of doctors distributed in each program cycle and date. One important note is that 93\% of all doctors in Mais Médicos were included in the first 5 program cycles and 66\% of all doctors including both PROVAB and Mais Médicos. This stands out given that the 2014 Presidential election occurred between the 5\textsuperscript{th} and 6\textsuperscript{th} program cycles, in October 2014. Given the fact that doctors in PROVAB receive only one-year contracts, it is possible that the government preferred to rely on

\textsuperscript{32} The receipt rates of PROVAB doctors as a dependent variable to determine whether municipalities were more inclined to receive doctors from this program as opposed to Mais Médicos or if they were positively correlated.
these contracts since they carry a less onerous fiscal commitment than the more expensive Mais Médicos program.

With respect to the timing of resource distribution, one important takeaway is that public opinion was an influential factor on reducing the partisan divide of the program and ultimately the perception of mayors, especially for center and right parties who were extremely resistant to it at the program’s start. When the program was first announced in July 2013 and program criticism was at its harshest, only 49.7% of the population approved of the program. The approval rating of Mais Médicos increased to 73.9% in September 2013 and 84.3% in November 2013. Unsurprisingly, the gradual softening of stances of opposition leaders such as Neves and Caiado coincides with positive public opinion on the program, and helps partially explain a less heated political climate before program implementation began.  

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34 Neves explicitly stated during the 2014 campaign that he would maintain Mais Médicos and the Cuban doctors who had entered the country as program workers if elected President. This was seen as an enormous step back from his previous stance on the program. For more, see: https://noticias.uol.com.br/politica/ultimas-noticias/2013/12/17/em-lancamento-de-pre-programa-de-governo-aecio-diz-que-mantera-mais-medicos.htm
Table 7: Percentage of Municipalities Having Received at Least One Doctor by Party and Program Cycle.

<table>
<thead>
<tr>
<th>Party</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEM</td>
<td>6%</td>
<td>26%</td>
<td>37%</td>
<td>51%</td>
<td>51%</td>
<td>54%</td>
<td>54%</td>
<td>55%</td>
<td>56%</td>
<td>58%</td>
<td>58%</td>
</tr>
<tr>
<td>PMDB</td>
<td>9%</td>
<td>35%</td>
<td>50%</td>
<td>64%</td>
<td>64%</td>
<td>67%</td>
<td>67%</td>
<td>68%</td>
<td>68%</td>
<td>69%</td>
<td>69%</td>
</tr>
<tr>
<td>PSB</td>
<td>10%</td>
<td>47%</td>
<td>59%</td>
<td>68%</td>
<td>68%</td>
<td>71%</td>
<td>71%</td>
<td>72%</td>
<td>72%</td>
<td>73%</td>
<td>74%</td>
</tr>
<tr>
<td>PSDB</td>
<td>8%</td>
<td>28%</td>
<td>45%</td>
<td>60%</td>
<td>60%</td>
<td>63%</td>
<td>63%</td>
<td>64%</td>
<td>64%</td>
<td>64%</td>
<td>65%</td>
</tr>
<tr>
<td>PT</td>
<td>15%</td>
<td>44%</td>
<td>64%</td>
<td>77%</td>
<td>77%</td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>81%</td>
<td>81%</td>
<td>81%</td>
</tr>
</tbody>
</table>

Source: Own elaboration. Data from Ministry of Health.

Table 7 shows the percentage of municipalities having received at least one doctor from Mais Médicos by program cycle and party. Only a few parties are selected to highlight distribution patterns. The most notable trend is that the PT almost always has the greatest proportion of municipalities having received at least one doctor throughout each program cycle. Although the PT has higher rates throughout the entirety of the first eleven cycles of Mais Médicos, each party seems to increase at similar rates from one cycle to the next. Perhaps the lack of change in percentages by party is due to the coincidental timing of very positive public perception of Mais Médicos and the initial round of distribution. Regional factors may also interfere with these percentages, given that the center-left PSB and PT both have larger concentrations in the North and Northeast, which is where the majority of doctors were distributed in the first two rounds. This also coincides with the highest jump in receival rates for these parties. After the first four rounds, the percentages level off. Nevertheless, the percentage of municipalities receiving doctors falls in line with ideology as an explanatory factor, with left parties having higher percentages and right parties having lower ones.
Table 8: Average Number of Doctors by Party, Cycle and Doctor Nationality.

<table>
<thead>
<tr>
<th>Party</th>
<th>Doctors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEM</td>
<td>Cuba</td>
<td>0.02</td>
<td>0.54</td>
<td>0.73</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.15</td>
<td>0.69</td>
<td>0.92</td>
<td>1.5</td>
<td>1.5</td>
<td>1.8</td>
<td>1.8</td>
<td>1.9</td>
<td>1.9</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>PMDB</td>
<td>Cuba</td>
<td>0.06</td>
<td>0.81</td>
<td>1.12</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.16</td>
<td>0.97</td>
<td>1.36</td>
<td>2.1</td>
<td>2.1</td>
<td>2.3</td>
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<td>2.5</td>
</tr>
<tr>
<td>PSB</td>
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<td>0.08</td>
<td>1.39</td>
<td>1.81</td>
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<td>2.7</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.28</td>
<td>1.67</td>
<td>2.22</td>
<td>3.3</td>
<td>3.3</td>
<td>3.9</td>
<td>3.7</td>
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<td>4.0</td>
<td>4.2</td>
<td>4.2</td>
</tr>
<tr>
<td>PSDB</td>
<td>Cuba</td>
<td>0.06</td>
<td>0.68</td>
<td>1.01</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
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<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
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<tr>
<td></td>
<td>Total</td>
<td>0.17</td>
<td>0.85</td>
<td>1.31</td>
<td>2.0</td>
<td>2.1</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.5</td>
<td>2.6</td>
</tr>
<tr>
<td>PT</td>
<td>Cuba</td>
<td>0.10</td>
<td>1.56</td>
<td>2.16</td>
<td>3.6</td>
<td>3.6</td>
<td>3.5</td>
<td>3.6</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.30</td>
<td>1.83</td>
<td>2.66</td>
<td>4.3</td>
<td>4.4</td>
<td>4.7</td>
<td>4.9</td>
<td>4.8</td>
<td>4.8</td>
<td>5.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Source: Data from Ministry of Health and TSE. Own elaboration. Two rows correspond to each party – the first one is the average number of Cuban doctors in municipalities run by said party and the second one corresponds to the average number of total doctors independent of nationality. The number in italics beneath party legend is the average estimated population size in 2013 of all municipalities controlled by said party.

Table 8 shows a similar trend previously observed in Table 7 – the average number of doctors increases at a steady rate independent of doctor nationality. It is also worth noting that the average number of total and Cuban doctors tends to be higher among left parties than non-left parties. Given that the average numbers are calculated based on the cumulative total counts of each round, I provide the estimated average population size of all municipalities controlled by the given party to provide context. The average population is higher in municipalities administered by the PT and PSDB, which also may explain the higher average number of doctors. It is still unclear if the higher reception rates of municipalities governed by left parties is due to their own ideology, selective preference of the national government, underlying socioeconomic indicators,
or higher rates of program adoption by municipal leaderships, as there is no available data on which municipalities requested doctors and did not receive them. Nevertheless, there is no evidence that non-left parties became more willing to receive doctors, Cuban or otherwise, due to increasing program popularity based on these descriptive statistics. This is largely due to the fact that public perception had turned positive well before program resources were distributed in the first cycle.

![Mais Médicos - Doctor Distribution by Cycle and Region](image)

**Figure 9: Mais Médicos – Doctor Distribution by Cycle and Region.**

Source: Own elaboration. Data from Ministry of Health.

Another important element in the timing of resource distribution was the regional allocation of doctors. The first two cycles primarily benefitted the North and Northeast regions, in which the Northeast received 39.97% and 46% and the North received 20.14% and 15.97% of all doctors in Cycles 1 and 2, respectively. These proportions decreased during Cycles 3 and 4, in which the South and Southeast regions
collectively received over 50% in each of those rounds. This may have in turn influenced the numbers highlighted in the previous tables, given that parties such as the PT and PSB had relatively greater municipal strength in the North and Northeast regions.

**Resource Distribution: Clientelism and Technical Criteria**

The assumption that the vote for the PT in presidential elections would lead to better results for the PT in municipal elections is not supported by the data analyzed. There is little to no correlation between the performance of PT candidates at the national level elected in 2010 and PT candidates at the municipal level elected in 2012, similar to how there is no correlation between poverty rates in PT and non-PT municipalities. This relationship becomes a bit more positively correlated if we consider left parties together with the PT, but it is still not significant. Furthermore, the relationship between poverty level and PT-vote at the national level is very strong, indicating that as the poverty level increases so does the vote for the PT in presidential elections. Other evidence suggests that this relationship has intensified over time, which seems logical given the benefits that the Lula administration has provided to the poor and emphasis placed on the advancement of individuals from low socioeconomic backgrounds, as highlighted in the previous Chapters.

This dichotomy presents two separate yet related questions: first, how do political factors at the municipal level, such as ideology of the governing party, coalitions and democracy variables, affect the distribution of doctors from Mais Medicos alongside health and poverty factors? Secondly, how does the overall relationship between
poverty and PT-support at the national level affect the distribution of resources of Mais Medicos?

The use of distribution of resources for political gain suggests that politicians will reward those who have voted for them or are likely to vote for them. In this sense, targeting can be a mechanism utilized to redistribute and concentrate resources where populations need them according to some technical criteria, where they will provide the most political gain, or both. In this section, I analyze the classification of municipalities according to the technical criteria utilized by the Ministry of Health and assess it according to potential political interests of the PT government. In doing so, I find that although some municipalities did not meet the program criteria for which they were classified, there are no patterns of clientelistic resource distribution of program doctors.

**Exploring the Targeting Criteria of Mais Medicos**

1: **Vulnerable Areas**

Municipalities classified as vulnerable areas had an average municipal human development index (HDI - 2010) rate of 628.5, which is 42.58% standard deviations below the average HDI rate of 659. A total of 46.91% of these municipalities were located in the Semi-arid region and 25.11% were located in the Amazon region. In total, 75.29% of all municipalities in the Semi-arid region and 80.69% of all municipalities located in the Amazon region received at least one program doctor. Regarding specially designated territories, 206 municipalities have at least one quilombo territory recognized by the federal government, among which 87.37% received at least one

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35 Municipal human development index is calculated by the United Nations Development Program and is based on factor analysis of indicators related to education, income and employment. More information and data can be found here: http://www.atlasbrasil.org.br/2013/pt/o_atlas/idhm/
program doctor. There are a total of 464 municipalities with at least one legally recognized indigenous settlement within their boundaries and 87.93% of them received at least one program doctor.

2: Health Care Spending
The federal government groups municipalities by the total yearly transfer per inhabitant in primary healthcare spending (PAB Fixo) that must be given to the municipality in order for it to meet the spending minimum (Pinto et al. 2014). Municipalities that do not qualify for other categories in the PAB category that corresponds to them, hence there is no exclusionary criteria to Mais Médicos.

Figure 10: Federal Transfer Amount in Healthcare Spending by Mais Médicos Category – Transfer Amount per Person to Meet Municipal Minimum.

Source: Own elaboration. Data from DATASUS and Ministry of Health.

The federal transfer amount that each municipality receives is based on indicators related to the number of Bolsa Familia recipients, extreme poverty rates,

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36 The second part of federal transfer is called the PAB Variável, whose value varies depending on the performance of municipalities according to a set of indicators. The PAB Variável is not factored into Mais Médicos criteria.
percentage of individuals with no health insurance plan, population density and population size. Municipalities are grouped based on these characteristics, and cutoffs are established by population size, with PAB I excluding municipalities with more than 50,000 inhabitants, PAB II excluding those with over 100,000, and PAB III and IV having a cut off of 500,000 inhabitants. As Figure 10 shows, the federal transfer per inhabitant follows this grouping: PAB I, PAB II and then PAB III and IV. The average amount received by non-participating municipalities is $R24.81, which falls between the PAB I ($R25.67) and PAB II ($R23.23) groups, although there is a greater deal of variation in this group.

3: Extreme Poverty and Doctors

Municipalities with 20% or greater extreme poverty rates in 2010 were allowed to request doctors and classified as extreme poverty municipalities. This corresponds to 24.68% (1319 of 5570) percent of all municipalities, and 24.12% were categorized as such (1344 of 5570) by the Ministry of Health. Several municipalities with extreme poverty rates higher than 20% were classified in other categories – 96.2% of all municipalities classified as Extreme Poverty were appropriately classified, having rates at or above 20%. A total of 287 municipalities (5.15%) had extreme poverty rates at or above 20% and did not receive any doctor from Mais Médicos.

Extreme poverty was the most frequent classification given to municipalities and these municipalities received the largest number of absolute doctors. It serves as a particular variable of interest for our analysis, given the importance of delivering public
goods and services to the poor, its association as a key constituency of the Worker’s Party, and its high correlation with the Roussef vote.

Figure 11 demonstrates the relationship between the PT national vote for Dilma Roussef in 2010 and the number of Mais Medicos doctors received among municipalities over 25,000 inhabitants. Extreme poverty is denoted by the color scheme: municipalities with extreme poverty rates more than or equal to 20% are in red and ones with less than 20% extreme poverty are in green. This dichotomy is put in the graph to account for the correlation between the PT Vote and Extreme Poverty as previously demonstrated.

As previously mentioned, a government wishing to maximize vote returns in exchange for public goods and services would aim to concentrate goods in the 40-60% vote range. The theory behind this is governments in competitive election scenarios will aim to concentrate benefits in areas inside the margins; the rate of return in terms of
votes will be higher in competitive areas as opposed to areas of very high or low support. As such, a bell-shaped relationship would be expected. Although this does not control for other factors as done in the regression results below, the loess line in Figure 11 demonstrates that this relationship does not exist in this case. In fact, the relationship between PT vote and doctor receipt rates is positive throughout and seems to intensify at the higher levels of poverty and voter support. This suggests that extreme poverty rates was a more influential determinant than the PT Vote, given the large quantity of municipalities with high levels of extreme poverty receiving high amounts of doctors.

**Regression Analysis**

In the following section, I assess these factors using regression analysis. Given our objective to see how political factors influenced resource distribution and ask why certain municipalities received more doctors than others, this provides us the opportunity to see Mais Médicos from two different perspectives – first, what did the national government do with resource distribution and second, what did subnational governments do?

As previously stated in Chapter 1, the decision to adhere to the program lies with the municipal leadership. Nevertheless, there are important limitations to our ability to assess which level made the decision: the federal government may have rejected or altered the requests of municipalities, or determined to focus on a region in any given cycle. To this end it would have been necessary to analyze data on which municipalities requested doctors, or how many they requested and then received, which is not
available. This limits what inferences can be made from data that only contain distribution totals. Nevertheless, we utilize available data to create variables that are important to assessing potential determinants of how the national government and subnational governments may have influenced resource distribution. In the following section, I explain how this is done in greater detail.

Furthermore, assessing factors at the national and subnational level call into question some factors in common, such as targeting criteria relating to human development and territorial variables related to the conditions established by the Ministry of Health for requesting doctors. Specifically, the variables related to political factors will provide insight on the actions of the national and subnational government. The PT vote totals in the past presidential election of 2010 will allow us to assess how closely doctors followed areas of PT support and whether there is evidence of a relationship between the distribution of doctors and the PT vote.

At the subnational level, I focus on two principal questions in light of the theories outlined above – did the left or electoral competition increase access to public goods and services? The challenge of measuring the left due to coalitional politics, common party switching and weak party discipline in Brazil were outlined in the previous section. Furthermore, the rifts between left parties and the dominance of the PT on the left have caused many other parties to move to towards the center and even leave the PT’s national coalition. Given this scenario, I particularly focus on the Worker’s Party at the subnational level and argue that the Worker’s Party, and not the left, caused greater municipal receiving rates of doctors. In municipalities that the PT does not control, the
presence of the Worker’s Party as measured by the percentage of councilmen of the PT at the subnational level helps explain higher receipt rates.

1: Methodology
To analyze the distribution of resources, I utilize multivariate regression models to test the association between higher rates of doctors from Mais Médicos and the power of the left, electoral competition and policy legacy. These models only include two dependent variables – the total number of doctors and the number of Cuban doctors. Given the interest in assessing the factors that encouraged municipalities to receive doctors, the dependent variable accounts for the doctors’ initial placement and does not consider whether the doctor quit or was moved to another municipality. Due to high per capita doctor rates in municipalities with low population totals causing issues with heteroskedasticity, I separate the econometric models by population size and utilize a doctors per capita rate for municipalities with 25,000 or more inhabitants and a simple count for municipalities with fewer than 25,000 inhabitants. One advantage to assessing a program such as Mais Médicos is many problems related to endogeneity are reduced in the sense that there are no concerns of reverse causality between doctor totals and independent variables since each municipality begins with zero program doctors. In other words, Mais Médicos did not influence the baseline variables outlined below since they are calculated from before the beginning of the program.

For municipalities with 25,000 or more inhabitants, I use a multivariate panel “between” model to assess all the variables outlined below. Following this, I utilize
matching models with weighted least regression models to isolate certain dependent variables of interest related to leftist parties and control for comparisons between alike municipalities to assess the average effect on the treated. For municipalities with fewer than 25,000 inhabitants, I first use a negative binomial panel model to assess all the variables below. Similar to the previous section, I use matching models to isolate certain variables and assess the impact of leftist parties and the PT.

2: Independent Variables
The first variables highlighted here include the technical criteria outlined by the Ministry of Health – the extreme poverty rate, primary healthcare funding levels received from the federal government, the human development index, binary variables for Amazon and Semi-arid regions, and count variables of the total number of recognized quilombos and indigenous settlements in each municipality. Due to multicollinearity issues between municipal human development index (HDI) and private insurance rates, the HDI is left out of these models.

Following the logic of the previous section, assessing the PT vote total for the elections of 2010 alongside the presents two principal problems – first, given the high correlation between extreme poverty rates and the PT vote at the national level, how do we isolate these factors? Secondly, how can the PT vote be used to test whether a clientelistic distribution is present?

The nature of clientelism as outlined in the previous section suggests that national governments will target electorally competitive areas, between the 40-60% range of the vote total, rather than areas of hardcore support with vote totals of 60% or
more. If the PT were to favor a clientelistic distribution of doctors, areas of very high levels of extreme poverty would likely have lower rates of receiving doctors given the tendency of very high level of PT support in these municipalities. In order to separate competitive areas of moderate support from areas of very high levels of support, Schady (2003) includes two variables – one variable that measures the percentage vote total and another that measures the percentage amount above 50%. Similarly, Diaz-Cayeros, Magaloni, and Estevez (2016) utilize a squared term of the national vote total to account for the bell-shape to this distribution. In order to account for this, I utilize a similar approach to the one utilized above when assessing the relationship between extreme poverty, PT voter support, and doctor receipt rates and include two separate variables: the vote total for the PT in the 2010 Presidential election and a squared term.

In light of the challenges of measuring the left at the subnational level, I consider three important variables: PT control, left control, and the percentage of PT vereadores (councilmen) in a given municipality. To account for electoral competition at the subnational level, I include two variables – the total number of candidates in an election and the margin of victory at the municipal level.

I assess how policy legacy may have determined the receipt rates of municipalities by including the initial year of ESF adoption and the coverage rate of the ESF before the first cycle of Mais Médicos. I also include the number of ANS private insurance plans divided by the total population as a proxy variable to measure the power of private healthcare in the region. As a final note, I control for population size and the rate of PROVAB doctors.
3: Presentation of Results on Doctor Distribution – Regression Models

The regression models are split by municipality size, the first model with municipalities with 25,000 or more inhabitants and the second one with municipalities with fewer than 25,000. The first model is a “between” panel model that utilizes doctors per capita as the dependent variable and the second model is a negative binomial model that uses count data of the cumulative total number of doctors received as the dependent variable. The reason for this is twofold – first, to ensure that heteroskedasticity is not in either of the models and that estimates are not skewed (the doctors per capita rates of municipalities with small populations create problems for the results) and, secondly, the independent variables may have different results with municipalities based on their size, particularly municipal level “democracy” variables in small municipalities that suffer problems with electoral competition and patronage networks established by politicians. All mathematical representations of the models are included in Appendix 1.

Table 9: Regression Results.

<table>
<thead>
<tr>
<th></th>
<th>Municipalities ≥ 25,000 inh.</th>
<th></th>
<th>Municipalities &lt; 25,000 inh.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Panel “between” model</td>
<td>Panel “pooling” model</td>
<td>MLE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doctors per capita</td>
<td>Cuban doctors per capita</td>
<td>Doctors (count)</td>
<td>Cuban doctors (count)</td>
</tr>
<tr>
<td>ESF Coverage (%)</td>
<td>-0.041– (0.007)</td>
<td>-0.041– (0.006)</td>
<td>-0.006– (0.000)</td>
<td>-0.007– (0.000)</td>
</tr>
<tr>
<td>2013</td>
<td>0.028 (0.059)</td>
<td>0.065 (0.052)</td>
<td>0.002 (0.002)</td>
<td>0.009– (0.002)</td>
</tr>
<tr>
<td>ESF Adoption Yr.</td>
<td>-0.021 (0.037)</td>
<td>-0.011 (0.033)</td>
<td>-0.001 (0.001)</td>
<td>0.000</td>
</tr>
<tr>
<td>Infant Mortality</td>
<td>0.0003 (0.001)</td>
<td>0.0002 (0.001)</td>
<td>0.000 (0.000)</td>
<td>0.000– (0.0000)</td>
</tr>
<tr>
<td>Income per capita</td>
<td>0.0003 (0.001)</td>
<td>0.0002 (0.001)</td>
<td>0.000 (0.000)</td>
<td>0.000– (0.0000)</td>
</tr>
<tr>
<td>Note:</td>
<td>p&lt;0.1; p&lt;0.05; p&lt;0.01</td>
<td></td>
<td></td>
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<tr>
<td>-------</td>
<td>---------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source: Own elaboration.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Extreme Poverty  
0.099−  0.112−  0.010−  0.010−  
(0.025)  (0.023)  (0.001)  (0.001)  
PAB Fixo  
0.060  0.244−  0.006−  0.009−  
(0.123)  (0.110)  (0.003)  (0.003)  
Roussef Vote 2010  
-0.014  -0.035  -0.001  -0.003  
(0.072)  (0.064)  (0.003)  (0.003)  
Roussef Vote 2010  
0.0003  0.0005  0.000  0.000  
(0.001)  (0.005)  (0.000)  (0.000)  
(Squared term)  
Semi Arid  
1.800−  1.721−  0.028  0.033−  
(1 − yes, 0 − no)  
(0.510)  (0.455)  (0.015)  (0.016)  
Amazon  
-0.201  0.598  0.064−  0.171−  
(0.531)  (0.475)  (0.017)  (0.017)  
Number of Quilombos  
-0.237  -0.155  0.211−  0.215−  
(count)  
(0.225)  (0.201)  (0.016)  (0.017)  
Indigenous Settlements  
0.293−  0.098  0.039−  0.039−  
(count)  
(0.136)  (0.121)  (0.005)  (0.006)  
Candidates in 2012 Mun. Election  
-0.014  0.004  0.003  -0.005  
(count)  
(0.111)  (0.099)  (0.005)  (0.005)  
Margin of Victory 2012  
-0.016  -0.011  -0.002−  -0.003−  
(0.008)  (0.007)  (0.000)  (0.000)  
Unity  
-0.380  -0.311  -0.020  -0.018  
(1 − yes, 0 − no)  
(0.374)  (0.333)  (0.013)  (0.014)  
Doctor Mayor  
-1.561−  -1.191−  -0.028  -0.011  
(1 − yes, 0 − no)  
(0.556)  (0.496)  (0.024)  (0.025)  
Left  
0.524  0.606  0.032−  0.042−  
(1 − yes, 0 − no)  
(0.445)  (0.397)  (0.014)  (0.016)  
Party 2010 Coalition  
-0.037  -0.295  0.022  0.031−  
(1 − yes, 0 − no)  
(0.376)  (0.355)  (0.012)  (0.013)  
PT Mun. Coalition  
0.055  0.087  0.032−  0.069−  
(1 − yes, 0 − no)  
(0.379)  (0.338)  (0.011)  (0.012)  
PT Mayor  
1.424−  0.840  0.176−  0.133−  
(1 − yes, 0 − no)  
(0.609)  (0.543)  (0.020)  (0.022)  
PT Councilmen %  
0.054−  0.044−  0.003−  0.003−  
(0.019)  (0.017)  (0.001)  (0.001)  
ANS Plans Rate  
-9.120−  -3.498  -1.384−  -1.017−  
(Private Insurance)  
(2.100)  (1.874)  (0.094)  (0.097)  
Constant  
14.172−  9.000−  -5.828−  -4.91−  
(5.225)  (4.670)  (.202)  (0.214)  

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>0.229</td>
<td>0.235</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R</td>
<td>0.215</td>
<td>0.222</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>-56665</td>
<td>-51901</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F Statistic (df = 24; 1342)</td>
<td>17.304−</td>
<td>17.00−</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 9 displays the regression results of the analysis. There are several important takeaways. First, the binary variable of leftist party is not significant in either of the first two models, thereby suggesting that parties designated as left did not significantly lead to higher receival rates for municipalities with 25,000 or more inhabitants. While the left variable is positively significant in the latter two models, it is unclear if this is due to the inclusion of the PT. I disentangle this issue in the next section where I conduct matching models to assess the impact of the left on non-PT led municipalities. PT-led municipalities had much higher receival rates of Mais Médicos doctors and the results are significant in Model 1 at the 5% level - 1.3 per 100,000 inhabitants more doctors in municipalities with 25,000 or more and .18 more doctors in municipalities with fewer than 25,000 inhabitants. It is interesting to note that municipalities with a PT mayor did not lead to significantly higher receival rates of Cuban doctors in the first group of municipalities. This will be further assessed in the following section when we isolate variables using matching techniques.

In terms of municipal electoral competition, there is evidence that the margin of victory had a slight negative and significant effect on receiving doctors from Mais Médicos in Models 1, 3, and 4. While this effect is very small in magnitude the relationship is as expected – more competitive municipalities in which mayors that won with less support led to a greater number of doctors. The number of candidates competing had no effect in any of the models.

In terms of socioeconomic and health-related factors, it can be seen that the program largely succeeded in allocating doctors to areas of need. In particular, the
extreme poverty rate is heavily correlated with doctors in all four models, in which a 10% increase in the extreme poverty rate leads to almost 1 more doctors per 100,000 inhabitants in municipalities with 25,000 or more inhabitants. There is also evidence across all models that territorial variables, namely the Amazon and Semi-Arid regions and the quilombo and indigenous settlements areas, are positively associated with receival rates across all of the models. Comparatively, the Rousseff vote is insignificant in all models and is negatively associated with doctors while the squared term is positively associated. This is likely due to the fact that the doctors are following areas of extreme poverty rather than the PT vote in 2010. These results would indicate that the program largely did follow program criteria and efforts to allocate doctors did follow a certain pattern based on need, as non-rigorous and broad as those conditions were made.

The ESF coverage rate was negatively associated with doctor receival rates in all models, thereby providing evidence that municipalities with lower ESF coverage were more likely to have higher receival rates of doctors – in Model 1, a 25% decrease in ESF coverage leads to one more doctor per 100,000 inhabitants. Finally, it is noteworthy how much private insurance rates were negatively associated with doctor receival rates: a one-percent increase in ANS-approved plans per inhabitant leads to 9.19 fewer doctors per 100,000 in Model 1 and 1.4 fewer doctors in Model 3. This result may indicate two separate factors: first, private insurance rates also coincide with higher human development indicators, thus there is some level of endogeneity in this. However, given the fact that other socioeconomic indicators also account for these
factors and do not register such large associations with doctor receiveal rates, it is more likely that the power of the medical lobby, which concentrates in areas where private insurance markets are stronger, had a very significant negative effect on the allocation of doctors. It is possible that this had an even stronger influence on mayors than party ideology in deciding whether to adopt the program, and is also probably a contributing factor in the position that leftist parties took on the program. It may also help explain the small magnitude and overall lack of significance of electoral competition in each of these models: mayors are not simply challenged into finding more doctors to stick into health centers to satisfy constituents with increasing electoral pressure, but rather play a more calculated risk analysis in determining how much there is to gain or lose between supporting one side or the other. This is coupled by the fact that mayors with doctor listed as their prior profession were significantly negatively associated in the first two models while not in the other two. Ultimately, the heavily negative association between the ANS plans rate and Mais Médicos doctors in all models is an important part of the narrative in explaining how political factors influenced resource distribution.

On a final note, the results in both Models 2 and 4 on Cuban doctor receiveal rates have surprising results: although still positively associated with some variables of the PT, the relationship is much weaker, particularly for municipalities with 25,000 inhabitants or more. Cuban receiveal rates are more highly associated with technical criteria such as extreme poverty rates, high levels of financial support from the federal government in primary health spending and territorial ones such as the Semi-Arid region and indigenous and quilombo territories. This likely relates more to the preferences of
doctors and their input on regional allocation: all doctors were given the chance to state their preference to work in certain areas based on population size and specific population characteristics. Similarly, part of the training and experience involved for the international corps of Cuban doctors is focused on serving in the remote and most difficult areas, which may lead to greater trust of the federal government to send them to these areas as well as a greater inclination of these doctors to serve in these areas.

**The Power of the Left – Average Effect of the Treatment on the Treated**

I now test the variables of left power by using matching techniques. The regression results helped identify the primary determinants that influence resource distribution and to what extent the power of the left, subnational electoral competition, and the policy legacy of the ESF influenced receipt rates for all program doctors and Cuban ones. I build upon this by using a quasi-experimental matching method to isolate certain variables related to the power of the left and estimate the average effect on the treated.

The matching process involves three principal components: the dependent variable, Yi, provided a treatment variable of Ti (1 = treated, 0 = control), and a set of Xi covariates that serve as controls. We aim to obtain the treatment effect (TEi) for treated observation i through the following equation: TEi = Yi1 – Yi0, in which Yi1 is the observed value of the treatment subtracted by Yi0, which is the unobserved value of Yi1 if it had not received treatment. Given that this value does not exist, we estimate Yi0 with Yj, which is the value of the dependent variable of a matched control produced by Xi == Xj. This second best scenario means that we aim to obtain the sample
average treatment effect on the treated (the mean of $TE_i$ is $iE[T_i = 1]$) by finding the difference between treated observations and a group of control observations that share similarities with the treated observations on the set of covariates used as controls. Before assessing the average effect of treatment on the treated, a process of matching observations between $T_i(1)$ and $T_i(0)$ is done based on the set of covariates ($X_i$). In order to construct the matching frontier, the mahalanobis (euclidean) distance is calculated on the covariates ($X_i$) such that observations in the treated and controlled group are paired by proximity to each other. In doing so, we isolate the effect of certain variables while controlling for others and thereby optimize our estimates.

There are several purposes for this: first, it removes model dependence and researcher discretion that may lead to biased estimates. By utilizing the variables that were significant in the original panel “between” model and negative binomial models as control variables to develop the matching frontier, the average difference in the dependent variable ($TE_i$) between $T_i=1$ and $T_i=0$ provides an estimate when all other factors that may effect the dependent variable are alike. Matching is also opportune for this case because our dependent variable, the number of doctors, is the same for each observation at the beginning of the program.

Specifically, given the significant results found in municipalities led by the Worker’s Party, I test three different treatment variables: PT municipal government, percent of PT councilmen, and PT competing in 2012 municipal election. For the first model, I consider all municipalities and for the next two I remove PT-led municipalities to assess the effect of these variables where the PT was not in control. Given that
treatment variables must be in binary form, I split the PT councilmen variable at the mean and place municipalities into two separate groups, high and low. With these variables in mind, I utilize the following set of covariates to form the maholobonis frontier for matching: ESF coverage (2013); extreme poverty rate (2010); income per capita (2010); region; log population (2013); federal transfer for healthcare (PAB Fixo) (2012); private insurance (ANS plans) (2013).

Table 10: Average Treatment Effect from Statistical Matching Models.

<table>
<thead>
<tr>
<th></th>
<th>Doctors per capita FSATT</th>
<th>Cuban doctors per capita FSATT</th>
<th>Doctors FSATT</th>
<th>Cuban doctors FSATT</th>
<th>Change in ESF Coverage (%) FSATT</th>
<th>Change in ESF Coverage (%) FSATT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT Mayor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(all municipalities)</td>
<td>2.95</td>
<td>1.65</td>
<td>0.46</td>
<td>0.40</td>
<td>4.70%</td>
<td>2.70%</td>
</tr>
<tr>
<td>N = 1210 – T = 191</td>
<td>(3.13)</td>
<td>(2.04)</td>
<td>(0.79)</td>
<td>(0.38)</td>
<td>(5.11%)</td>
<td>(2.03%)</td>
</tr>
<tr>
<td>Left</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(all municipalities)</td>
<td>1.54</td>
<td>0.83</td>
<td>0.27</td>
<td>0.25</td>
<td>1.35%</td>
<td>1.28%</td>
</tr>
<tr>
<td>N = 1107 - T = 401</td>
<td>(1.73)</td>
<td>(1.15)</td>
<td>(0.37)</td>
<td>(0.26)</td>
<td>(1.00%)</td>
<td>(0.68%)</td>
</tr>
<tr>
<td>N = 3534 – T = 1005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(without PT)</td>
<td>0.18</td>
<td>0.24</td>
<td>0.13</td>
<td>0.14</td>
<td>-0.03%</td>
<td>1.16%</td>
</tr>
<tr>
<td>N = 997 – T = 251</td>
<td>(.58)</td>
<td>(.39)</td>
<td>(.19)</td>
<td>(.19)</td>
<td>(1.76%)</td>
<td>(.37%)</td>
</tr>
<tr>
<td>N = 3298 – T = 624</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT Vereadores (binary)</td>
<td>1.54</td>
<td>1.51</td>
<td>0.07</td>
<td>0.02</td>
<td>0.51%</td>
<td>0.22%</td>
</tr>
<tr>
<td>(without PT-led municipalities)</td>
<td>AIE = .07</td>
<td>AIE = .04</td>
<td>AIE = .02</td>
<td>AIE = .01</td>
<td>AIE = .33</td>
<td>AIE = .07</td>
</tr>
<tr>
<td>N = 942 – T = 490</td>
<td>(0.9)</td>
<td>(.97)</td>
<td>(.15)</td>
<td>(.11)</td>
<td>(.79%)</td>
<td>(.55%)</td>
</tr>
<tr>
<td>N = 2993 – T = 1402</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Source: Own elaboration. Data from TSE, IBGE, DATASUS, and Ministry of Health.

Table 10 displays the result of the treatment variable of interest when matching is utilized, as well as the unweighted difference in means in parenthesis and the Athey-Imbens Estimate (AIE) of model dependence (see Appendix 1 and Appendix 2 for more details). These results provide several insights on the power of the left. First, PT mayors
of municipalities with 25,000 inhabitants or more continue to be positively associated with higher receival rates, with an unweighted difference of means of 3.1 becoming an average effect of the treatment on the treated (FSATT) of 2.95 when leaving all observations in the sample. This corresponds to a Cohen effect size (d) of .36 of a standard deviation (SD). This suggests that when holding all socioeconomic factors equal, the PT led to a significant increase in Mais Médicos receival rates. Similarly, the only variable that led to notably higher ESF Coverage rate changes was the presence of a PT mayor – in municipalities with 25,000 or more inhabitants the PT led to a +4.7% change and a +2.7% change in smaller municipalities. The effect on municipalities with fewer than 25,000 inhabitants appears smaller although this is due to these municipalities receiving a fewer number of doctors: the Cohen effect size of d = .33 SD is still high. This is also considering that these smaller municipalities on average have higher ESF Coverage Rates.

Furthermore, the presence of the PT in city councils in municipalities where the mayor is not of the PT has a positive effect on receival rates, with an unweighted difference in means of .9 and an FSATT 1.54, or .14 of an SD. This effect also increases as more observations are removed from the sample and matches become more precise (see Appendix 2 for more details). Furthermore, the effect on Cuban doctors is also moderate among municipalities with 25,000 or more inhabitants (FSATT = 1.51, d = .16 SD). While this effect is higher among this group of municipalities, it does not seem to have a high effect on municipalities with fewer than 25,000 inhabitants.
Finally, comparing the average effect of treatment on the treated among left parties provides evidence that the effect is minimal when the PT is removed from the universe – the FSATT in Model 1 is reduced from 1.54 to .18 and from .27 to .13 in Model 3. This drop in magnitude indicates that the PT pushed the receiveal rates up for the left and other leftist parties had comparatively lower receiveal rates.

This provides evidence that the presence of the PT in municipalities, either as mayor or in city council seats, led to higher receiveal rates among municipalities whereas the left did at a much smaller magnitude. There seems to be several implications from these findings. Although the left did on average receive more doctors than non-left parties, this was by a small margin. Thus, it becomes apparent that the left did not explain the distribution of doctors of Mais Médicos, but the PT did. In this case, it can be seen that the alignment between the national and subnational governments leads to a greater increase in program doctors, Cuban or otherwise. The representation of the PT in the city councils also highlights the importance of the party in pressuring non-PT mayors into receiving doctors. It is interesting to note, however, that municipalities with fewer than 25,000 inhabitants did not experience this effect to nearly the same degree.

Why would this be the case? A simple explanation is that many smaller municipalities with a strong presence of the PT in the city council already had high levels of ESF Coverage: 89.3% municipalities with fewer than 25,000 inhabitants that had 33% representation of the PT in the city council had ESF Coverage of 80% or greater before Mais Médicos, whereas only 77.4% municipalities with 25,000 or more inhabitants reach this level of ESF Coverage. Given these results, we fail to reject both Hypothesis 1 and 2.
Although it is unclear whether mayors of the PT were more pressured by the federal government or more ideologically inclined to accept more doctors, it is impossible to separate these two effects only through quantitative analysis. Nevertheless, the significantly positive effect of PT councilmen on municipalities without a PT mayor suggests that the PT was able to successfully pressure mayors of other parties into receiving more doctors, particularly Cuban ones, in municipalities with 25,000 or more inhabitants.

**Conclusion**

This Chapter explores the factors that determined the distribution of doctors of Mais Médicos. Specifically, the results of panel regression analysis and the statistical matching models allow us to test if the power of the left or electoral competition explained the distribution of resources, as well as the policy legacy of the private and public healthcare systems. These theories were also tested alongside the technical criteria of socioeconomic indicators and the national vote of the PT in the 2010 elections to assess the overall profile of the population that received doctors from the program and if these doctors followed the PT vote for President in 2010.

The results suggest that the doctors were largely distributed to populations that the Ministry of Health outlined as priority targets: poverty rates, protected populations, and designated regions were particularly relevant variables in determining the distribution of resources. Furthermore, there was no relationship found between the Rousseff vote in 2010 and doctor resources, thereby suggesting that the national
government did not utilize program resources as to maximize votes or mobilize support among peripheral voters for the upcoming election.

The political variables at hand suggest that electoral competition had a minor effect in only some cases: this variable was only significant at the 10% level for municipalities with 25,000 or more inhabitants and at the 1% level for municipalities with fewer than 25,000. The magnitude was small for each of these groupings. On the other hand, the variables representing policy legacy had enormous influence on the distribution of resources: both doctors and Cuban doctors were found to have a negative correlation with ESF Coverage rates and a very negative association with private insurance rates. This suggests that areas with lower levels of primary care coverage were more likely to receive doctors and higher levels of private insurance rates among the population resulted in fewer doctors.

Finally, the relationship between the left and Mais Médicos is more nuanced. The importance of the PT at the mayor level and in the city council help explain the overall distribution of resources: municipalities with a PT mayor or with higher levels of the PT in the city council were more likely to receive doctors. This indicates that there is a relationship between levels of government of the same party. Furthermore, the lack of the power of the left as an explanatory factor and the ample distribution of resources among municipalities governed by leftist and non-leftist parties alike reinforces the argument that Brazil’s cooperative federalism and weak party structure help the federal government diffuse their programs and distribute resources at the subnational level. It is important to emphasize that it is not the case that other left parties aside from the PT
did not adopt or receive doctors from Mais Médicos. Instead, they were not more likely to receive these doctors than non-left municipalities.

This analysis provides a complete overview of the political factors that shaped the overall distribution of resources of Mais Médicos. This sets up well for the upcoming Chapter 5, which comparatively examines how doctors were allocated to health centers at the neighborhood level within the cities of Fortaleza and Salvador. Doing so will allow us to understand not only where these doctors were allocated according to socioeconomic indicators relative from one municipality to another, but also what neighborhoods doctors were placed in. This more granular level analysis allows us to assess the overall affect that the program had on the poor in urban areas, and the politics associated with the development of the ESF in urban areas.

CHAPTER 5 – A COMPARATIVE ANALYSIS OF MAIS MÉDICOS IN URBAN BRAZIL: THE CASES OF FORTALEZA AND SALVADOR

This Chapter focuses on the impact of Mais Médicos on healthcare provision in urban areas by comparatively analyzing the northeastern cities of Fortaleza, CE, and Salvador, BA. Specifically, I aim to respond to the following question: to what extent did doctors reach poor areas and neighborhoods in these two cities? These cities were selected due to their similarities in a number of socioeconomic indicators and their high receival rates of Mais Médicos doctors while being represented by mayors of opposing political ideologies: Salvador, BA was governed by mayor Antonio Carlos Magalhães Neto of the right-wing DEM, while Fortaleza, CE was led by mayor Roberto Claudio of the PSB. These cities also make for a useful comparison given the legacy of the Family Health Strategy in both cities – Fortaleza had promoted the ESF in prior administrations
while Salvador had a legacy of obstructing the ESF. I find evidence that although both cities tried to allocate doctors in areas with higher levels of extreme poverty, Fortaleza was more successful due to their preexisting structure and presence of primary healthcare centers.

This analysis is structured in the following manner. I begin by outlining how the two cases were selected and the methodological considerations for this analysis. Then I provide case analysis on the development of primary care in Fortaleza and Salvador. I comparatively assess development and socioeconomic indicators of both cities while paying particular attention to the spatial characteristics of extreme poverty in both cities. After this, I provide a background assessment of the development of the ESF in both cities from the start of the program to the current period. In doing so, I stress the significance of the expansion of the ESF in Fortaleza during the PT administration of Luizianne Lins in 2008-2012 that preceded the administration of Roberto Claudio and what this meant for Mais Médicos. I then assess the spatial distribution of health centers in each city: I find that health centers in Fortaleza are more evenly distributed whereas Salvador has many health centers clustered in certain areas and many areas of extreme poverty that are isolated from health centers. Finally, I comparatively evaluate the distribution of Mais Médicos doctors at the neighborhood level in each city through regression analysis. Ultimately, I find that the current dichotomy of the left and non-left administrations does not explain the difference in the distribution of resources: both administrations aimed to increase access for the poor through Mais Médicos. However, the legacy of the ESF is an important explanatory factor as to why Fortaleza was more
successful in increasing ESF coverage to the poor. In this sense, the prior progressive administration in Fortaleza expanded ESF coverage whereas the prior conservative administration of Salvador obstructed the development of the ESF. Consequently, Fortaleza had a stronger infrastructure of health centers that were more evenly distributed throughout the population that allowed for a more optimal expansion and reallocation of doctors.

**Case Selection and Methodology**

The analysis in Chapter 2 gives a descriptive panorama of how Mais Médicos developed in large cities and metropolises relative to human development levels, the prior development of the ESF and partisan ideology. Now, I turn my attention towards the question of whether Mais Médicos improved healthcare access for the poor using the existing ESF coverage as a baseline. In this section, I focus on outlining the methodology used for case selection and provide the results for case selection.

The selection of Fortaleza and Salvador is based on a statistical matching technique, in which the observations are separated into two separate groups and then paired together based on similarities in a set of previously defined indicators. The criteria utilized for case selection is based on a similar methodology utilized for the matching process of Chapter 3, in which alike pairs are constructed by calculating the mahalobonis distance based on a set of indicators provided. The results provided allow the selection of the cases of Fortaleza, CE and Salvador, BA for comparative analysis due to their similarities in the following variables: population size, Mais Médicos receival rate, region, extreme poverty rate, income per capita, region, human development
index rate, and ESF coverage rate prior to Mais Médicos adoption. The principal variable upon which these two cities differ is partisan ideology: Fortaleza has been run by the center-left mayor Roberto Claudio of the PDT while Salvador has been run by the right-wing ACM Neto.

The matching technique utilized for selection of cases in this comparative analysis is based on the methodology developed by Nielsen (2016) for qualitative case study research. While case selection can be done on many different criteria, my objective is to select cases where socioeconomic and health indicators are as similar as possible.

The advantages of using such statistical methods for matching are several, although I highlight two in particular: most importantly, it ensures that the comparative analysis utilizes cases that are in fact similar, particularly given the large amount of relevant variables at hand. Given the aim of comparative analysis to ensure that case selection is nonrandom and systemic, allowing for case similarity to be determined by a concrete set of variables is methodologically desirable. Furthermore, it ensures a degree of transparency by providing exact details on how cases were selected by outlining the variables utilized for this process and the results.

1: The Statistical Modeling of Matching for Case Selection

The five most commonly used techniques for statistical matching are exact matching, coarsened exact matching, propensity score matching, genetic matching, and mahalanobis distance matching. Given that none of the cities in our sample are exact

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37 The formulas for the techniques used in this process are outlined in Appendix 1.
matches and the inappropriate nature of coarsened exact matching due to the large number of continuous variables used for matching cases, I utilize the mahalabonis distance for approximating close matches. I choose the mahalabonis matching technique instead of the propensity score or genetic matching techniques for reasons similar to those expressed in the model used in Chapter 3, which is that several studies have found it to be a more robust method for matching purposes (King et al. 2017).

Mahalabonis matching consists of a set of algorithms that minimize the Mahalobonis distance between pairs, which is a generalization of the Euclidean distance that accounts for correlations between variables. In doing so, it seeks to identify similar units based on their overall proximity to one another. The formula utilized for this process is provided in Appendix 1.

2: Defining the Universe of Relevant Cases

Given the focus on cities, I establish two criteria to define the universe of relevant cases: (1) municipalities with a population of at least 250,000 inhabitants in 2013 and (2) municipalities that have received at least 25 doctors from Mais Médicos. I do this to ensure that cities that received a sufficient amount of doctors are selected for meaningful comparative analysis.

As previously mentioned, there are 101 municipalities that have at least 250,000 inhabitants. When considering only municipalities that have received at least 25 doctors, this number is reduced to 52 municipalities. All of them are included in the sample for establishing potential matching pairs.
3: Defining the Relevant Variables

For constructing the pairing frontier, I first include several variables outlined as technical criteria. These are the following: primary healthcare spending federal transfer amount received per inhabitant, extreme poverty rate, and income per capita. Additionally, I include the variables of region and a log output of population (2013 estimates). I consider region an important control variable given that doctor distribution per cycle was closely related to region, and also to account for disparities in economic development and variation in political ideology of parties among regions. Meanwhile, population is a necessary control variable given the challenges that urban areas face are in part determined by their overall size and the amount of individuals to which they are pressured to provide public services.

The primary variable upon which I utilize as the treatment condition is the party ideology of the mayor. Given the importance of the PT as a causal variable for greater receival rates, it would seem logical to continue with this dichotomy. I choose instead to use the left-right divide for several reasons: first, the descriptive analysis outlined in Chapter 2 shows that left parties, not just the PT, were an influential variable in determining doctor receival rates in urban centers. Several cities with leftist non-PT mayors, such as Porto Alegre, Fortaleza, and Belo Horizonte, represent important forces of the left within their cities and actively supported and promoted Mais Médicos as a means of improving access to primary care. Secondly, there are very few overall cases of PT mayors that serve as viable comparisons. Even in the few cases where there are viable cases for comparative analysis with PT-led cities, it is made unfeasible by the fact
that some mayors switched parties before finishing their term, such as João Pessoa, or had gubernatorial elections in 2014, such as Brasilia.\(^{38}\)

Based on the parameters presented above, a summary of the variables used for case selection criteria follows:

**Treatment/varying variable:**
Partisan ideology of mayor (2012) – (1 – left; 0 – right)

**Control/similar variables:**
Mais Médicos rate – number of total program doctors received per capita.  
Log population (2013)  
Region – categorical variable defining region of municipality: North, Northeast, South, Southeast, Center-west.  
PAB fixo (2012) – federal transfer per inhabitant received by municipality to meet floor on primary healthcare spending.  
Extreme poverty rate (%) (2010) – defined as percentage of individuals living on less than half of monthly minimum salary.  
Income per capita (2010)

**Matching Results**
I utilize a “greedy” matching model for the pairing process, in which municipalities can only be paired once and not repeatedly used. This allows for municipalities to be paired to their most optimal match rather than being repeated multiple times.

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\(^{38}\)The mayor of João Pessoa, Luciano Cartaxo, moved from the PT to the PSD in 2015 before his reelection campaign, which he won. Brasilia is treated as a state entity despite having functions of a municipality in areas of policy. It was governed by Agnelo Queroz of the PT from 2011-2015, and lost reelection in 2015 to Ricardo Rollemberg of the PSB.  
Table 11: Matching Results for Comparative Analysis.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Match distance ((D^2))</th>
<th>Case 1</th>
<th>Case 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.89</td>
<td>CONTAGEM</td>
<td>JUIZ DE FOR A</td>
</tr>
<tr>
<td>2</td>
<td>1.54</td>
<td>CARUARU</td>
<td>SAO LUIS</td>
</tr>
<tr>
<td>3</td>
<td>2.02</td>
<td>CARAPICUIBA</td>
<td>SOROCABA</td>
</tr>
<tr>
<td>4</td>
<td>2.09</td>
<td>LONDRINA</td>
<td>GOIANIA</td>
</tr>
<tr>
<td>5</td>
<td>3.13</td>
<td>FORTALEZA</td>
<td>SALVADOR</td>
</tr>
<tr>
<td>6</td>
<td>3.13</td>
<td>SANTOS</td>
<td>PORTO ALEGRE</td>
</tr>
<tr>
<td>7</td>
<td>3.71</td>
<td>RIO BRANCO</td>
<td>BOA VISTA</td>
</tr>
<tr>
<td>8</td>
<td>3.84</td>
<td>GOV. VALADARES</td>
<td>MONTES CLAROS</td>
</tr>
<tr>
<td>9</td>
<td>4.26</td>
<td>LIMEIRA</td>
<td>PONTA GROSSA</td>
</tr>
<tr>
<td>10</td>
<td>4.45</td>
<td>MAUA</td>
<td>PRAIA GRANDE</td>
</tr>
</tbody>
</table>

Source: Own elaboration.

The results of the statistical matching model are provided above in Table 11. I only include the ten cases that are most similar with the criteria provided above since I use a cutoff of match distance equal to 5 \((D^2 = 5.0)\). I consider all of these cases to be sufficiently similar for the purposes of comparative analysis.

The cases of Fortaleza and Salvador are the fifth matched pair based on similarities among the variables and the overall mahalabonis distance score. Ultimately, I select these two cities for the comparative analysis for three reasons. First, their status as the central city of their respective metropolitan regions and their status as major state capitals provides added interest. Although a great deal of literature exists on urban poverty in Brazil, much of it is focused on the megalopolises of São Paulo and Rio de Janeiro. Even very large cities such as Fortaleza and Salvador with population totals of
over 2.5 million are comparatively left out when studying urban poverty and public services. Secondly, given the focus of the Mais Médicos program on the comparatively poorer regions of the country such as the North and Northeast, it is fitting to study two cities from these regions. Among the 51 cities included in the universe for case selection, the fourteen cities with the highest extreme poverty rates are from the North and Northeast regions. Included in these fourteen cities are both Fortaleza and Salvador. Finally, analyzing these two cities provides a greater amount of data tools and sources at our disposal, since both cities have neighborhood-level data in the United Nations Development Program’s human development units (unidades de desenvolvimento humano - UDH), which aggregates census tracts that have common indicators to form larger neighborhood units. For the comparative analysis, I use this database to analyze the placement of doctors at the neighborhood level.

A Descriptive Comparison of Poverty and Development in Fortaleza and Salvador

On the surface, Fortaleza and Salvador share a common history in the economic development of Brazil, which helps explain part of the similarities in socioeconomic indicators. Together with Recife, they have historically been the largest cities in terms of population and economic power of the Northeast region (Carvalho & Pereira 2015; Costa & Pequeno 2015). During the 19th and 20th Centuries, the region suffered a decline in economic power relative to the Southeast regions following the transition from plantation-based agricultural activities such as cotton, tobacco, and sugarcane production centered in the Northeast to the coffee boom and subsequent industrialization that transformed São Paulo-Rio de Janeiro-Belo Horizonte triangle into
the economic powerhouse that it is today (Furtado 1971). Similarly, it is also important to note the historical legacy of slavery and slavery-based economic activities that drove the Northeast region. As a result, poverty and inequality is even more concentrated along racial lines than in the Southeast, despite the presence of large racial inequalities there as well (Flory 1979). The percentage of Afro-Brazilians of the entire population is 4.85% in Fortaleza and 27.80% in Salvador and the percentage of declared mix race individuals is 57.85% in Fortaleza and 51.67% in Salvador. While the inequality of race is strong in Fortaleza, the case of Salvador is perhaps the most extreme: it has the highest disparity in earnings between the average salaries between whites and blacks in all of Brazil, in which whites earn 2.9 more than blacks.

Table 12: Descriptive Statistics of Fortaleza and Salvador.

<table>
<thead>
<tr>
<th>City</th>
<th>Party</th>
<th>Population</th>
<th>PIND</th>
<th>RDPC</th>
<th>ESF Coverage</th>
<th>MM Doctors</th>
<th>MM Doctors Rate</th>
<th>Area (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORTALEZA CE</td>
<td>PSB</td>
<td>2,551,806</td>
<td>3.4%</td>
<td>R846</td>
<td>36%</td>
<td>178</td>
<td>7.0</td>
<td>314,930</td>
</tr>
<tr>
<td>SALVADOR BA</td>
<td>DEM</td>
<td>2,883,682</td>
<td>4.0%</td>
<td>R973</td>
<td>18%</td>
<td>115</td>
<td>4.0</td>
<td>692,818</td>
</tr>
</tbody>
</table>

Source: Own elaboration. Data from IBGE, DATASUS, and Ministry of Health.

Table 12 displays relevant descriptive statistics for our analysis. Both Fortaleza and Salvador are quite similar in terms of income per capita, extreme poverty rate and total population. Both cities received a significant number of doctors from Mais Médicos.

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39 Slavery officially ended in Brazil in 1888 during the proclamation of the Republic.
41 The extreme concentration of Afro-Brazilians in Salvador relative to other parts of the country is due to its historical legacy as a principal hub of the Atlantic slave trade. This has left it with a complicated legacy in which it and the state of Bahia are recognized as the center of Afro-Brazilian culture while exhibiting extreme inequities along racial lines.
42 PIND = Extreme poverty rate (%)
43 RDPC = Income per capita (in $R)
– in absolute terms, Fortaleza received the 2nd most program doctors and Salvador received the 5th most among all municipalities in the country.

**Figure 12: Map of Extreme Poverty in UDH of Fortaleza.**

Source: Shapefile and data from the UNDP. Own elaboration in QGIS.

Extreme poverty in Fortaleza is generally concentrated in the outer rings of the city, particularly on the western side. In this sense, it has the spatial components of most cities, in which the wealthy are concentrated in the center of the city and average incomes decrease as one moves away from the center. The southwest corner of the city, where the traditionally poorest neighborhoods of Siqueira, Granja Lisboa, and Canindezinho are located, has the most concentrated poverty rate. Other concentrations of high units of extreme poverty include Jangarussu in the southeastern corner, Barra do Ceará, in the northwest, and Vicente Pinzón in the northeast.
Figure 13: Map of Extreme Poverty in UDH of Salvador.

Source: Shapefile and data from the UNDP. Own elaboration in QGIS.

Figure 13, which displays extreme poverty in neighborhoods (UDH) of Salvador, also has an interesting spatial dynamic. The wealthy reside predominantly on the south and east coast and poverty progressively increases moving to the north. The two main islands, Ilha das Fraudes, which is located in the far-right of the map near Madre de Deus, and Ilha de Maré, which is the closer of the two to mainland Salvador, have the highest rates of extreme poverty in the entire city. Ceásá in the center-north of the map and Paripe in the northeast of mainland Salvador near Ilha de Maré are also areas of high extreme poverty.

There are several important takeaways when comparing extreme poverty rates in Salvador and Fortaleza. The first is that the spatial dynamics of poverty in both cities
share the typical outline of most cities, in which higher income households are concentrated in the center of the city where economic activities are located and population density is higher and the poor are left on the outskirts and peripheries. Despite this, there are pockets of poverty in wealthy areas as there are in the majority of Brazilian cities. An important difference between the two capitals is geography: the isolated nature of poverty in Salvador is larger than in Fortaleza due to a high concentration of poverty in islands and other regions of high poverty that are more remotely excluded from denser areas than in Fortaleza. This presents a great challenge in providing accessible public services and goods such as primary healthcare, as will be evident in the following sections.

**Background: The Development of the Family Health Strategy and Policy Legacy in Fortaleza and Salvador**

Since we are interested in knowing whether these two municipalities improved access to primary healthcare for the urban poor by allocating doctors within greater proximity to their residences, a discussion of the specific policy legacy of the Family Health Strategy is relevant. There is great variety in the politics of the adoption of the ESF among the large cities of Brazil. In some cases, this had to do with how the state governors responded to handing greater autonomy to municipalities and the political forces at hand during the decentralization reforms that coincided with the establishment of the Family Health Strategy. Many local politicians outwardly resisted the development of SUS and the ESF as they preferred to maintain patronage networks in the highly centralized health system that focused on secondary care and private health networks.
In the case of the state of Bahia, there was heavy resistance to the reforms of the 1990’s. The Magalhães political family dynasty concentrated power in the PFL party (now DEM) and resisted the reforms to decentralize. The city of Salvador was one of the latest reformers to adopt the ESF and never had a mayor who significantly increased coverage. During the principal years of ESF adoption, a member of the municipal government of a PFL mayor admitted that it was a mistake to resist adoption and expansion of the ESF, mainly due to its viability to attract votes from the poor (Sugiyama 2013).

Meanwhile, the state of Ceará was noted for its progressive reforms. Led by innovative governors such as Tasso Jeressaiti and Ciro Gomes of the then center-left PSDB, the original Community Health Agent (PAC) program was created and expanded by these two governors in the 1980’s. This program, which trained workers with high school education levels to conduct basic health functions and provide regular visits to families to promote and advocate for health, was so successful that PAC agents were incorporated as an element of the Family Health Strategy team when the program was nationalized (Tendler 1997). In terms of how these reforms affected Fortaleza, it was one of the first to have the PAC program and it adopted the ESF in the first year of its nationalization in 1998. Additional decentralization reforms, such as the installation of the Municipal Health Council and municipal structure of healthcare were implemented during this time. However, ESF installation moved rather slowly during its initial inception, and stagnated at a coverage level of 17% in 2001 (Batista et al. 2005).
Table 13: Number of Family Health Strategy Teams by City and Mayor in Office.

<table>
<thead>
<tr>
<th>Municipality</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORTALEZA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESF Teams</td>
<td>0</td>
<td>50</td>
<td>97</td>
<td>101</td>
<td>101</td>
<td>75</td>
<td>93</td>
</tr>
<tr>
<td>SALVADOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESF Teams</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>14</td>
<td>20</td>
<td>31</td>
<td>81</td>
</tr>
<tr>
<td>Continued</td>
<td>2005</td>
<td>2006</td>
<td>2007</td>
<td>2008</td>
<td>2009</td>
<td>2010</td>
<td>2011</td>
</tr>
<tr>
<td>FORTALEZA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESF Teams</td>
<td>77</td>
<td>234</td>
<td>246</td>
<td>214</td>
<td>225</td>
<td>258</td>
<td>256</td>
</tr>
<tr>
<td>SALVADOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESF Teams</td>
<td>110</td>
<td>115</td>
<td>115</td>
<td>80</td>
<td>91</td>
<td>152</td>
<td>136</td>
</tr>
</tbody>
</table>

Source: Own elaboration. Data from DATASUS – data collected from the month of December of each year.

Table 13 displays the number of ESF teams by year in each city as well as the mayor. The most striking part of this data is the jump in number of ESF teams in Fortaleza once the Worker’s Party (PT) gained power in the city. Prior to this, the development of the ESF in Fortaleza and Salvador was rather comparable in terms of overall number of teams and coverage. Between her first and second year as mayor, Luzianne Lins increased the number of ESF teams from 93 in 2004 to 234 in 2006, which more than doubled ESF coverage from 14.22% to 33.99%. Lins won reelection in the 2008 municipal elections and therefore was able to maintain the higher level of ESF teams, reaching a historic high in December 2010 at 258 teams.

Comparatively, Salvador never experienced the same results in terms of ESF expansion. Expansion of the ESF was never a top priority for Antonio Imbassahy of the
PFL, who gave the program its initial start in Salvador in 2000 but never invested significant resources to expand it beyond a minimal presence. The mayor João Henrique de Barradas Carneiro of the center-left PDT won election in 2004 with 74% of the votes and then switched to the PMDB and won reelection in 2008. The number of Family Health Strategy teams largely remained constant throughout Carneiro’s first term. The Worker’s Party formed part of this coalition and commanded the Municipal Secretary of Health at the beginning of his term, but ultimately decided to leave the coalition to support the candidacy of Walter Pinheiro (PT) for the 2008 municipal election of Salvador. As such, Carneiro focused on ESF coverage expansion as a primary proposal in his reelection campaign. After winning reelection, Carneiro successfully increased ESF coverage from 10.17% to 17.49% from 2008 to 2010, but this expansion was short lived: ESF coverage decreased to 13.32% by the end of 2012 (Carvalho & Pereira 2015). Ultimately, Salvador never had the sustained political support for massively improving ESF coverage the same way that Fortaleza did.

The current mayors of Fortaleza and Salvador, Roberto Claudio and ACM Neto respectively, both have two things in common: they are associated with dominant political family dynasties in their respective states and they defeated the PT in the second round of voting in their 2012 victories. Regarding the former, Claudio’s support base comes from the Gomes family, whose brothers Ciro and Cid had been prominent politicians of the state of Ceará since the 1980’s. The most prominent of the two, Ciro, has been recognized as a political “maverick” since the beginning of his political career. One of the original founders of the PSDB in 1988 when he was first elected mayor of
Fortaleza, he left the party in 1996 following his disappointment with the direction of the party towards the center of the political spectrum during the Cardoso presidency. Both Ciro and Cid have been a member of four different political parties since leaving the PSDB. They left the PSB in 2013 after having joined it in 2005 for PROS and then ultimately affiliated themselves with the PDT in 2015. Claudio has followed their political affiliation in each step (Costa & Pequeno 2015).

ACM Neto comes from the dominant political family dynasty of Bahia whose family’s presence in political power dates back to the 1930’s. His grandfather, Antonio Carlos Magalhães (ACM), consolidated the family’s political power in Bahia having been a federal deputy during the military dictatorship of the pro-military party ARENA and then as governor of Bahia from 1991-1994 as a member of the PFL (now DEM). This political lineage is known as “carlismo” and has been able to control the politics and policies of the right through patronistic networks for decades. ACM’s son, Luis Eduardo Magalhães, was a state deputy (1979-1987) during the military era and a federal deputy during the return to democratic rule (1987-1998). Luis became President of the Chamber of Deputies from 1995-1997 while his father ACM was President of the Senate (1997-2001) and they were crucial allies to Fernando Henrique Cardoso during his presidency. In the Cardoso years they were largely in charge of generating legislative support for his agenda. Luis was seen as the future of conservative politics and a potential future presidential candidate of the PFL before his death due to a heart attack in 1998 (Castro 2011).
Both ACM Neto and Roberto Claudio focused heavily on the lack of coverage of the Family Health Strategy in their respective cities. In Fortaleza, despite having supported the prior PT-led administration of Lins, the PSB broke away from Lins’ chosen successor Elmano de Freitas due to conflicts between Lins and state governor Cid Gomes. The Gomes brothers launched Claudio’s candidacy for mayor, which created a division in the left. As a mayoral candidate, Claudio focused his campaign on the increase in public security as violence had spiked in Fortaleza during the final years of Lins’ administration. In terms of healthcare, he draw attention to the lack of adequate ESF coverage and inadequate conditions in the UAPS health centers where Family and Community Health teams work. His plan of government guaranteed that every neighborhood would have a health center in with at least one doctor. This setup would avoid the irregular operating hours of the health centers, for which he blamed the carelessness of the Lins administration. Ultimately, Claudio defeated Elmano in the 2nd Round with 53% of the votes.  

Neto won in the 2nd Round with 53% of the vote in a runoff against Nelson Pelegrino of the PT. Prior to his 2012 victory, ACM Neto had unsuccessfully run for mayor of Salvador in 2008 and had been elected in 2002 as a federal deputy of Bahia. The departure of Carneiro left the race wide open and DEM launched ACM Neto as a pre-candidate early in the campaign. In terms of health policy, Neto’s support for the

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44 Information was found in the government proposal plan for the Claudio campaign. See here: [http://imgs.opovo.com.br/files/Plano_De_Governo_Roberto_Claudio_Final.pdf](http://imgs.opovo.com.br/files/Plano_De_Governo_Roberto_Claudio_Final.pdf)

& [http://g1.globo.com/ba/bahia/apuracao/salvador.html](http://g1.globo.com/ba/bahia/apuracao/salvador.html)

46 For more information, see: [https://eleicoes.uol.com.br/2012/noticias/2012/04/23/dem-lanca-acm-neto-como-pre-candidato-a-prefeitura-de-salvador.htm](https://eleicoes.uol.com.br/2012/noticias/2012/04/23/dem-lanca-acm-neto-como-pre-candidato-a-prefeitura-de-salvador.htm)
ESF as expressed in his plan of government is surprising given the tremendous resistance to obstruct the program by Antonio Imbassahy, a previous city mayor of the PFL/DEM and close member of the political group associated with his family. However, it is rather telling that members of Imbassahy’s government admitted that obstructing the ESF was a political error given its potential to lure votes from the poor (Sugiyama 2013).

ACM Neto offered two ambitious promises in his plan of government – (1) reform of the Eduardo Bizarria Mamede USF health center, located in the poor neighborhood of Mussurunga, and (2) increasing ESF coverage to 50%.

Examining Resource Distribution of Mais Medicos at the Neighborhood Level in Fortaleza and Salvador

Estimated levels of coverage and number of teams of the Family Health Strategy only tells part of the story since they do not take into consideration proximity to health centers. The ESF is a program that was specifically designed to provide low cost primary healthcare for all and as such did not initially target the poor. However, one of the goals during program expansion was to prioritize access among vulnerable and low-income groups (Wadge et al 2016). I now focus on the spatial distribution of health centers in Fortaleza and Salvador order to gain a greater understanding of access to primary healthcare for the poor. Specifically, I used nearest neighbor analysis and the average minimum distance to assess the overall network of health centers and how this related to UDH neighborhoods with high levels of extreme poverty. For a complete review of the statistical techniques utilized for calculating the data in the sections below, please refer to Appendix 1.

47 A walkthrough of these techniques can be found here: [http://www.tandfonline.com/doi/full/10.1080/10095020.2016.1151205](http://www.tandfonline.com/doi/full/10.1080/10095020.2016.1151205)
Health centers where Family Health teams are placed are referred to as units of primary health attention (unidades de atenção primária a saúde – UAPS) in Fortaleza and family health units (unidade de saúde a família – USF) in Salvador. Given that several ESF teams are centered at basic health centers (UBS), for the purposes of this study, I refer to them both by their respective names.

Figure 14: Distribution of Health Centers in Fortaleza

Source: Shapefile and data from the UNDP. Own elaboration in QGIS.
A purely comparative eye test of the maps of health centers of Salvador and Fortaleza as displayed in Figures 14 and 15 suggests a relatively higher level of clustering of health centers in Salvador. While the highly poor concentrated in the northeast area of mainland Salvador in and around Paripe have a dense network of health centers, the other poor neighborhoods, particularly both islands, have only one health center each and they are located in non-central parts of each neighborhood. Meanwhile, Fortaleza’s health centers are more evenly distributed throughout the city. There is a health center located in or less than 2 kilometers away from each of the UDH’s of highest extreme poverty. Particularly, the areas lacking health centers the most are in the western part
of the map, and even then the Vicente Pinzón has two health centers located within the UDH where it is located.

Table 14: Nearest Neighbor Analysis of Health Centers.

<table>
<thead>
<tr>
<th>City Network</th>
<th>Total Number of Points</th>
<th>Observed Mean Distance</th>
<th>Expected Mean Distance</th>
<th>Nearest Neighbor Index</th>
<th>Z-Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fortaleza (UAPS)</td>
<td>117</td>
<td>0.008</td>
<td>0.009</td>
<td>0.93</td>
<td>-1.39</td>
</tr>
<tr>
<td>Salvador (All UBS &amp; USF)</td>
<td>119</td>
<td>0.007</td>
<td>0.016</td>
<td>0.59</td>
<td>-8.50</td>
</tr>
<tr>
<td>Salvador (Only USFs)</td>
<td>72</td>
<td>0.011</td>
<td>0.015</td>
<td>0.68</td>
<td>-5.16</td>
</tr>
<tr>
<td>Salvador (USFs on mainland only)</td>
<td>70</td>
<td>0.008</td>
<td>0.011</td>
<td>0.81</td>
<td>-2.93</td>
</tr>
</tbody>
</table>

Source: Own elaboration. Data from UNDP and CNES.

The nearest neighbor analysis of Table 14 confirms this point. While the health networks of both cities exhibit clustering (Nearest Neighbor Index < 1), Salvador suffers from extreme clustering of USF and UBS centers. Even when conducting this analysis on mainland Salvador and including only USF centers, the data still suggests high levels of clustering. Perhaps more problematic in terms of ensuring access to Family Health Strategy teams is the complete isolation of USF and UBS centers in the poorest parts of the city.

Table 15: Average Distance (meters) from Highest Density Area of Neighborhood to Nearest Health Center by Extreme Poverty Rate Groupings.

<table>
<thead>
<tr>
<th>Extreme Poverty Rate</th>
<th>Fortaleza</th>
<th>Salvador</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count of Units in Group (N)</td>
<td>Average Minimum Distance (meters)</td>
</tr>
<tr>
<td>Low (0-2%)</td>
<td>128</td>
<td>729.21</td>
</tr>
<tr>
<td>Medium (2-6%)</td>
<td>86</td>
<td>688.50</td>
</tr>
<tr>
<td>High (6-8%)</td>
<td>11</td>
<td>718.05</td>
</tr>
<tr>
<td>Very High (+8%)</td>
<td>20</td>
<td>699.25</td>
</tr>
</tbody>
</table>

Source: Own elaboration. Data from UNDP and CNES.

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48 A more detailed assessment of nearest neighbor analysis can be found in Appendix and the following link: http://desktop.arcgis.com/en/arcmap/10.3/tools/spatial-statistics-toolbox/average-nearest-neighbor.htm
Another form of assessing access to primary healthcare is measuring the minimum distance for populations to a health center. As opposed to using the center point of each neighborhood, I group neighborhoods by extreme poverty level to analyze the minimum distance from the point of highest density within each neighborhood to the nearest health center. Table 15 displays the average minimum distance to a health center for neighborhoods within certain ranges of extreme poverty rate. There is no direct relationship between areas of extreme poverty and proximity to health centers in either city based on these measures.

Nevertheless, there are several important takeaways. The intense clustering of health centers in the case of Salvador in areas of medium to high poverty is evident: the average minimum distance is relatively shorter as are the standard deviations compared to UDH’s with very high and low levels of extreme poverty. On average, UDH’s of very high levels of poverty in Salvador have the greatest difficulty of access to health centers of any of the neighborhood groupings. This is particularly true given the isolation observed of neighborhoods such as Ilha dos Frades, Ilha de Maré, and Ceasá. Comparatively, the data suggests that health centers in Fortaleza are more evenly distributed given the lack of outliers and consistent levels of standard deviation. Furthermore, the average minimum distance is highest for neighborhoods of low extreme poverty and there are very few density spots of neighborhoods in the other three groupings that are isolated from health centers.
This has important implications for a comparative analysis on the allocation of Mais Médicos doctors at the micro level. Salvador’s distribution of health centers is largely clustered in areas where poverty is medium to high. This raises the possibility that neighborhoods with very high levels of extreme poverty may not even have health centers within them to receive a doctor from Mais Médicos regardless of the intentions of the municipal government in allocation of doctors. This does not invalidate the analysis in the upcoming section, given that both mayors have a choice on where to allocate resources across a broad set of neighborhoods and populations. Furthermore, the fact that health centers do not exist in these areas also reflects a real policy choice of the current and past administrations within each city, which is a feature that this analysis aims to capture.

Regression Analysis

1: Methodological Considerations

In this section I provide a brief outline of the econometric models used to analyze distribution of doctors to the poor. For each model, the unit of analysis remains the neighborhood (UDH) of the specific city analyzed. The independent variables include extreme poverty rate, total population, neighborhood population density, aging rate, rate of pregnant women aged 10-17, and the illiteracy rate. All of the control variables are purely controls for population and health factors, while the main independent variable of interest is the extreme poverty rate. I also include the illiteracy rate as a proxy control for measuring the impact of civil society on improving public resources. I do not use infant mortality as a variable due to issues with multicollinearity with
extreme poverty rates. The type of model specifically used changes according to the dependent variable. The regressions designed for this analysis do not utilize spatial econometric models due to the lack of spatial dependency in the datasets according to Moran tests. For models in which the dependent variable is the simple count of Mais Médicos doctors, I utilize negative binomial models. In turn, I utilize OLS regression models for the change in number of ESF doctors before and after Mais Médicos due to the fact that several of these numbers are negative. A summary of the variables and the mathematical representation of them can be found below. For a more detailed explanation of the statistical and econometric models utilized, please refer to Appendix 1.

2: Regression Results
The results of the regression models display that neither city effectively targeted neighborhoods with high levels of extreme poverty due to a lack of health centers in those neighborhoods. This can be seen as the lack of significance at the 5% level in models 3 and 4 of the extreme poverty variable. However, when the interaction term of extreme poverty and number of health centers is introduced in models 5 and 6, very high and positive levels of significance are observed. Whereas the log variable of total neighborhood population is heavily significant in models 3 and 4, it loses significance in models 5 and 6. This suggests that both mayors aimed to target doctors in areas of high poverty provided that the area had a health center within it. Based on this finding, I fail to reject Hypothesis 3.
Table 16: Regression Results.

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>ESF Teams Change</th>
<th>Mais Medicos doctors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS zero-inflated</td>
<td>count data</td>
</tr>
<tr>
<td></td>
<td>Fortaleza (1)</td>
<td>Salvador (2)</td>
</tr>
<tr>
<td></td>
<td>Fortaleza (3)</td>
<td>Salvador (4)</td>
</tr>
<tr>
<td></td>
<td>Fortaleza (5)</td>
<td>Salvador (6)</td>
</tr>
<tr>
<td>Extreme Poverty</td>
<td>0.102**</td>
<td>0.096*</td>
</tr>
<tr>
<td></td>
<td>(0.045)</td>
<td>(0.054)</td>
</tr>
<tr>
<td>Log Population</td>
<td>0.456***</td>
<td>0.619***</td>
</tr>
<tr>
<td></td>
<td>(0.071)</td>
<td>(0.099)</td>
</tr>
<tr>
<td>Density</td>
<td>-0.00003</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.0004)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Ageing Rate</td>
<td>-0.001</td>
<td>-0.072*</td>
</tr>
<tr>
<td></td>
<td>(0.036)</td>
<td>(0.040)</td>
</tr>
<tr>
<td>Illiteracy</td>
<td>-0.092*</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(0.052)</td>
<td>(0.107)</td>
</tr>
<tr>
<td>Pregnant Mothers 10-17 age</td>
<td>0.011</td>
<td>-0.103</td>
</tr>
<tr>
<td></td>
<td>(0.056)</td>
<td>(0.067)</td>
</tr>
<tr>
<td></td>
<td>0.054***</td>
<td>0.037***</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.265***</td>
<td>-4.111***</td>
</tr>
<tr>
<td></td>
<td>(0.638)</td>
<td>(0.878)</td>
</tr>
<tr>
<td>Observations</td>
<td>246</td>
<td>243</td>
</tr>
<tr>
<td>R2</td>
<td>0.200</td>
<td>0.207</td>
</tr>
<tr>
<td>Adjusted R2</td>
<td>0.180</td>
<td>0.187</td>
</tr>
<tr>
<td>Log Likelihood Residual Std. Error</td>
<td>1.379 (df = 239)</td>
<td>1.786 (df = 236)</td>
</tr>
<tr>
<td>F Statistic</td>
<td>9.981*** (df = 6; 239)</td>
<td>10.294*** (df = 6; 236)</td>
</tr>
</tbody>
</table>

Note: *p<0.1; **p<0.05; ***p<0.01

Source: Own elaboration

When the net change of ESF doctors is the dependent variable as in Models 1 and 2, there is a slight difference of magnitude: a 9.8% increase in extreme poverty.
leads to roughly one more ESF team in Fortaleza whereas a 10.42% increase in extreme poverty gives the same result in Salvador. Moreover, we find that this result is significant at the 5% level in Fortaleza while it is significant only at the 10% level in Salvador. As such, we fail to reject the null hypothesis (Hypothesis 4) that Fortaleza will more effectively increase access to healthcare for the poor than Salvador due to the policy legacy of the ESF.

There are several implications for this analysis. With regards to the prior assertion that both cities sought to provide the poor with greater access provided a health center was in their area as made evident in Models 5 and 6, the evidence suggests that both mayors targeted those in the poorest areas given the distribution of health centers. In this sense, the decision of current and past administrations of where to place health centers becomes imperative.

In terms of Fortaleza more effectively increasing access to healthcare for the poor, I base this assertion on the fact that the change in ESF Teams from the beginning and end points of our analysis is positively associated with poverty rates. This means that the poor benefitted more greatly in Fortaleza than in Salvador. The reason for this is twofold. The first reason is that, as previously highlighted, Fortaleza was able to take advantage of a stronger network of health facilities, which provided more health centers that were more evenly distributed throughout the city. This allowed them to allocate Mais Médicos doctors to more regions of the city. Secondly, the underlying data shows that Fortaleza made a more conscious effort to totally reconfigure the allocation of doctors. The city administration requested more doctors from Mais Médicos but also
reduced the total number of ESF teams for which it paid for. This tendency did not occur in Salvador. In Fortaleza, the total change in ESF teams from the beginning and end of this timeframe was 158 despite requesting 178 doctors from Mais Médicos, whereas in Salvador the total change in ESF teams was 177 with 115 program doctors. The data suggests that not only was Fortaleza placing ESF teams in poorer areas, they were also actively reducing the number of ESF teams in wealthier neighborhoods: 7 out of 8 neighborhoods with negative change rates in ESF teams had extreme poverty rates below 6.15% and 4 out of 8 had less than 3.08%. No such effect occurred in Salvador.

This analysis has one important limitation, which is that there is no data available on the opening date of health centers. All health centers included existed at the end point of this analysis. While there is data available on the Requalifica program, this does not account for health centers that were constructed without the financial and technical assistance of the federal government. However, there is no evidence that the deficit of health centers in poor UDH units was improved to the point where Mais Médicos could increase access to healthcare for the poor from the time that ACM Neto entered office to the cutoff of this period of analysis.

The policy legacy of the development of the ESF had an important impact on the ability of municipal governments to evenly distribute doctors from Mais Médicos. Whereas improving access to care to more vulnerable populations was clearly an objective of both mayors, Claudio benefitted from a more evenly distributed set of ESF centers and a higher number of ESF teams from the initial starting point of Mais Médicos. In Salvador, if the UDHs of Coutos and Paripe/São Tomé are removed from the
sample, the government’s ability to reach the poor is even further reduced: this area received 50% (13 out of 26) of Mais Médicos doctors allocated to neighborhoods with over 8.5% extreme poverty rates in this time period. Despite this, the administration led by ACM Neto of DEM made important strides in improving healthcare and aimed to improve healthcare in regions where it has traditionally been lacking. Despite not reaching anywhere close to the 50% coverage rate promised during ACM Neto’s political campaign in 2012, coverage did increase during this time period and poor neighborhoods did benefit, reaching 30.8% in July 2016 from 17.69% at the start of Mais Médicos. This represents an important turn in the strategies and tactics of the DEM-led right-wing in Salvador, a party which focused great energy on obstructing the Family Health Strategy program in its initial years. Given their absence from office for over a decade, it is possible that the party reassessed their strategy and used Mais Médicos to connect with lower socioeconomic sectors of society that they had previously shunned.

Conclusion
This Chapter provides a comparative analysis of the development of public healthcare in Fortaleza and Salvador during the implementation of Mais Médicos. The importance of these two cities given their prominence in the Northeast region and their socioeconomic similarities make for an ideal comparison, as do the political variables of left and non-left that I aim to isolate. Nevertheless, while poor neighborhoods in Fortaleza received doctors of the ESF to a greater extent than in Salvador, partisan ideology of the current administration does not explain this difference: both the center-left administration of Roberto Claudio and the right-wing ACM Neto aimed to distribute
doctors of Mais Médicos to the poor. Although this is the differing variable upon which this analysis is based, I discover an important element that helps explain this difference – the diverging path dependency of the ESF prior to the implementation of Mais Médicos. The Claudio administration of Fortaleza benefitted enormously from the expansion of the ESF that occurred during the prior administration of the PT, whereas ACM Neto’s government was hindered by the obstruction of the ESF that had been previously implemented by his own party. Although the ESF never reached high levels of coverage in Fortaleza before Mais Médicos, it was expanded to a much greater extent compared to Salvador.

These findings tell us several important things about the politics of Mais Médicos and public healthcare in Brazil on a larger scale. In the prior Chapter I had emphasized the importance of the PT in pushing for Mais Médicos at the municipal level and the lack of distinction of other left parties from non-left parties. This Chapter extends that not only was the PT an important catalyst at the subnational level for expanding Mais Médicos, a policy of its own creation at the national level, it also was instrumental in the case of Fortaleza in expanding primary care and the ESF before the existence of Mais Médicos. This had a lasting impact for subsequent administrations that found it easier to expand the ESF with the Mais Médicos program. Furthermore, the ideological divisions and opposition to public healthcare from the right was more evident in the politics of the ESF than with Mais Médicos. The case of Salvador further confirms this tendency. A DEM politician from a political dynasty, which dominated conservative politics in Bahia and had actively obstructed of the ESF, not only aggressively pursued Mais Médicos but
also made efforts to extend these services to the most socioeconomically disadvantaged.

In the next Chapter, I provide a conclusion by expanding on the findings of both Chapters 4 and 5 and how they relate to the overall scope of this work. I relate them to the power of the left, electoral competition and path development of public healthcare in Brazil, and state how they are important to the political economy of social policy in Brazil. I also highlight the limitations of this work and suggest lines for future research that can be built on these findings.

**CHAPTER 6 – FINAL CONSIDERATIONS**

**Findings**

There are several important findings in this analysis. In Chapter 4, the question I sought to answer was how did political factors influence the distribution of doctors in the Mais Médicos? In order to appropriately address the explanatory factors that might answer this question, I developed the following hypotheses:

**Hypothesis 1:** PT-led municipalities will be associated with a greater level of MM doctors. Where the PT is not in power, a higher percentage of PT councilmen will be positively associated with receival rates.

**Hypothesis 2:** PT-led municipalities will be associated with a greater level of Cuban doctors with more Cuban doctors. In municipalities without a PT mayor, Cuban doctors will be positively associated with the proportion of PT councilmen.
The regression analysis indicates that the PT at the subnational level led to significantly higher receival rates, whereas other leftist parties did not. Because of this, I fail to reject both Hypothesis 1 and 2.

In terms of electoral competition, there was a slight but negative association between the margin of victory and receival rates. This implies that mayors in more competitive districts did receive more doctors on average, although this effect was so small that there are other determinants worth highlighting that had a more definitive effect on explaining the distribution of resources of Mais Médicos. The first is the overall negative correlation between ANS private insurance rates and receival rates for a given municipality. These effects were salient. Alongside these, other socioeconomic factors such as the level of ESF coverage before adoption and extreme poverty rates were positively associated with receival rates. Ultimately, the overall effect that socioeconomic factors such as extreme poverty had and the lack of evidence that the PT national vote in 2010 had on the allocation of doctors, would suggest that program resources largely were targeted to the priority regions as designated by the program designers and the Ministry of Health.

Chapter 5 provides a comparative analysis on the extent to which the cities of Fortaleza and Salvador allocate doctors from Mais Médicos in poor neighborhoods. These two cities were selected for comparative analysis based on similarity according to a set of socioeconomic indicators but difference in one variable: Fortaleza was led by the center-left mayor Roberto Claudio of the PSB and Salvador’s mayor was ACM Neto of the right-wing DEM. The hypotheses pertaining to these questions are the following:
Hypothesis 3: Extreme poverty rates will be positively associated with the allocation of Mais Médicos doctors in both Salvador and Fortaleza.

Hypothesis 4: A policy legacy of greater prior adoption of the Family Health Strategy will allow Fortaleza to increase health access, as measured by the change in ESF teams before and after Mais Médicos, to the poor more than Salvador.

I fail to reject Hypothesis 3 and 4. A more explicit interpretation of this is that Fortaleza was able to reach poor neighborhoods with greater success than in Salvador, although this was not due to the partisan ideology of each city administration. Instead, the prior expansion of the ESF in Fortaleza gave more ample opportunity to the Claudio administration for using Mais Médicos doctors to shift ESF teams to populations in greater need. On the other hand, the prior obfuscation in Salvador led to a change in strategy by the ACM Neto administration of the conservative DEM party upon returning to power in which poor neighborhoods were targeted to the best ability of the government. However, the active efforts to neglect primary care in Salvador by previous DEM-led administrations inhibited the expansion of the ESF. This left many poor areas without health centers, and the current administration did not sufficiently alleviate this problem between 2012-2016 by constructing new health centers.

In the following section, I relate these findings to the broader scope of the literature utilized in the theoretical framework that guided this analysis. This will tell us how this research contributed to the understanding of how the provision of public goods and services function in Brazil, how electoral competition and the power of the
left explain these increases and what this means for the policy legacy of the Brazilian health system.

**Applications of Findings to the Overall Literature**

1: **Targeting**

A central concern regarding this program was whether the Rousseff administration would exploit this program to distribute resources for political gain. There is no evidence that this program was used for political gain. The standard measures used to measure this relationship suggest that the PT did not aim to benefit either their core or peripheral voters as determined by the vote for the PT in the 2010 Presidential elections. Additionally, the wide acceptance of the program by municipal leaders also suggests that the program did not exclude mayors of opposing political parties. Furthermore, there is strong evidence that doctors were largely assigned to regions of “need”, at least according to the priorities established by the Ministry of Health. The strong positive correlation between extreme poverty rates and doctors provides evidence to this fact. Additionally, the presence of doctors in specific regions such as the Semi-Arid and Amazon regions and federally protected areas namely the quilombos and indigenous settlements, suggest that Mais Médicos provided assistance to historically neglected areas.

2: **Power of the Left**

The explanatory power of the presence of leftist parties as a catalyst for increasing the provision of social policy is based on evidence on the importance of the left in developing universalist social protection systems in the developed and developing world (Esping-Andersen 1990). The “pink tide” of leftist parties that came to power in
Latin America since the 2000’s brought a particular approach to governance, in which “basic universalism” was introduced as a means of reducing poverty and inequality through minimal universalist policies that ensured basic benefits and improvements in education and health provision despite having a limited tax base (Huber & Stephens 2012). In this light, the policies of Bolsa Familia, Minha Casa Minha Vida, and Mais Médicos introduced during the PT-led presidencies of Lula and Dilma Rousseff can be seen.

How does the power of the left help explain the distribution of Mais Médicos? The evidence produced by this study suggests that the left did not lead to significantly higher receival rates than the non-left at the subnational level, although the presence of the PT in mayor positions and city councils was a determining factor. This stands in stark contrast to the policy legacy of the ESF, where the presence of all left parties were instrumental in ensuring higher adoption and receival rates (Rocha & Soares 2009; Sugiyama 2013)

It is important to note that this does not mean that the left did not receive doctors from Mais Médicos, but rather there is no significant evidence they received relatively more doctors than municipalities governed by non-left parties. The reasons for this can be explained by the institutional structures of coalition formations as a result of proportional representation and federalism in Brazil. With regards to the former, the presence of proportional representation in the legislative arena has created a party structure in which the effective number of parties is high and coalitions are formed regardless of ideology. This also carries over to executive level elections and it leads to
alliances between parties on opposite ends of the ideological spectrum and frequent party switching and opportunism by politicians. Ultimately, these factors dilute the overall ideological divisions of policymaking in Brazil and contribute to the lack of partisan divide on policy implementation of programs such as Mais Médicos. Perhaps more significantly, the institutional structures of federalism as outlined by Fenwick (2016) suggest that in areas such as health policy there are incentives for municipalities to cooperate with the federal government regardless of party. Much of what explains the lack of significance for leftist parties as a whole can be explained by this relationship: it was simply beneficial for left and non-left parties alike to collaborate with the federal government on implementing their policy. In this case, Mais Médicos offered a tremendous benefit: the benefit of fixating a primary care doctor on a three-year contract with no financial cost for the municipality. Unsurprisingly, enough mayors felt that the risk of losing conservative constituents by bringing doctors would be outweighed by the benefits it would bring from uninsured constituents benefitting from having a doctor. This especially became true when public opinion on the program increasingly trended upward.

Nevertheless, why would the power of the left at the subnational level help explain the development of the ESF and not Mais Médicos? This is a more complicated question to answer. Nevertheless, there were important contextual differences between the initial expansion of the ESF and Mais Médicos. The ESF was implemented at a time when state governors still had control over the actions of municipal mayors, particularly in healthcare. Many rallied allied municipal mayors to obstruct any policy
that reduced their patronage structure established under the corporatist healthcare model and the ESF was particularly seen as a means of reducing this power. As fiscal decentralization advanced, governors relatively lost power and municipalities gained greater autonomy to work directly with the federal government. This relationship outlined by Fenwick (2016) explains exactly this institutional structure, although it did not happen overnight. The ESF was heavily impacted by the gradual movement towards decentralization and much of the resistance to it came from conservative politicians. Another difference between the implementation of the ESF and Mais Médicos is that the ESF was establishing a new program that had no precedent while Mais Médicos was simply extending the ESF to neglected populations when evidence showed that ESF expansion had stalled. By the time Mais Médicos was implemented, the ESF had over a decade of development and much of the resistance to the program had waned. This is also made evident by the approach made by the DEM-led administration in Salvador. After spending tremendous resources on obstructing the ESF and reducing and obstructing it in cases where prior administrations had put in place, ACM Neto aggressively expanded the ESF and relied heavily on Mais Médicos to achieve this. Although constrained by the previous experience of the ESF, this perhaps demonstrates that one of the foremost conservative politicians at the municipal level learned an important lesson after witnessing the growth of the PT: tending to the needs of the poor in a country of huge inequality where the median voter is poor is an effective strategy for increasing one’s popularity.
As a final note, this research highlights the overall strength of the PT in promoting and expanding access to primary healthcare. Both our matching techniques in Chapter 4 that explain the variance in receipt rates of Mais Médicos and the policy legacy of the ESF in Fortaleza in Chapter 5 provide evidence to this point. While it is true that the alignment between national and subnational governments is another motivating factor behind these higher rates, they only tell part of the story as made evident by Chapter 5. Ultimately, the legacy of the PT in pushing for the ESF is very strong as manifested by their historical ties to the *sanitaristas* movement and their expansion of the ESF at the subnational level before Mais Médicos. In Chapter 4, the overall presence of the PT explains a great degree of the variance in receipt rates: both municipalities that had a mayor of the PT and an above average presence of the PT in the city council of cities with 25,000 or more inhabitants represent two ways in which the Rousseff government could rely on their own party to expand their program. The higher receipt rates among non PT mayors in cities where the city council was heavily represented by the PT also suggests party competition between the PT and other parties: where the PT had stronger representation, the mayors were more sensitive to receiving doctors.

The flow of Cuban doctors largely followed the trends outlined above for the entire program. Most notably, the presence of the PT led to higher rates of Cuban doctors. This relationship was particularly strong with the PT vereadores (councilmen) binary variable in municipalities with 25,000 or more inhabitants, in which a higher rate of PT city councilmen in municipalities without a PT mayor not only led to higher doctor
rates but an even higher rate of Cuban doctors. This would suggest that PT city council members effectively pressured mayors not only to receive doctors but also to receive Cuban ones. Aside from this, Cuban doctor rates were particularly sensitive to the criteria laid out by the Ministry of Health in both municipality groups. The relationship between territorial variables, namely the Semi-Arid and Amazon regions and program doctors intensified when isolating Cuban doctors. The only territorial variable where the relationship was weakened is with the indigenous settlements variable among municipalities with 25,000 or more inhabitants. Aside from this, the relationship between doctors and PAB fixo (fiscal transfers for primary health) and extreme poverty rates increased in magnitude and becomes statistically significant in the case of PAB fixo for municipalities with 25,000 or more inhabitants. These relationships suggest that Cuban doctors were the most likely to be sent to municipalities with the most strenuous work conditions given the high poverty, low funding and high presence of protected communities.

3: Electoral Competition

The theory of electoral competition leading to greater provision of public goods and services has conflicting empirical results and elections at the subnational level in Brazil are particularly weak at explaining policy adoption and distribution of resources in federal funding and programs. In this section, I highlight some of the reasons.

In the case of Mais Médicos, the relationship between electoral competition and doctors is as expected: as the margin of victory decreases the receipt rates of doctors increases. Nevertheless, the magnitude of this relationship is very small, and almost
zero in the case of smaller municipalities (>25,000). In the case of municipalities of 25,000 or more inhabitants, the relationship is statistically significant at the 5% level and has a coefficient of -.016. In other words, an increase of 62.5% margin of victory approximately leads a reduction of one doctor per 100,000 inhabitants while controlling for other factors. Furthermore, the total number of candidates has no relationship with the number of doctors received. The assertion that greater electoral competition leads mayors to receive a greater number of doctors while controlling for other factors is true on average, but this evidence is not very convincing given the small magnitude of this relationship.

This is particularly surprising in the case of smaller municipalities. In the sense of how proponents of electoral competition view the problems associated with clientelism and democratic rule in less populated areas, it is these areas where the relationship between margin of victory and doctor rates would logically be most significant. Whereas larger municipalities have a larger average number of candidates in elections, the average margin of victory is less in these municipalities (18.15% vs. 17.57%). This is particularly surprising given the fact that second rounds of elections occur in municipalities with 200,000 inhabitants or more and many candidates in smaller municipalities run unopposed: only 2 candidates ran unopposed in municipalities with 25,000 or more inhabitants while 106 ran unopposed in municipalities with fewer than 25,000 inhabitants.

Perhaps more striking is the overall impact of ESF Coverage rates and ANS private plans rates across all municipalities. These variables have the expected
relationship: negative correlation between ESF Coverage rates and number of doctors received and ANS private plans rate and number of doctors received. However, the overall magnitude of this relationship, particularly in the case of private insurance rates, is strikingly large. This suggests that mayors were particularly sensitive to the insured and uninsured, and implies that mayors in competitive elections were likely to respond to whichever group was the largest, placed the greatest amount of pressure, or dominated as a loyal constituent. This also means that some of the largest beneficiaries of the Mais Médicos program were municipalities where the rate of private insurance and ESF Coverage were both low. In other words, these doctors were destined for areas where there were many individuals who had no doctor available to see them. In terms of an overall targeting strategy, it is a very positive sign in the sense that those needing doctors received them. Nevertheless, it also raises questions as to the overall impact of the private healthcare industry. Specifically, why is it that high private insurance rates lead to such low doctors received rates? The cases of the entire population of a given municipality having private insurance rates close to 100% are nonexistent and those with the highest private insurance rates also tend to have the lowest ESF Coverage rates. This highlights the challenge facing progressive governments in the Presidency that wish to universalize social policy in a decentralized context: a great deal of the poor uninsured living in regions with a high overall level of wealth and where private insurance rates are high are unlikely to benefit from such a federal program.

Chapter 5 highlights some interesting similarities in terms of electoral competition between the cases of Fortaleza and Salvador. In both cases, the mayors
that oversaw the receipt of doctors from Mais Médicos had been previously taken to second round elections with candidates from the PT. In the case of Fortaleza, Roberto Claudio of the PSB represented a challenge from the left to PT rule. Claudio won the election in 2012 by a 6.04% margin of victory in the second round against the incumbent Luzianne Lins of the PT. Meanwhile, ACM Neto led a revival of the dominant right-wing force in the local politics of Salvador, in which he defeated Nelson Pelegrino of the PT in the second round by 7.01%. Both mayors had resounding success in their 2016 reelection campaigns as well: ACM Neto won in the first round of the election obtaining 73.99% of the vote and a 59.44% margin of victory and Claudio won in a runoff against Captain Wagner, a challenger of the right-wing PR, by a margin of victory of 7.14%.

In this sense, it was not simply electoral competition but specifically competition from the PT that helps explain part of the reasons why both mayors targeted the poor with Mais Médicos. In the case of Claudio, there was particular pressure to repair relations with the progressives that supported the PT and felt hostility towards the administration. It is unclear to what extent the favorable reception of Mais Médicos factored into the results of 2016, nor is it the focus of this study. The primary challenge in 2016 was from the right and it is possible that Claudio successfully captured a sufficient amount of the PT vote that had been his primary competition in the prior election. On the other hand, the resounding success of ACM Neto is worthy of particular attention and represents a shining example of resurgence of the right in Salvador. As with the case of Fortaleza, the second place finish of the PT and small margin of victory in 2012 both partially explain why the DEM broke with its past in Salvador. Whereas
prior leaders obstructed the ESF, ACM Neto utilized Mais Médicos to expand these services where possible for the poor. In this sense, the case of Salvador is an exception to the rule in the sense that it was a city with a high rate of ANS plans (26.79%) and a low rate of ESF Coverage (31%) that aimed to expand health services for the uninsured.

4: Policy Legacy

In a strict sense, Mais Médicos was not aimed at restructuring the public health system or breaking its path development, but rather was constructed to continue the development of the latter system and strengthen the ESF. The Unified Health System and ESF both suffered from years of stagnation and the PT leadership sought to place it back on track. Capitalizing on the discontent manifested in the protests of June 2013, the PT managed to create a program expanded public health in the areas where it was lacking.

Nevertheless, Mais Médicos also ran into the same wall that the ESF had: the private health system. As private insurance rates increased, receival rates went significantly down. As stated in the previous section, the distribution of resources of Mais Médicos was primary divided by the duality of the health system, both the private system that developed primarily under the corporatist model prior to the return of democratic rule in the 1980’s and the public system that was developed since the 1988 Constitution. In essence, the program had success in areas where the ESF was lacking and in regions suffering from high levels of poverty provided that there were not high insurance rates.
Despite this, there are other encouraging signs for progressives aiming to expand the ESF. Specifically, the distribution of resources was not driven by partisan factors at the subnational level, and many non-leftist parties received program doctors. This is a positive indication that the policy legacy of resistance to the ESF that occurred in municipalities run by conservative parties has been significantly weakened to the point of not being a factor in Mais Médicos. This tendency was made particularly evident by the policy legacy of public healthcare in Salvador and the change in strategy from obstruction to acceptance of successive DEM-led governments in the city. This also speaks to the institutional structure of public healthcare in Brazil. The ESF was established to be the principal primary care program of SUS and the main gatekeeper for the majority of the population. Its acceptance among conservative politicians at the municipal level as this study shows is an important development in its legacy.

It is also worth contemplating the overall sustainability of Mais Médicos, particularly when parties aside from the PT take over the presidency. Many of the doctors were placed on three-year contracts with the possibility of extension with plans, but the PT also put in place sweeping changes of the training and education of doctors in Brazil by prioritizing the Family and Community Health specialization and the development of university programs in medicine and residency programs in regions beyond the Southeast. This also brings up the question of how politics may influence future decisions. While the high popularity of Mais Médicos may insulate the current rounds of doctors in the field from having a complete dismantle of the program, the movement towards the training and prioritization of primary care doctors at the
university level that Mais Médicos also put in motion is what will determine whether the current doctors are adequately replaced with new ones.

**Future Research**

This study provides the building blocks for future studies on Mais Médicos and the political economy of healthcare in general. It is particularly focused on addressing how the left influenced the distribution of resources of Mais Médicos and how the historical development of health policy in Brazil fits within this context. In this section, I highlight the questions that this research brought up that could were not further analyzed or were not the focus of this particular study despite being important.

In terms of the role of the PT, one important remaining question is the relationship between national and subnational governments. In this study, it is evident that the PT at the subnational level is a primary explanatory variable in the distribution of program resources. Nevertheless, it still remains unknown how these relationships were constructed. Were PT mayors pressured by the national government to accept more programs? Do they receive different information from the federal government on program adoption than other parties at the municipal level or is there a natural bias for subnational units of the same party of the national government to seek information on its programs for adoption and implementation? Small data in the form of qualitative research would be best suited for examining this relationship and would greatly benefit our understanding on how information is disseminated between different levels of government of the same party.
This study examined the relationship between electoral competition and the distribution of resources of Mais Médicos. The results suggest that there is a weak negative association between these two factors. Nevertheless, new studies could further examine how this variable explains receipt rates with other techniques. Furthermore, it became evident that electoral competition was far more nuanced than the simple pressure of being in a competitive district: politicians gauge a number of factors, including the demands of their main constituents and the relative strength of other political forces that may provide competition. In Chapter 4, there is evidence that the level of private insurance was one of the most influential determinants of program resources. Additionally, the strength of the PT in both Fortaleza and Salvador was an important factor in encouraging both administrations to receive doctors of Mais Médicos. This evidence also showed up in Chapter 4 with the strength of PT city council members pushing for doctors. More in-depth studies would be particularly well suited in providing theories on how politicians gauge the support of the insured and uninsured. Additionally, further studies could examine the relationship that electoral competition from the left, particularly the presence of the PT, influenced whether conservative parties were more likely to receive more doctors.

One important limitation to the comparative analysis that utilizes Fortaleza and Salvador to assess the extent of allocation of doctors in poor areas in cities is the lack of voter data at the neighborhood level, or at least in terms of comparable units. One cannot make assumptions of the political allegiances of the poor in these cities simply because on average they receive more government benefits from leftist parties such as
the PT. Survey research that matches voter preferences and the distribution of resources would add important missing information to this equation and open up analysis as to how municipal leaders allocated doctors according to where their levels of support were strongest and weakest.

A final salient issue that comes to light that is not central to this work is potential evidence of exploiting Mais Médicos by municipal governments to reduce their overall commitments to the ESF. This is made evident in Chapter 5 where the Claudio administration of Fortaleza increased the absolute number of ESF teams through Mais Médicos despite directly reducing the municipal governments overall commitment to ESF doctors. The logic of this makes sense: since the federal government bears the overall burden of doctor salary, many municipalities may have decided to simply free ride on the federal government without actually increasing access to the ESF. Another possibility is that municipalities were also using Mais Médicos to gain doctors that could work the total 40 hours per week or simply replace less qualified ones. Nevertheless, this leaves questions on how this played out among municipalities of different regions, size, and political parties that future research could help answer.
APPENDIX 1 – FORMULAS OF STATISTICAL AND ECONOMETRIC MODELS AND LIST OF VARIABLES

List of Variables:

Policy Legacy

ESFCov – percentage of ESF Coverage at Cycle C (time variant).
ESFAd – year in which ESF was first adopted (0 = 1998, 1 = 1999, 2 = 2000, ...) in municipality.

ANS – ANS plans rate (Quantity of ANS plans/Population) at Cycle C (time-variant).

DM – 1 if mayor has doctor listed as prior profession, 0 if not.

Health and socioeconomic indicators/targeting criteria:

IM – Infant mortality rate in year 2013.
IpC – Income per capita in municipality M in year 2010.
PABF – PAB Fixo rate in municipality M in year 2012 (one year before Mais Médicos implementation).

Health and socioeconomic indicators/targeting criteria:

Arid – 1 if in Semi-Arid region, 0 if not.
Amazon – 1 if in Amazon region, 0 if not.
QuCnt – Count variable for number of quilombos in municipality.
ISCnt – Count variable for number of indigenous settlements in municipality.

Political variables

National vote:

Rous – Vote percentage for Dilma Rousseff in 2010 election (2nd round).

Municipal electoral competition

CME – Number of total candidates competing in municipal election.
MME – Margin of victory for 2012 municipal election.

Political ideology/party variables at municipal level.

Uni – 1 if municipal and state government parties are aligned, 0 if not.
Left – 1 if municipal mayor is of leftist party, 0 if not.
PTC – 1 if PT is in municipal mayor coalition, 0 if not.
PTM – 1 if municipal mayor is of PT party, 0 if not.
PTV – Percentage of councilmen (vereadores) of PT.

Population:

log(Pop) – log form of population in 2013.

Dependent variables:

MMpc – Mais Médicos per capita (Doctors/Population (2013) * 100,000)
MM – Mais Médicos doctors (count total)
Cubpc – Cuban doctors per capita (Cuban Doctors/Population (2013) * 100,000)
Cub – Cuban doctors of Mais Médicos (count total)

Models for Chapter 4:
Model 1:
A between estimator takes the individual effects model, where M is municipality (unit component) and C is program cycle (time component):

\[ M_{MC} = \beta_0 + \beta_1 \text{ESFCov}_M + \beta_2 \text{ESFA}_M + \beta_3 \text{M}_M + \beta_4 \text{pC}_M + \beta_5 \text{Exp}_M + \beta_6 \text{PABF}_M + \beta_7 \text{Rous}_M + \beta_8 \text{Arid}_M + \beta_9 \text{Amaz}_M + \beta_{10} \text{QuCnt}_M + \beta_{11} \text{ISCnt}_M + \beta_{12} \text{CME}_M + \beta_{13} \text{MM}_M + \beta_{14} \text{MC}_M + \beta_{15} \text{Uni}_M + \beta_{16} \text{DM}_M + \beta_{17} \text{Left}_M + \beta_{18} \text{PTC}_M + \beta_{19} \text{PTM}_M + \beta_{20} \text{PTV}_M + \beta_{21} \text{ANS}_M + \beta_{22} \log(\text{Pop})_M + e_M \]

and averages out the time component resulting in the regression:

\[ M_{MC} = \beta_0 + \beta_1 \text{ESFCov}_M + \beta_2 \text{ESFA}_M + \beta_3 \text{M}_M + \beta_4 \text{pC}_M + \beta_5 \text{Exp}_M + \beta_6 \text{PABF}_M + \beta_7 \text{Rous}_M + \beta_8 \text{Arid}_M + \beta_9 \text{Amaz}_M + \beta_{10} \text{QuCnt}_M + \beta_{11} \text{ISCnt}_M + \beta_{12} \text{CME}_M + \beta_{13} \text{MM}_M + \beta_{14} \text{MC}_M + \beta_{15} \text{Uni}_M + \beta_{16} \text{DM}_M + \beta_{17} \text{Left}_M + \beta_{18} \text{PTC}_M + \beta_{19} \text{PTM}_M + \beta_{20} \text{PTV}_M + \beta_{21} \text{ANS}_M + \beta_{22} \log(\text{Pop})_M + (\beta_M - \beta_0 + e_M) \]

where the bars indicate average variables and signifies that time has been averaged out. The variance is calculated as in the following formula:

\[ s_B^2 = \frac{1}{N - 1} \sum_M (x_M - \bar{x})^2 \]

Model 2:
A between estimator takes the individual effects model, where M is municipality (unit component) and C is program cycle (time component):

\[ M_{MC} = \beta_0 + \beta_1 \text{ESFCov}_M + \beta_2 \text{ESFA}_M + \beta_3 \text{M}_M + \beta_4 \text{pC}_M + \beta_5 \text{Exp}_M + \beta_6 \text{PABF}_M + \beta_7 \text{Rous}_M + \beta_8 \text{Arid}_M + \beta_9 \text{Amaz}_M + \beta_{10} \text{QuCnt}_M + \beta_{11} \text{ISCnt}_M + \beta_{12} \text{CME}_M + \beta_{13} \text{MM}_M + \beta_{14} \text{MC}_M + \beta_{15} \text{Uni}_M + \beta_{16} \text{DM}_M + \beta_{17} \text{Left}_M + \beta_{18} \text{PTC}_M + \beta_{19} \text{PTM}_M + \beta_{20} \text{PTV}_M + \beta_{21} \text{ANS}_M + \beta_{22} \log(\text{Pop})_M + e_M \]

and averages out the time component resulting in the regression:

\[ M_{MC} = \beta_0 + \beta_1 \text{ESFCov}_M + \beta_2 \text{ESFA}_M + \beta_3 \text{M}_M + \beta_4 \text{pC}_M + \beta_5 \text{Exp}_M + \beta_6 \text{PABF}_M + \beta_7 \text{Rous}_M + \beta_8 \text{Arid}_M + \beta_9 \text{Amaz}_M + \beta_{10} \text{QuCnt}_M + \beta_{11} \text{ISCnt}_M + \beta_{12} \text{CME}_M + \beta_{13} \text{MM}_M + \beta_{14} \text{MC}_M + \beta_{15} \text{Uni}_M + \beta_{16} \text{DM}_M + \beta_{17} \text{Left}_M + \beta_{18} \text{PTC}_M + \beta_{19} \text{PTM}_M + \beta_{20} \text{PTV}_M + \beta_{21} \text{ANS}_M + \beta_{22} \log(\text{Pop})_M + (\beta_M - \beta_0 + e_M) \]

where the bars indicate average variables and signifies that time has been averaged out. The variance is calculated as in the following formula:

\[ s_B^2 = \frac{1}{N - 1} \sum_M (x_M - \bar{x})^2 \]
**Model 3:**

The negative binomial pooling model has the following formula:

\[ MM_{MC} = B_0 + B_1ESFCov_{MC} + B_2ESFAd_{MC} + B_3JM_{MC} + B_4P_{MC} + B_5PABF_{MC} + B_6Rous_{MC} + B_7Rous^2_{MC} + B_8Arid_{MC} + B_9Ama_{MC} + B_{10}QuCnt_{MC} + B_{11}ISCnt_{MC} + B_{12}CMEMC + B_{13}MMEMC + B_{14}UnMC + B_{15}DM + B_{16}Left_{MC} + B_{17}PTC_{MC} + B_{18}PTM_{MC} + B_{19}PTV_{MC} + B_{20}ANS_{MC} + B_{21}\log(\text{Pop})_{MC} + (\beta_M - \beta_0 + \epsilon_M) \]

**Model 4:**

The negative binomial pooling model has the following formula:

\[ Cub_{MC} = B_0 + B_1ESFCov_{MC} + B_2ESFAd_{MC} + B_3JM_{MC} + B_4P_{MC} + B_5PABF_{MC} + B_6Rous_{MC} + B_7Rous^2_{MC} + B_8Arid_{MC} + B_9Ama_{MC} + B_{10}QuCnt_{MC} + B_{11}ISCnt_{MC} + B_{12}CMEMC + B_{13}MMEMC + B_{14}UnMC + B_{15}DM + B_{16}Left_{MC} + B_{17}PTC_{MC} + B_{18}PTM_{MC} + B_{19}PTV_{MC} + B_{20}ANS_{MC} + B_{21}\log(\text{Pop})_{MC} + (\beta_M - \beta_0 + \epsilon_M) \]

**Mahalobonis Matching:**

**Matching Technique:**

Squared Mahalobonis distance is defined for two \( p \times 1 \) vectors \( x \) and \( y \) as

\[ D^2 = (x-y)^\top S^{-1}(x-y), \]

where \( S \) is the covariance matrix of the \( p \times p \) distribution (Rubin 1973).

Athey-Imbens Estimate (AIE) - Model of Robustness (Model Dependence):

\[ \hat{\sigma}_\theta = \sqrt{\frac{1}{K} \sum_{k=1}^{K} (\hat{\theta}_k - \hat{\theta}_B)^2} \]

in which \( K \) represents the number of covariates of the \( k \)th covariate, \( \hat{\theta}_B \) is the base-model estimate and \( \hat{\theta}_k \) represents the full set of estimates of the covariates. For more, see: Athey & Imbens (2014).

**Outcome Variable:**

- **MMpc** – Mais Médicos per capita (Doctors/Population (2013) * 100,000)
- **MM** – Mais Medicos doctors (count total)
- **Cubpc** – Cuban doctors per capita (Cuban Doctors/Population (2013) * 100,000)
- **Cub** – Cuban doctors of Mais Médicos (count total)
- **ΔESF** - Change in ESF Coverage before and after Mais Médicos (9/13 – 7/16).
Treatment variable:

Left – 1 if municipal mayor is of a leftist party, 0 if not. (All municipalities)
Left – 1 if municipal mayor is of a leftist party, 0 if not. (Without PT-led municipalities)
PTM – 1 if municipal mayor is of PT party, 0 if not. (All municipalities)
PTV.bin – 1 if percentage of PT vereadores is above mean, 0 if not. (Without PT-led municipalities)

Covariates (used for matching):

Log population (2013)
Region – categorical variable defining region of municipality: North, Northeast, South, Southeast, Center-west.
ESF Coverage (%) (2013)
PAB fixo (2012) – federal transfer per inhabitant received by municipality to meet floor on primary healthcare spending.
Extreme poverty rate (%) (2010) – defined as percentage of individuals living on less than half of monthly minimum salary.
Income per capita (2010)
ANS plans rate (2013)

Models and Formulas for Chapter 5:

Mahalobonis matching for case selection:

Universe for case selection is defined as all municipalities in which

M ≥ 250,000;
MM ≥ 25

Treatment/varying variable:

Partisan ideology of mayor (2012) – (1 – left; 0 – right)

Covariates (used for matching):

Mais Médicos rate – number of total program doctors received per capita.
Log population (2013)
Region – categorical variable defining region of municipality: North, Northeast, South, Southeast, Center-west.
ESF Coverage (%) (2013)
PAB fixo (2012) – federal transfer per inhabitant received by municipality to meet floor on primary healthcare spending.
Extreme poverty rate (%) (2010) – defined as percentage of individuals living on less than half of monthly minimum salary.

Income per capita (2010)

**Nearest neighbor analysis:**

The mean nearest neighbor distance

\[
\bar{d} = \frac{\sum_{i=1}^{N} d_i}{N} \quad [1]
\]

where N is the number of points. \(d_i\) is the nearest neighbor distance for point \(i\).

b) The expected value of the nearest neighbor distance in a random pattern

\[
E(d_i) = 0.5 \sqrt{\frac{A}{N}} + \left( 0.0514 + \frac{0.041}{\sqrt{N}} \right) \frac{B}{N} \quad [2]
\]

where \(A\) is the area and \(B\) is the length of the perimeter of the study area.

c) The variance

\[
Var(\bar{d}) = 0.070 \frac{A}{N^2} + 0.037B \sqrt{\frac{A}{N^3}} \quad [3]
\]

d) The Z statistic

\[
Z = \frac{\bar{d} - E(d_i)}{\sqrt{Var(\bar{d})}} \quad [4]
\]

**Distance Matrix:**

The minimum distance is calculated with the formula for the euclidean distance,

\[
d_{st}^2 = (x_s - x_t)(x_s - x_t)'
\]
in which the centerpoint of the area of highest density serves as Point S and health centers are Point T.

**Regression Models:**

**Unit of Analysis:**

NF - Neighborhood in Fortaleza.
NS - Neighborhood in Salvador

**Dependent Variables:**

MM - Count of Mais Médicos doctors
ΔESF - Change in number of ESF doctors (ESF doctors 2016 – ESF doctors 2013)

**Independent Variables:**

LogPop – Log of total population (2010)
Lit - Literacy rate (2010)
Preg - Rate of pregnant women in 10-17 age range (2010)
Age - Aging rate (2010)
EP.Cen – Interaction variable – Extreme poverty rate * Number of health centers

**Econometric Models:**

**Model 1:**

ΔESF_{NF} = B_0 + EP_{NF} B_1 + \text{LogPop}_{NF} B_2 + Lit_{NF} B_3 + Preg_{NF} B_4 + Age_{NF} B_5

**Model 2:**

ΔESF_{NS} = B_0 + EP_{NS} B_1 + \text{LogPop}_{NS} B_2 + Lit_{NS} B_3 + Preg_{NS} B_4 + Age_{NS} B_5

**Model 3:**

MM_{NF} = B_0 + EP_{NF} B_1 + \text{LogPop}_{NF} B_2 + Lit_{NF} B_3 + Preg_{NF} B_4 + Age_{NF} B_5

**Model 4:**

MM_{NS} = B_0 + EP_{NS} B_1 + \text{LogPop}_{NS} B_2 + Lit_{NS} B_3 + Preg_{NS} B_4 + Age_{NS} B_5
Model 5:

$$MM_{NF} = B_0 + EP_{NF}B_1 + \text{LogPop}_{NF}B_2 + \text{Lit}_{NF}B_3 + \text{Preg}_{NF}B_4 + \text{Age}_{NF}B_5 + \text{EP.Cen}_{NF}B_6$$

Model 6:

$$MM_{NS} = B_0 + EP_{NS}B_1 + \text{LogPop}_{NS}B_2 + \text{Lit}_{NS}B_3 + \text{Preg}_{NS}B_4 + \text{Age}_{NS}B_5 + \text{EP.Cen}_{NS}B_6$$
This section provides a more in-depth look at the statistical matching approaches utilized in Chapter 4. As there are several ways in which to estimate causal effects with matching methods, I provide these estimates along with visual aides to accompany the results highlighted in the thesis.

The matching results of Chapter 4 utilized optimal matching with replacement and utilized 100% of the proportion estimated. I justify utilizing 100% of the estimated for three reasons: 1. the average mahalbonis distance remains low for these estimates, thereby suggesting a good level of balance with even with matched pairs of the highest mahalobonis distance, 2. the Athey-Imbens Estimate of model dependence (measure of variance of the results) is lower for higher levels of N and, 3. the lack of variance of the results for lower proportions of the points estimated. Nevertheless, in order to avoid issues of selection bias of the researcher in choosing how many matches to remove, below I provide the results at proportion estimates of the 50%, 20%, and 10% levels. I include the Athey-Imbens Estimate (AIE) for each estimate as well. For the PT Mayor and PT Councilmen of the +25,000 inhabitants matching processes, I provide visual aides of the matching frontier, pruned means, and estimated effects with the number of observations pruned on the X-axis.
### Estimated Effects with Mahalobonis Matching

**Table 17: Average Treatment Effect from Statistical Matching Models – 50% Proportion Estimated.**

<table>
<thead>
<tr>
<th></th>
<th>Doctors per capita FSATT</th>
<th>Cuban doctors per capita FSATT</th>
<th>Doctors FSATT</th>
<th>Cuban doctors FSATT</th>
<th>Change in ESF Coverage (%)</th>
<th>Change in ESF Coverage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
</tr>
<tr>
<td>PT Mayor</td>
<td>2.94</td>
<td>1.64</td>
<td>.46</td>
<td>.40</td>
<td>4.72%</td>
<td>2.71%</td>
</tr>
<tr>
<td>(all municipalities)</td>
<td>AIE = .14</td>
<td>AIE = .13</td>
<td>AIE = .01</td>
<td>AIE = .02</td>
<td>AIE = .35</td>
<td>AIE = .27</td>
</tr>
<tr>
<td>N = 605 – T = 143</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 1920 – T = 324</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>1.55</td>
<td>.83</td>
<td>.27</td>
<td>.25</td>
<td>1.37%</td>
<td>1.29%</td>
</tr>
<tr>
<td>(all municipalities)</td>
<td>AIE = .05</td>
<td>AIE = .05</td>
<td>AIE = .01</td>
<td>AIE = .01</td>
<td>AIE = .08</td>
<td>AIE = .21</td>
</tr>
<tr>
<td>N = 554 – T = 223</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 1767 – T = 625</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>.08</td>
<td>.20</td>
<td>.13</td>
<td>.14</td>
<td>.02%</td>
<td>1.15%</td>
</tr>
<tr>
<td>(without PT municipalities)</td>
<td>AIE = .19</td>
<td>AIE = .12</td>
<td>AIE = .02</td>
<td>AIE = .01</td>
<td>AIE = .29</td>
<td>AIE = .25</td>
</tr>
<tr>
<td>N = 498 – T = 175</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 1649 – T = 447</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT Vereadores (binary)</td>
<td>1.54</td>
<td>1.5</td>
<td>.07</td>
<td>.02</td>
<td>0.52%</td>
<td>0.23%</td>
</tr>
<tr>
<td>(without PT-led municipalities)</td>
<td>AIE = .11</td>
<td>AIE = .07</td>
<td>AIE = .01</td>
<td>AIE = .01</td>
<td>AIE = .2</td>
<td>AIE = .04</td>
</tr>
<tr>
<td>N = 471 – T = 234</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 1497 – T = 692</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Own elaboration. Data from TSE, IBGE, DATASUS, and Ministry of Health.
Table 18: Average Treatment Effect from Statistical Matching Models – 20% Proportion Estimated.

<table>
<thead>
<tr>
<th></th>
<th>Doctors per capita FSATT</th>
<th>Cuban doctors per capita FSATT</th>
<th>Doctors FSATT</th>
<th>Cuban doctors FSATT</th>
<th>Change in ESF Coverage (%) FSATT</th>
<th>Change in ESF Coverage (%) FSATT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT Mayor</td>
<td>2.93</td>
<td>1.58</td>
<td>.47</td>
<td>.40</td>
<td>4.70%</td>
<td>2.90%</td>
</tr>
<tr>
<td>(all municipalities)</td>
<td>AIE = .59</td>
<td>AIE = .24</td>
<td>AIE = .02</td>
<td>AIE = .02</td>
<td>AIE = .34</td>
<td>AIE = .09</td>
</tr>
<tr>
<td>N = 242 – T = 74</td>
<td>N = 768 – T = 208</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>1.62</td>
<td>.94</td>
<td>.26</td>
<td>.25</td>
<td>1.41%</td>
<td>1.28%</td>
</tr>
<tr>
<td>(all municipalities)</td>
<td>AIE = .17</td>
<td>AIE = .14</td>
<td>AIE = .01</td>
<td>AIE = .01</td>
<td>AIE = .13</td>
<td>AIE = .06</td>
</tr>
<tr>
<td>N = 221 – T = 100</td>
<td>N = 707 – T = 290</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>.08</td>
<td>.26</td>
<td>.13</td>
<td>.14</td>
<td>-.02%</td>
<td>1.19%</td>
</tr>
<tr>
<td>(without PT)</td>
<td>AIE = NA</td>
<td>AIE = NA</td>
<td>AIE = .02</td>
<td>AIE = .01</td>
<td>AIE = NA</td>
<td>AIE = .05</td>
</tr>
<tr>
<td>N = 199 – T = 106</td>
<td>N = 660 – T = 235</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT Vereadores (binary)</td>
<td>1.56</td>
<td>1.5</td>
<td>.07</td>
<td>.02</td>
<td>0.49%</td>
<td>0.24%</td>
</tr>
<tr>
<td>(without PT-led municipalities)</td>
<td>AIE = .11</td>
<td>AIE = .13</td>
<td>AIE = .01</td>
<td>AIE = .02</td>
<td>AIE = .16</td>
<td>AIE = .04</td>
</tr>
<tr>
<td>N = 188 – T = 94</td>
<td>N = 597 – T = 276</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Own elaboration. Data from TSE, IBGE, DATASUS, and Ministry of Health.
Table 19: Average Treatment Effect from Statistical Matching Models – 10% Proportion Estimated.

<table>
<thead>
<tr>
<th></th>
<th>Doctors per capita FSATT</th>
<th>Cuban doctors per capita FSATT</th>
<th>Doctors per capita FSATT</th>
<th>Cuban doctors per capita FSATT</th>
<th>Change in ESF Coverage (%) FSATT</th>
<th>Change in ESF Coverage (%) FSATT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT Mayor</td>
<td>(1) 2.99</td>
<td>(2) 1.67</td>
<td>(3) .47</td>
<td>(4) .40</td>
<td>(5) 4.74%</td>
<td>(6) 2.77%</td>
</tr>
<tr>
<td>(all municipalities)</td>
<td></td>
<td>AIE = .15</td>
<td>AIE = .24</td>
<td>AIE = NA</td>
<td>AIE = NA</td>
<td>AIE = NA</td>
</tr>
<tr>
<td>N = 121 – T = 44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 384 – T = 131</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>(1) 1.68</td>
<td>(2) 1.01</td>
<td>(3) .27</td>
<td>(4) .25</td>
<td>(5) 1.38%</td>
<td>(6) 1.28%</td>
</tr>
<tr>
<td>(all municipalities)</td>
<td></td>
<td>AIE = .27</td>
<td>AIE = .14</td>
<td>AIE = NA</td>
<td>AIE = .01</td>
<td>AIE = .33</td>
</tr>
<tr>
<td>N= 111 – T = 54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 353 – T = 159</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>(1) .27</td>
<td>(2) .24</td>
<td>(3) .13</td>
<td>(4) .14</td>
<td>(5) -.02%</td>
<td>(6) 1.18%</td>
</tr>
<tr>
<td>(without PT municipalities)</td>
<td></td>
<td>AIE = NA</td>
<td>AIE = NA</td>
<td>AIE = NA</td>
<td>AIE = NA</td>
<td>AIE = NA</td>
</tr>
<tr>
<td>N = 100 – T = 46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 330 – T = 139</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT Vereadores</td>
<td>(1) 1.58</td>
<td>(2) 1.48</td>
<td>(3) .07</td>
<td>(4) .02</td>
<td>(5) 0.43%</td>
<td>(6) 0.21%</td>
</tr>
<tr>
<td>(binary)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(without PT-led municipalities)</td>
<td></td>
<td>AIE = .52</td>
<td>AIE = .33</td>
<td>AIE = .02</td>
<td>AIE = .02</td>
<td>AIE = .64</td>
</tr>
<tr>
<td>N = 94 – T = 45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 299 – T = 140</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Own elaboration. Data from TSE, IBGE, DATASUS, and Ministry of Health.
PT Mayor +25,000 Inhabitants:

Figure 16: Average Mahalanobis Distance of Sample
Figure 17: Pruned Means.
Figure 18: Estimated Effects
High Level of PT Councilmen (0 – no, 1 – yes), +25,000 Inhabitants:

Figure 19: Average Mahalobonis Distance of Sample
Figure 20: Pruned Means
Figure 21: Estimated Effects
BIBLIOGRAPHY


Washington, DC: The International Bank for Reconstruction and Development/The World Bank, pp. 179–194. Available at:


Carlismo e as sucessivas estratégias de adaptação da elite política baiana,
Couttolenc, B., Lindelow, M. & Gragnolati, M., 2013. Twenty Years of Health System Reform in Brazil World Bank, ed., Washington, DC: License: Creative Commons
Attribution CC BY 3.0. Available at:


Donaghy, M.M., 2013. *Civil society and participatory governance: municipal councils and social housing programs in Brazil*, Routledge. Available at:
https://catalog.library.georgetown.edu/record=b4761306~S4 [Accessed September 1, 2017].


http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1414-


Brasileira de Ciências Sociais, 19(54), pp.23–40. Available at:


Leal, V.N., 1977. Coronelismo: the municipality and representative government in Brazil, Cambridge, UK: Cambridge University Press. Available at:

http://dx.doi.org/10.7476/9788575413678.

Lindert, K. et al., 2007. The Nuts and Bolts of Brazil’s Bolsa Familia Program: Implementing Conditional Cash Transfers in a Decentralized Context, Washington, DC.


University Press. Available at:


http://www.worldcat.org/title/coligacoes-partidarias-na-nova-democracia-brasileira-


Pereira Duarte, A.L., 2015. O Programa Mais Médicos. Available at:
http://deduarte.jusbrasil.com.br/artigos/150960917/o-programa-mais-medicos
[Accessed January 22, 2016].


Wadge, Hester Bhatti, Yasser Carter, Alexander Harris, Matthew Parston, Greg Darzi, A., 2016. Brazil’s Family Health Strategy: Using Community Health Care Workers to Provide Primary Care,