Working Paper | 494 Outubro de 2018

FGV | SAO PAULO SCHOOL OF ECONOMICS

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Assessing the impact of More Doctors Program on health care indicators

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August 17th, 2018

Abstract

This paper aims to assess the short run effects of the More Doctors Program, launched by the Brazilian federal government in 2013. Using differences-in-differences approach with municipal data collected between 2010 and 2015, we confirm that MDP has two correlated impacts. First, it has increased health service attendance on treated municipalities. We document that appointments, consults, referrals, and home visits have increased by 5.9%, 9.4%, 12.3%, and 29.7%. Second, we find a negative impact on hospitalization. We argue that intensification on health service access have reduced general hospitalization (4.6%). However, it does not seem to have been able to reduce mortality in the municipalities, in line with Carrilo and Feres (2018) and Fontes *et al.* (2017). We argue that increase in referrals and appointment with specialists can be interpreted as quality improvement, since a more precise diagnostic, can reduce hospitalization due to faster health recovery without an impact on mortality.

Key words: policy evaluation, "Mais Médicos" Program, More Doctors Program, physicians supply, differences-in-differences, propensity score matching, econometrics, basic health care, mortality, morbidity.

JEL Codes: C13, H43, I18.

1 INTRODUCTION

This paper investigates the direct impacts of Brazil's More Doctor Program (MDP) on health outcomes. The MDP program was created in 2013 by the Brazilian Ministry of Health with the objective of improving access to health care for users of the Unified Healthcare System (SUS in Portuguese) in regions with physician shortages[3]. In particular, MDP targets the provision of basic health care through the supply of physician directly prevailing at the local level. Moreover, distant-from-state-capital municipalities face the additional difficulty of allocating

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[3] Currently, more than 75% of the Brazilian population is exclusively dependent on the Brazilian public health system, which requires a robust structure in order to serve this entire population. According to data from June 2017 of the National Agency of Supplementary Health (ANS, by its acronym in Portuguese). Available at: <http://www.ans.gov.br/anstabnet/>. Access in 01/22/2018.

and retaining healthcare professionals in areas of greater economic and social vulnerability. In this context, MDP reinforces the shift from a centralized model structured around public hospitals in main urban areas to a decentralized one that aims to correct municipalities' supply of physicians to support local residents. On the other hand, as the federal government centralizes the supply of physicians to the most needed municipalities and provides the resources allocated for paying these professionals, it keeps some control over the municipalities' incentives for the use of those resources otherwise.

This type of intervention can be extremely relevant in developing countries where small municipalities, away from large urban centers or in isolated regions, with low income and employment opportunities, usually cannot attract healthcare professionals. Training and retention of healthcare professionals in regions of greater economic and social vulnerability is not solely a Brazilian problem. Furthermore, local governments may face budget struggle and designate previously oriented health funds to other municipal necessities. This implies that municipalities can have lower incentive to allocate funds to improve health teams swelling the pressure on more traditional public health providers such as public hospitals. MDP not only urgently provides physicians to SUS priority regions, but also invests on construction, renovation, and expansion of Basic Healthcare Units (UBS in Portuguese) and incentives for the training of new professionals focused on basic healthcare.

MDP is not the first program designed to increase health care access in Brazil. Community Health Agents Program (1991) and the Family Health Program (1994) were also planned with that goal. These programs provided professional healthcare teams at the community level. Each team is responsible for a predetermined number of families, located at a specific geographic area. The literature on community-based intervention have been identified to improve health education and reducing mortality (Riley, 2005, Soares and Rocha, 2010) and indicates a notable advance in SUS coverage by ensuring the inclusion of a large number of poor families in the primary care assistance network (Macinko, Guanais, and Cimões, 2008, Rocha and Soares, 2010).

Programs of incentive and attraction of health professionals have still presented heterogeneous results so far (OECD, 2008). The first studies that

evaluates MDP in Brazil focused on its coverage and equity (Girardi *et al.*, 2016; de Sousa Lima *et al.*, 2016; Oliveira, Sanchez and Santos, 2016). Next, Bento da Silva *et al.* (2016) and Santos *et al.* (2017) analyzed the subjective satisfaction with the Program and the potential lessen of hospitalizations before and after MDP, respectively[4]. The next two papers are more related to ours since they put emphasis on a robust quantitative analysis of the Program. Carrillo and Feres (2018) focus on the impact of the MDP on child health and Fontes *et al.* (2017) evaluated the Program in terms of hospitalization for ambulatory care sensitive conditions.

This paper is mostly related to an unconclusive literature linking provider supply and healthcare utilization. While Fuchs (1978), Wilensky and Rossiter (1983), Cromwell and Mitchell (1986), Busato and Kunzi (2008) found positive effects of physician on utilization rates, Carlsen and Grytten (1998) and Grytten and Sorensen (2001) found no evidence that greater physician supply is associated with more primary care visits.

Our paper contributes to this literature by investigating not only the quantitative impact on consults and general attendance by age groups. We also investigate whether users are referred/appointed to specialists taking additional clinical exams. This can be interpreted as an evaluation on the quality of the Program, different from previous papers. By having appointed to correct specialists and diagnostic, users can face a reduction on hospitalization due to faster health recovery.

In Brazil, about 54% of the population lives in municipalities with less than 200,000 inhabitants and almost one-third of the population live in inland municipalities, where SUS dependency is even larger (about 80% of the population does not have health insurance). The ratio of doctors per household in those places is below to the national average[5]. The physicians enrolled in the Program receive a grant-aid provided by the federal government and, in some

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[4] Other papers on that issue are Vieira *et al.* (2017), Kemper, Mendonça and Sousa (2016), Silva *et al.* (2016a), Comes *et al.* (2016a), Comes *et al.* (2016b), Gonçalves *et al.* (2016), Mendonça, Diercks and Kopittke (2016), Lima *et al.* (2016), Oliveira, Sanchez and Santos (2016), Silva (2016b), Carvalho, Marques and Silva (2016), Oliveira *et al.* (2015) and Soares Neto, Machado and Alves (2016).

[5] According to data from CNES/MS for 2015.

cases, housing and food aid by the local government. According to statistics from the Ministry of Health (MS)[6], the MDP has 18,240 positions in 4,058 municipalities and Indigenous Special Sanitary Districts (DSEI in Portuguese) throughout the country, with an estimated attended population of 63 million people in 2017.

Using differences-in-differences approach with municipal data collected between 2010 and 2015, we confirm that MDP has two correlated impacts. First, it has increased health service attendance on treated municipalities. We document that appointments, consults, referrals, and home visits have increased by 5.9%, 9.4%, 12.3%, and 29.7%. Second, we find a negative impact on hospitalization. We argue that intensification on health service access have reduced general hospitalization (4.6%). However, it does not seem to have been able to reduce mortality in the municipalities. Noteworthy, our results on infant mortality are in line with of Carrilo and Feres (2017) and Fontes *et al.* (2017). However, in contrast we shed a light on the effects on indicators that capture quality improvement such as referrals as well as the consequence of that treatment on hospitalization in other diseases groups.

We claim to have some evidence that support our identification strategy, which is that there is no trend differential in unobservable correlated with MDP's implementation. We consider different specifications to show that treated and untreated areas have similar trends in all the outcomes of interest before policy adoption. We also control for region-specific time trends and for linear trends interacted with a wide range of pretreatment characteristics. Last, we find that policy adoption is not correlated with health status of those municipalities which could cast doubt on the possibility that changes in the composition of the population influence our results.

This paper is divided into five sections, including this brief introduction. Section 2 presents the background of the More Doctors Program. Section 3 presents the data and the variables used in the econometric models and describes the methodology framework. Section 4 presents the results and section 5 summarizes the main conclusions.

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[6] Available at <http://maismedicos.gov.br/conheca-programa>. Access in 01/22/2018.

2 THE MORE DOCTORS PROGRAM BACKGROUND

The National Policy of Basic Attention (PNAB in Portuguese) has elaborated the MDP focusing on the organization of basic health care in the Brazilian public system within the Unified Healthcare System (SUS), one of the largest public health market in the world.

In addition to assigning to the public system the responsibility for providing universal access to healthcare in Brazil, article 196 of the Federal Constitution of 1988 reads for a unified, decentralized system with attributions defined by each sphere of government, and integral care focused on prevention. In the 1990s, significant investments were made to expand access to healthcare in Brazil, especially changes related to basic care (Machado, 2007). At that time, policies such as the Family Health Program (PSF), which began in 1994, emerged as an important milestone in the health care model in Brazil.

Throughout 2000s, the Family Health Strategy (ESF, former PSF in Portuguese) has consolidated itself as a program focused on the organization of primary care, which is fundamental in regions with greater socioeconomic inequalities. The design of the minimum staff, proposed by the PNAB, should assure physician, nurse, nursing assistant, and community health agents (ACS in Potuguese) to the localities benefited by the program (Soares and Rocha, 2010).

Despite the evolution of basic healthcare organization and the expansion of the ESF, the shortage of professionals in certain regions has become more latent recently. Such scarcity is suggested in Scheffer *et al.* (2015) that points the great disparity in the distribution of these professionals in the Brazilian territory.

Large cities, with more than 500,000 inhabitants, concentrate 30% of the population and 60% of all Brazilian physicians (Scheffer *et al.*, 2015). The mismatch that exists in the distribution of these professionals is especially significant in the North and Northeast regions and in comparison between capitals and interior cities.

In addition, Brazil, in 2015, presents 2.1 doctors per thousand inhabitants, below the average of OECD countries (3.0 doctors per thousand inhabitants,

OECD, 2008). Brazil's neighboring countries, such as Argentina and Uruguay, have 3.9 and 3.7 physicians per thousand inhabitants, respectively[7].

In this context, the MDP emerges. Converted into Law No. 12,871, in October 2013, one of the main objectives of the program is to reduce de shortage of physicians in the SUS' priority areas and strengthen the provision of basic healthcare services.

The program is structured in three main axes: (i) investments in the infrastructure of the Basic Health Units (UBS), (ii) expansion of medical courses and vacancies, and (iii) implementation of the More Doctors for Brazil Program, which supports the immediate provision of professionals in priority areas. The goal of the program in this last axis is to reach a level of 2.7 physicians per thousand inhabitants by 2026.

Eligibility for the Program depends on the criteria established by the Ministry of Health to define the priority regions for the SUS[8]. From these criteria, municipalities eligible for the MDP can be classified into six main profiles (CONASS, 2013): (i) P1 area – 40% of the census tracts with the largest percentages of the population in extreme poverty of the capitals; (ii) P2 area – 40% of the census tracts with the largest percentage of the population living in extreme poverty of the municipalities located in the metropolitan region; (iii) P3 area – 40% of the census tracts with the largest percentages of population in extreme poverty of the municipalities with more than 80,000 inhabitants, with the lowest levels of public revenue per capita and high social vulnerability; (iv) P4 area – municipalities with 20% or more of the population living in extreme poverty; (v) P5 area – municipality that is located in the Special Indigenous Sanitary

[7] According to report of the Ministry of Health on the two years of the More Doctors Program (Brazil, 2015).

[8] Ordinance No. 1,377, dated June 13, 2011, establishes the criteria for defining priority areas and regions with deficiency and difficulty of retention of physicians, based on a model that takes into account the following indicators: (i) Gross Domestic Product (GDP) per capita; (ii) population without health insurance coverage; (iii) percentage of the population living in the rural area; (iv) percentage of the population living in extreme poverty; (v) percentage of the population that is beneficiary of the "Bolsa Família" Program; (vii) percentage of hours worked by physicians in the area of Primary Care for each thousand inhabitants; (vii) percentage of beds for each thousand inhabitants; and (viii) turnover indicator defined as a function of the number of hiring, termination of employment relationship, and number of incomplete Family Health staff, according to the data extracted from SUS information systems.

District (DSEI); and (vi) P6 area – 40% of the census tracts with the largest percentages of the population in extreme poverty of the other municipalities.

The municipalities must express their interest in participating in the Program, celebrating a term of adhesion and commitment. Eligible municipalities are published in public notices for each cycle of adherence and renewal published by the Ministry of Health[9]. Table 1 shows the distribution of municipalities according to these profiles and their adherence to the MDP until 2015. Although the overall membership rate is high, the rate between smaller municipalities and the main target of the Program is still low compared to other profiles – 81.6% among the extremely poor municipalities and 66.4% among the other localities, which encompasses smaller municipalities.

Table 1. Distribution of municipalities eligible for MDP according to the profile and percentage of adherence

Profile	Total of municipalities	Participating municipalities	Participation (%)
Capital	27	27	100.00%
Metropolitan region	509	441	86.64%
G100	98	93	94.90%
20% of extreme poverty	1,708	1,393	81.56%
DSEI*	34	34	100.00%
Other localities	3,228	2,144	66.42%
Brazil	5,604	4,132	73.73%

Notes: (1) There are 34 DSEI in Brazil. (2) Total values represent Brazilian municipalities plus DSEI.
Source: DEPREPS/SGTES/MS, in Brazil (2015).

The MDP also encompasses the registration of medical professionals interested in participating in the Program[10] through the same system. The performance of enrolled physicians is conditioned to the exclusive performance in basic healthcare of the adhered municipalities (priority areas defined by the Program), and the participation lasts for three years, extendable for another year.

For those physicians with training abroad, they must undergo a preparatory course that involves contents about the Unified Health System (SUS) and Brazilian legislation, sociodemographic and epidemiological realities of the country, Portuguese language classes and rules of operation and work in the

[9] Available at <http://maismedicos.gov.br/editais/editais-abertos-anteriores>. Access in 01/22/2018.
[10] Particularly in the case of Cuban physicians, there is no registration through the site, and the entry of these professionals is regulated by a Term of Reference signed between the Cuban and Brazilian governments.

Basic Unit of Health (UBS) and other public health institutions[11]. The Ministry of Health system consolidates the participating municipalities and professionals, sending the medical contingent to the registered priority areas, with acceptance from both sides for hiring.

The legislation that regulates the MDP also concerns the form of remuneration for hired doctors. Physicians hired through the MDP have their remuneration funded by federal resources – the scholarship-training is about R$ 10,000 net monthly, according to the website of the Ministry of Health[12].

Municipalities have autonomy to manage their healthcare services. In other words, MDP is an alternative resort for municipalities, especially in the countryside, that have difficulty in contracting for lack of resources and/or low attractiveness of physicians. Thus, while the federal government provides resources for the remuneration of medical professionals, the municipality is responsible for defraying the housing and meals of these professionals.

Last, although the MDP has axes focused on the training of medical professionals and infrastructure improvements in basic healthcare facilities in municipalities, this study focus only on the axis of emergency provision of professionals.

3 DATA AND EMPIRICAL STRATEGY

3.1 Data

We collect data mostly from Ministry of Health. Other sources, such as IBGE, Finances of Brazil (FINBRA/STN), Annual Social Information Relation (RAIS/MTE) and National Institute for Educational Studies and Research “Anísio Teixeira” (INEP/MEC) are also used. Information on the adhesion of municipalities to the MDP was obtained from the Secretariat of Labor Management and Health Education (SGTES/MS) through a specific request. A complete description of the variables employed, sources and periodicity can be found in the appendix of this paper.

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[11] The legislation allows international physicians to execute health services without revalidation of the diploma. That has generated a lot of repercussion and discussions between the idealizers of the program and class entities, as well as between civil societies as a whole. See Ordinance 1,369, of July 8, 2013, which defines the obligations of all physicians enrolled in the program.

[12] Available at <http://maismedicos.gov.br/perguntas-frequentes-de-gestores>. Access in 01/22/2018.

We focus our analysis on municipalities up to 500,000 inhabitants due two main reasons. One of the objectives of the MDP is to provide professionals in remote, low-income regions with high economic and social vulnerability, whose incentive for medical migration is lower than in the richest and central regions of the country. The second reason is statistical: localities with more than 500,000 inhabitants have very different health indices in relation to other municipalities of the sample and many of them do not have a correspondent control group, making it difficult to associate with correspondent treated ones. Again, the limitation to this data sample allows us a more appropriate assessment of the effects of the Program on treated municipalities. Our sample constitutes of 2,940 municipalities for the period of 2010 to 2015. Out of those, we have 2,210 treated municipalities and the rest is our control group.

This means that although there may be medical shortages in large cities to serve the population, these locations are more attractive than smaller municipalities and regions of the interior of Brazil. This limitation of sample focuses on the analysis of the effects of MDP on localities that are the main target of the policy[13].

The variables used have a biannual or annual frequency and we present at the municipal level, from 2010 to 2015 in Table 2 below[14]. Our variables of interest can be classified in three different sets:

- Basic service statistics: appointments (total, childcare, prenatal, preventive, and STD/AIDS), consults (total, infant, adults, and elderly), referrals (total, special attendance, hospitalization, emergency, and home hospitalization), examinations (total and obstetrical ultrasonography), and home visits;
- Morbidity statistics: hospitalization of children under 5 years (total, for pneumonia, and for dehydration) and hospitalization (total, for pregnancy,

[13] In Appendix, Table A2, we provide descriptive statistics of the variables used in the econometric models developed in the following section in natural logarithm form (log). All variables are a proportion of the population and are used in log form in the models.

[14] The results are similar if one considers monthly or bimonthly data. However, with those interval, we would have to take care of the amount of no procedures (zeros) for the outcome variables. Last, most data were unavailable after 2016, so we decide to consider data 2015 which leaves us with (close) three years before and after treatment.

childbirth and puerperium diseases, for infectious and parasitic diseases, and for respiratory diseases);

- Mortality statistics: general mortality, infant mortality (total, for infectious and parasitic diseases, and for respiratory diseases), elderly mortality, maternal mortality, preventable causes (of children under 5 years of age and of people above 5 years of age), and live births rate.

The variables that indicate the treatment (participation of the municipality in the MDP) are: month of adhesion, i.e., month of adhesion in which the municipality decided to join the Program; and month of unsubscribe to the MDP, month in which the municipality requested the removal of the Program.

Table 2. Descriptive statistics (level): before and after

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Dependent variables						
Appointments	404.9	1,724	413.5	1,647	393.8	1,819
Childcare	63.40	533.5	64.31	408.1	62.21	662.1
Prenatal	33.91	140.8	33.84	143.7	33.99	136.8
Preventive	29.91	147.5	30.28	51.68	29.43	215.9
STD/AIDS	8.979	378.9	10.05	466.8	7.583	216.3
Physician Consults	654.8	3,502	642.6	3,436	670.7	3,586
Under 1 year of age	14.79	32.33	15.09	15.72	14.39	45.65
Adults (15 to 59 years of age)	352.5	2,015	354.8	1,940	349.6	2,109
Elderly (above 60 years of age)	179.4	1,834	159.1	1,637	205.7	2,062
Referrals	54.66	595.4	51.07	217.2	59.33	868.8
Special attendance	39.63	205.2	38.23	189.0	41.46	224.6
Hospitalization	4.854	142.0	4.354	10.25	5.504	215.2
Emergency	8.265	144.2	7.280	25.24	9.546	216.9
Home hospitalization	2.782	170.9	2.031	96.18	3.758	234.9
Exams	342.8	2,443	302.9	1,357	394.7	3,367
Obstetrical ultrasonography	10.81	168.0	10.38	118.3	11.38	216.3
Home visits	22.25	44.56	22.35	41.87	22.13	47.83
Hospitalization - Under 5 years old	11.65	1,039	4.334	7.614	21.17	1,576
Pneumonia	10.62	1,039	3.090	5.536	20.43	1,576
Dehydration	1.664	3.324	1.825	3.809	1.454	2.542
Hospitalization	18.96	21.77	19.63	21.53	18.09	22.04
Pregnancy, childbirth and puerperium	3.687	4.606	3.822	4.599	3.510	4.608
Infectious and parasitic diseases	2.698	3.699	2.875	3.856	2.467	3.471
Respiratory diseases	3.893	4.527	4.117	4.610	3.602	4.400
Infant mortality	16.44	54.32	14.92	36.69	18.42	70.95
Infectious and parasitic diseases	1.563	7.195	1.521	5.096	1.618	9.238
Respiratory diseases	1.610	6.322	1.549	3.468	1.691	8.738
General mortality	3.082	0.919	3.016	0.911	3.167	0.924
Elderly mortality	16.70	4.715	16.79	4.832	16.57	4.556
Maternal mortality	1.546	4.824	1.448	2.795	1.674	6.586
Preventable causes mortality (above 5 years of age)	1.248	0.742	1.286	0.762	1.198	0.712
Preventable causes mortality (under 5 years of age)	1.143	0.818	1.164	0.845	1.116	0.781
Live births	483.9	139.0	488.7	102.1	477.7	175.7
Explanatory variables						
SUS physicians	1.960	1.527	1.941	1.495	1.985	1.567

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
SUS physician, except MDP physicians, in AB	1.422	0.900	1.422	0.883	1.421	0.922
SUS nursing staff	2.092	1.124	1.909	0.983	2.330	1.246
SUS health professionals	5.487	2.873	5.219	2.704	5.837	3.043
Water coverage	0.673	0.224	0.658	0.221	0.694	0.225
Teachers per capita	0.0129	0.00296	0.0127	0.00287	0.0130	0.00307
Health facilities	0.00165	0.000924	0.00155	0.000884	0.00178	0.000958
Total expenditure per capita	2,896	2,330	2,800	2,852	3,022	1,373
Health expenditure per capita	664.2	513.0	621.1	616.5	720.3	324.8
Education expenditure per capita	834.8	735.4	800.2	936.2	879.8	316.1
Population	30,294	54,177	30,527	54,061	29,990	54,328
Child population	4,831	8,403	5,014	8,604	4,592	8,127
Elderly population	3,338	6,012	3,233	5,746	3,476	6,339
Women population	15,193	27,634	15,306	27,570	15,046	27,717
Expecting mothers	108.6	163.0	113.6	163.9	102.2	161.6
Gini index	0.795	0.0444	0.797	0.0443	0.792	0.0443
Perc. black and brown	0.505	0.233	0.506	0.233	0.503	0.233
Perc. indigenous	0.00487	0.0311	0.00494	0.0314	0.00479	0.0308
People in rural area	0.335	0.204	0.336	0.204	0.334	0.203
Literacy rate	0.859	0.0852	0.859	0.0855	0.860	0.0848
Area	1,212	3,983	1,231	4,040	1,188	3,907
Altitude	440.1	292.2	438.2	292.7	442.5	291.6
Distance to the state capital	251.9	156.1	251.6	156.2	252.3	156.0
Temperature	22.57	2.969	22.58	2.971	22.55	2.967
Rainfall	113.8	33.53	113.7	33.75	113.9	33.25
Legal Amazon	0.0922	0.289	0.0926	0.290	0.0916	0.288
Semi-Arid Zone	0.211	0.408	0.214	0.410	0.207	0.405
Border Zone	0.0167	0.128	0.0174	0.131	0.0157	0.124
Inicial condition	0.144	0.182	0.123	0.152	0.172	0.211
GDP per capita	21.08	20.19	20.46	20.01	21.90	20.39

Source: Prepared by the author.

Table 3. Descriptive statistics (level): treated and control groups

Variable	Total		Control		Treatment	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Dependent variables						
Appointments	404.9	1,724	473.3	1,532	382.4	1,782
Childcare	63.40	533.5	73.02	847.5	60.22	375.9
Prenatal	33.91	140.8	33.07	145.9	34.19	139.0
Preventive	29.91	147.5	32.39	23.08	29.09	169.6
STD/AIDS	8.979	378.9	6.753	30.64	9.715	436.7
Consultation	654.8	3,502	768.0	2,227	617.4	3,830
Under 1 year of age	14.79	32.33	16.80	16.38	14.12	36.05
Adults (15 to 59 years of age)	352.5	2,015	413.3	919.1	332.4	2,263
Elderly (above 60 years of age)	179.4	1,834	215.0	1,895	167.6	1,814
Referrals	54.66	595.4	67.59	87.13	50.39	684.9
Special attendance	39.63	205.2	51.84	70.43	35.60	233.1
Hospitalization	4.854	142.0	5.729	11.26	4.565	163.7
Emergency	8.265	144.2	9.323	29.80	7.915	165.4
Home hospitalization	2.782	170.9	1.699	6.707	3.139	197.1
Examinations	342.8	2,443	449.2	3,610	307.7	1,905
Obstetrical ultrasonography	10.81	168.0	9.980	10.75	11.09	193.7
Home visits	22.25	44.56	26.96	55.92	20.70	39.99
Hospitalization - Under 5 years old	11.65	1,039	4.119	7.859	14.14	1,198
Pneumonia	10.62	1,039	3.099	6.193	13.10	1,198
Dehydration	1.664	3.324	1.771	3.752	1.629	3.169
Hospitalization	18.96	21.77	14.90	21.16	20.30	21.80

Variable	Total		Control		Treatment	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Pregnancy, childbirth and puerperium	3.687	4.606	2.769	4.167	3.990	4.703
Infectious and parasitic diseases	2.698	3.699	2.360	3.531	2.809	3.746
Respiratory diseases	3.893	4.527	3.399	4.267	4.056	4.598
Infant mortality	16.44	54.32	12.82	29.82	17.64	60.21
Infectious and parasitic diseases	1.563	7.195	1.561	12.61	1.564	4.039
Respiratory diseases	1.610	6.322	1.445	3.251	1.665	7.048
General mortality	3.082	0.919	3.220	1.003	3.036	0.885
Elderly mortality	16.70	4.715	16.59	5.283	16.73	4.512
Maternal mortality	1.546	4.824	1.519	6.599	1.555	4.071
Preventable causes mortality (above 5 years of age)	1.248	0.742	1.140	0.658	1.283	0.765
Preventable causes mortality (under 5 years of age)	1.143	0.818	1.119	0.685	1.151	0.858
Live births	483.9	139.0	484.1	148.3	483.8	135.8
Explanatory variables						
SUS physicians	1.960	1.527	1.970	1.350	1.957	1.580
SUS physician, except MDP physicians, in AB	1.422	0.900	1.531	0.889	1.386	0.901
SUS nursing staff	2.092	1.124	2.231	1.162	2.046	1.108
SUS health professionals	5.487	2.873	5.982	2.789	5.324	2.882
Water coverage	0.673	0.224	0.704	0.201	0.664	0.230
Teachers per capita	0.0129	0.00296	0.0131	0.00307	0.0128	0.00292
Health facilities	0.00165	0.000924	0.00177	0.000908	0.00161	0.000926
Total expenditure per capita	2,896	2,330	3,398	1,681	2,731	2,486
Health expenditure per capita	664.2	513.0	782.0	366.9	625.3	547.3
Education expenditure per capita	834.8	735.4	886.3	365.4	817.8	821.0
Population	30,294	54,177	14,950	24,518	35,362	60,022
Child population	4,831	8,403	2,290	3,680	5,670	9,307
Elderly population	3,338	6,012	1,792	2,775	3,849	6,670
Women population	15,193	27,634	7,433	12,417	17,756	30,635
Expecting mothers	108.6	163.0	62.51	85.27	123.9	178.9
Gini index	0.795	0.0444	0.803	0.0487	0.792	0.0425
Perc. black and brown	0.505	0.233	0.469	0.224	0.516	0.235
Perc. indigenous	0.00487	0.0311	0.00305	0.0256	0.00547	0.0327
People in rural area	0.335	0.204	0.319	0.190	0.340	0.207
Literacy rate	0.859	0.0852	0.872	0.0766	0.855	0.0874
Area	1,212	3,983	657.8	1,026	1,396	4,541
Altitude	440.1	292.2	493.2	277.0	422.6	295.0
Distance to the state capital	251.9	156.1	262.7	152.6	248.3	157.1
Temperature	22.57	2.969	22.33	2.874	22.64	2.996
Rainfall	113.8	33.53	115.7	27.04	113.1	35.39
Legal Amazon	0.0922	0.289	0.0808	0.273	0.0959	0.294
Semi-Arid Zone	0.211	0.408	0.137	0.344	0.236	0.424
Border Zone	0.0167	0.128	0.00411	0.0640	0.0208	0.143
Inicial condition	0.144	0.182	0.170	0.175	0.136	0.183
GDP per capita	21.08	20.19	22.73	22.82	20.54	19.21

Source: Prepared by the author.

Three main set of statistics in the period are worth to mention. First, for both treated and control groups, we note an increase in: (i) the number of physician (from 1.94 to 1.96 per 1,000 residents), (ii) the number of consults (from 642 to 670 per 1,000 residents in a typical municipality in a semester), (iii) exams (from 302 to 394 per 1,000 residents in a typical municipality in a semester), and (iv) referrals (from 51.07 to 59.33 per 1,000 residents in a typical municipality in a semester). Second, a huge increase in (i) hospitalization of children under 5 years old (goes from 4.33 to 21.17 per 1,000 residents in a typical municipality in

a semester) and (ii) infant mortality (from 14.92 to 18.42 per 1,000 residents in a typical municipality in a semester). Last, we also oberve an increase in nursing staff and health professionals (from 1.9 to 2.3 and from 5.2 to 5.8 respectively per 1,000 residents in a typical municipality in a semester). Those figures depict the fact the Program seems to be operating properly in therm of health services, however hospitalization and mortality of children have gone up in the period. Last, other health inputs also have increased such as nurses and health staff in the period.

Other variables that characterize the municipality and used as controls in our models are related to income, sanitation, (total) municipal expenditure, population, local information on physicians and health professional's teams, education exependitures, municipality's initial health conditions, and health infrastructure. We also consider the penetration of PSF in each municipality.

3.2 Empirical strategy

In the first phase of the MDP, the federal government determined which municipalities (among the eligibes) could join it based on the priority regions of SUS. In the next phase, any municipality could participate in the Program. This characteristic allows us to consider the same municipality at different periods, before and after participation. Another feature of the Program is that some municipalities may have joined in a determined month, and received physicians later, or they may have even not received professionals enrolled in the MDP. This makes this municipality part of the group of treatment at certain times and group of control in others. Given these characteristics, the econometric approach used is differences-in-differences, allowing treatment (MDP) to vary in time as new municipalities adhere to the Program or stop receiving physicians[15].

A major concern to evaluate the causal effect of the MDP is that the participation to the Program may not occur due to observable variables. In other words, as Brazilian municipalities are quite heterogeneous the idiosyncratic motivation to join the MDP may not be observed.

[15] Nowadays, more than four thousand municipalities are part of the Program, which means that the group of municipalities not affected by the policy is small, making it difficult to compare the whole period of control and treatment.

Unobserved aspecst on local administration, geographic characteristics and initial health conditions of the municipality may influence the decision to participate in the MDP. Therefore: (i) we assume that intrinsic characteristics that might lead the municipality to participate in the Program are constant over time and eliminated by our econometric strategy and (ii) we control for initial health/socioeconomic conditions of the municipalities multiplied by time trends (Bertrand, Duflo and Mullainathan, 2004; Rocha and Soares, 2009; Carrillo and Feres 2017; and Vieira, Costa and Lopes 2017). This last strategy aims to capture not only the initial conditions of those variables but also their evolution over time.

We estimate a differences-in-differences model where the control group is those non-participating municipalities in a certain period as follows:

$$\mathrm{Y_{it}} = \alpha_{\mathrm{i}} + \gamma \mathrm{Participation_i} + \delta \mathrm{Period_t} + \theta \mathrm{Treatment_{it}} + \beta \mathrm{trend} * \mathrm{X_{it}} + \mu_{sy} + \varepsilon_{\mathrm{it}} \quad (1)$$

Where $\mathrm{Y_{it}}$ is the dependent variable for the municipality *i* in the semester-year *t*. In this case the set of dependent variables basic healthcare, morbidity and mortality indicators. The variable $\mathrm{Participation_i}$ is a dummy variable that identifies if the municipality *i* received MDP physicians in any semester-year *t*, the variable $\mathrm{Period_t}$ is a dummy variable that identifies if the period *t* is before or after the participation in the MDP by the municipality *i*, θ is the causal effect parameter of the MDP from the interaction of the variables of $\mathrm{Participation_i}$ and $\mathrm{Period_t}$, resulting in the variable $\mathrm{Treatment_{it}}$. The set of variables $\mathrm{X_{it}}$ are explanatory variables of municipality *i* and capture characteristics such as municipal expenditures, income, sanitation, health professionals staff, population, education, and PSF penetration. These variables are interacted with a linear time trend (trend) to capture specific trends for each municipality. The variable μ_{sy} is a non-linear trend state-year specific, α_{i} is a fixed-time effect for the municipality *i* and $\varepsilon_{\mathrm{it}}$ corresponds to the error. The standard errors are clustered by municipality (see Bertrand, Duflo and Mullainathan, 2004).

In order to create a sample with comparable control and treatment municipalities, we also implement the Propensity Score Matching strategy (PSM). Threfore a probit model is estimated where dependent variables assumes one if

the municipality participated in the Program and zero otherwise, but using 2010 year, three years before the Program has started. We use as control variables population, sanitation, proportion of health professionals in the municipality (physicians, nursing teams and professionals in general), GDP per capita, municipal expenses with health and education, total municipal expenses, distributed benefits of "Bolsa Família" Program, geographical data and the initial health condition of each municipality[16].

The main concern of such strategy is that the trajectory of the investigated variables of the participating municipality must be similar to those of the non-participating ones in the pre-treatment period. Our strategy aims to detect that only after the adoption of the policy, the trend of the treated group differs significantly from the trend of the control. We test this for different periods as shown in Appendix B[17]. All the variables seem to have a similar path before the treatment period.

We must also check whether there is an adoption of orthogonal policies to MDP by local governments. For instance, municipal governments may attempt to solve their problems related to the physician's shortage in the public system through policies other than the MDP and, in this case, the causal effect would be associated with policies other than the Program. We address this issue by using the specific information on number of physicians of the Program made available by the Ministry of Health, controlling for those hired by other means and also include controls on local public epxenditures. Finally, is important to argue that we focus on short run impact of MDP, i.e., we evaluate MDP impact only in its first three years of implementation, determined strictly by data availability.

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[16] See Table A3 in the appendix.

[17] In this case we test for the following specification, where where $k \in \{1,2,3,4\}$ periods before MDP participation: $\mathrm{Y_{it}} = \alpha_{\mathrm{i}} + \gamma \mathrm{Participation_i} + \delta \mathrm{Period_t} + \theta \mathrm{Treatment_{it}} + \mu_{sy} + \varepsilon_{\mathrm{it}} \quad (3)$.

4 RESULTS

4.1 Effects on basic healthcare indicators

We first investigate the mechanical impact of MDP, i.e, the impact on healthcare services[18]. We start with doctor consults. The number of general doctor consults increased 9.4% in participating municipalities, pushed especially by the consults of children under one year of age (11.1%), adults (between 15 and 59 years of age – 9.3% of increase), and elderly people (more than 60 years of age – 7.1%). More related to systematic care, we find an increase of 5.9% in appointments. More importantly, most of this effect comes from the increase in preventive appointments (5.0%). The last direct impact on MDP is related to home visits by medical teams. We find an astonishing increase of 29.7% independent of controls inclusion in the model. This result is in line with our previous finding on the impact on preventive appointments. Increasing the number of monitoring actions seems to be a relative cheap strategy to combat expensive hospitalizations.

Table 4. The effect of MDP on the number of Consults

	(1)	(2)	(3)	(4)	(5)	(6)
Consults						
MDP impact	0.097**	0.070	0.042	0.108***	0.096***	0.094***
	(0.045)	(0.045)	(0.032)	(0.033)	(0.034)	(0.034)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.477	0.440	0.752	0.749	0.753	0.753
Consults: infants						
MDP impact	0.078**	0.111***	0.055*	0.129***	0.113***	0.111***
	(0.033)	(0.035)	(0.031)	(0.033)	(0.034)	(0.033)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.676	0.684	0.723	0.736	0.728	0.728
Consults: adults						
MDP impact	0.094**	0.070*	0.041	0.104***	0.095***	0.093***
	(0.041)	(0.041)	(0.030)	(0.031)	(0.032)	(0.032)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.501	0.463	0.761	0.755	0.760	0.760
Consults: elderly						
MDP impact	0.077**	0.049	0.031	0.079***	0.073**	0.071**
	(0.037)	(0.037)	(0.028)	(0.029)	(0.030)	(0.030)

[18] See Table A4, in Appendix, that shows that the impact of MDP on the number of physician per 1,000 residents. We find an increase of 4.2% on average, smaller than Carrillo and Feres (2017) that finds an increase in 18%.The difference might be that we consider an average of effect of one semester change rather than an accumulative impact of the policy as described in their equation (2).

	(1)	(2)	(3)	(4)	(5)	(6)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.518	0.483	0.728	0.721	0.720	0.720
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes
Population weighting	No	No	No	No	Yes	Yes
PSF	No	No	No	No	No	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 5. The effect of MDP on the number of Appointments

	(1)	(2)	(3)	(4)	(5)	(6)
Appointments						
MDP impact	0.078**	0.034	0.037	0.067**	0.061**	0.059**
	(0.039)	(0.040)	(0.029)	(0.029)	(0.029)	(0.029)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.501	0.482	0.761	0.768	0.772	0.773
Appointments: childcare						
MDP impact	0.017	0.011	0.010	0.037	0.019	0.017
	(0.042)	(0.044)	(0.040)	(0.041)	(0.041)	(0.041)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.678	0.685	0.738	0.749	0.749	0.749
Appointments: prenatal						
MDP impact	0.054	0.041	0.034	0.065*	0.048	0.047
	(0.035)	(0.039)	(0.033)	(0.038)	(0.036)	(0.036)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.715	0.716	0.787	0.793	0.791	0.791
Appointments: preventive						
MDP impact	0.054*	0.035	0.033	0.059**	0.053**	0.050*
	(0.031)	(0.030)	(0.027)	(0.026)	(0.026)	(0.026)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.584	0.562	0.687	0.687	0.684	0.685

	(1)	(2)	(3)	(4)	(5)	(6)
Appointments: STD/AIDS						
MDP impact	0.087*	0.065	0.064	0.072	0.051	0.050
	(0.046)	(0.054)	(0.046)	(0.053)	(0.056)	(0.056)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.579	0.594	0.583	0.599	0.592	0.592
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes
Population weighting	No	No	No	No	Yes	Yes
PSF	No	No	No	No	No	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 6. The effect of MDP on the number of Home Visits

	(1)	(2)	(3)	(4)	(5)	(6)
Home visits						
MDP impact	0.285***	0.281***	0.247***	0.296***	0.300***	0.297***
	(0.037)	(0.040)	(0.035)	(0.037)	(0.037)	(0.037)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.649	0.651	0.698	0.702	0.698	0.699
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes
Population weighting	No	No	No	No	Yes	Yes
PSF	No	No	No	No	No	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

This means that people living at the participating municipality are having better acces to doctors (consults, appointments, and home visits). That would turn into better quality services if one also observes that those treated individuals

are also being referred to specialized doctors and to treatments that are more specific. This is exactly what we test for in the next Table.

Our estimations suggest an increase in 12.3% in general referrals. More related to quality improvement, specialized attendance such as physiotherapy, speech therapy, occupational therapy, psychology, and other medical specialties has also increased by 13.3% according to our estimation. However we do not find any impact on referrals to home hospitalization, hospitalization, and emergency care. We also do not find any statistical difference on the number of checkups[19].

Table 7. The effect of MDP on the number of Referrals

	(1)	(2)	(3)	(4)	(5)	(6)
Referrals						
MDP impact	0.102**	0.101**	0.075**	0.129***	0.125***	0.123***
	(0.041)	(0.041)	(0.038)	(0.038)	(0.039)	(0.039)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.640	0.639	0.715	0.722	0.719	0.720
Referrals: special attendance						
MDP impact	0.108**	0.109***	0.092**	0.138***	0.134***	0.133***
	(0.042)	(0.042)	(0.040)	(0.040)	(0.041)	(0.041)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.657	0.660	0.716	0.725	0.720	0.720
Referrals: hospitalization						
MDP impact	0.079**	0.064	0.047	0.064	0.059	0.059
	(0.036)	(0.040)	(0.037)	(0.040)	(0.040)	(0.040)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.693	0.694	0.694	0.694	0.692	0.692
Referrals: emergency						
MDP impact	0.050	0.080	0.031	0.095*	0.082	0.081
	(0.046)	(0.054)	(0.046)	(0.052)	(0.053)	(0.053)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.628	0.633	0.632	0.639	0.640	0.640
Referrals: home hospitalization						
MDP impact	-0.032	-0.046	-0.039	-0.052	-0.051	-0.052
	(0.032)	(0.047)	(0.033)	(0.046)	(0.042)	(0.041)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.417	0.418	0.420	0.422	0.414	0.414
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

[19] Considering heterogeneity, our results show larger effects in the municipalities located at Middle West and Northeast. These present the largest shortage of physicians, which seems to corroborae the Program's objectives.

Non-linear trend	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes
Population weighting	No	No	No	No	Yes	Yes
PSF	No	No	No	No	No	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

4.2 Effects on hospitalization and exams indicators

Next, we estimate the effect of the MDP on hospitalization. It is not straightforward to sign its expected effect since medical appointments and consults can lead hospitalization to go both ways. However, we find a constent reduction (4.6%) in general hospitalization. This effect seems to come from our finding that this reduction comes mostly from decrease in hospitalization for infectious and parasitic diseases (5.9%). These preventable diseases would not to have hospitalization as an outcome even in a bad scenario. With proper care, apropriated diagnostics with systematic medical monitoring, individuals could have those illnesses treated. Our previous result on health inputs seems consistent with the interpretation that a reduction in hospitalization is a good side effect of local health.

Table 8. The effect of MDP on the number of Hospitalization

	(1)	(2)	(3)	(4)	(5)	(6)
Hospitalization						
MDP impact	-0.005	-0.042	-0.010	-0.040	-0.046*	-0.046*
	(0.023)	(0.029)	(0.024)	(0.029)	(0.027)	(0.027)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.939	0.941	0.940	0.942	0.942	0.942
Hospitalization: pregnancy, childbirth and puerperium						
MDP impact	-0.008	-0.028	-0.008	-0.029	-0.027	-0.028
	(0.024)	(0.033)	(0.024)	(0.033)	(0.032)	(0.032)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.829	0.830	0.830	0.831	0.821	0.821
Hospitalization: infectious and parasitic diseases						
MDP impact	-0.051**	-0.061*	-0.047**	-0.052*	-0.059**	-0.059**
	(0.021)	(0.031)	(0.022)	(0.031)	(0.029)	(0.029)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.791	0.802	0.791	0.802	0.799	0.799
Hospitalization: respiratory diseases						
MDP impact	-0.033*	-0.035	-0.028	-0.030	-0.036	-0.036
	(0.019)	(0.023)	(0.019)	(0.023)	(0.022)	(0.022)
Observations	35,280	34,536	35,280	34,536	33,540	33,540

R^2	0.856	0.857	0.857	0.858	0.861	0.861
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes
Population weighting	No	No	No	No	Yes	Yes
PSF	No	No	No	No	No	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 9. The effect of MDP on the number of Hospitalization of children under 5 years

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Hospitalization of children under 5 years						
MDP impact	-0.046*	-0.058*	-0.035	-0.039	-0.042	-0.043
	(0.028)	(0.032)	(0.028)	(0.031)	(0.031)	(0.031)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.466	0.471	0.469	0.477	0.460	0.461
Hospitalization of children under 5 years - pneumonia						
MDP impact	-0.037	-0.039	-0.024	-0.023	-0.026	-0.027
	(0.025)	(0.028)	(0.025)	(0.028)	(0.027)	(0.027)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.445	0.450	0.447	0.455	0.435	0.435
Hospitalization of children under 5 years - dehydration						
MDP impact	-0.014	-0.035	-0.020	-0.029	-0.020	-0.021
	(0.019)	(0.025)	(0.019)	(0.025)	(0.024)	(0.024)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.450	0.449	0.453	0.450	0.430	0.430
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes
Population weighting	No	No	No	No	Yes	Yes
PSF	No	No	No	No	No	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Although consistently estimated with a negative sign, we do not find a sinificant effect on children hospitalization, nor due to pregnancy, childbirth and puerperium diseases. We also do not find any impact on medical exams.

Table 10. The effect of MDP on the number of Exams

	(1)	(2)	(3)	(4)	(5)	(6)
Exams						
MDP impact	0.070	0.035	0.019	0.069*	0.058	0.056
	(0.049)	(0.048)	(0.041)	(0.042)	(0.041)	(0.041)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.587	0.575	0.731	0.734	0.733	0.733
Exams: obstetrical ultrasonography						
MDP impact	0.044	-0.007	0.021	0.010	0.002	-0.001
	(0.033)	(0.038)	(0.033)	(0.037)	(0.037)	(0.037)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.701	0.717	0.723	0.743	0.733	0.734
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes
Population weighting	No	No	No	No	Yes	Yes
PSF	No	No	No	No	No	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

4.3 Effects on mortality indicators

We next evaluate whether the program is associated with changes in total, infant, elderly, and maternal mortality as well as live birth rate. Given the systematic shift in the number of physicians, one would expect positive effects on general mortality given that we provide some evidence that the quality of care seems to be improved.

Our data exposes none evidence that MDP led to gains in any mortality indicators. We find estimates that can usually be bounded to a tight interval around zero, allowing us to rule out any short run impact on mortality. There are no effects of the policy on mortality even when we consider different causes of death. Last, we do not find any impact on live birth rate.

Table 11. The effect of MDP on Mortality

	(1)	(2)	(3)	(4)	(5)	(6)
General mortality						

	(1)	(2)	(3)	(4)	(5)	(6)
MDP impact	-0.004	0.007	-0.001	0.008	0.004	0.004
	(0.007)	(0.008)	(0.007)	(0.008)	(0.008)	(0.008)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.577	0.585	0.578	0.585	0.554	0.554
Elderly mortality						
MDP impact	-0.003	0.007	0.002	0.008	0.005	0.006
	(0.010)	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.350	0.380	0.350	0.381	0.349	0.350
Maternal mortality						
MDP impact	-0.001	-0.001	-0.006	-0.005	-0.011	-0.011
	(0.012)	(0.015)	(0.013)	(0.016)	(0.016)	(0.016)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.145	0.140	0.147	0.141	0.131	0.131
Mortality for preventable causes: children under 5 years of age						
MDP impact	-0.001	0.008	0.010	0.011	0.006	0.006
	(0.010)	(0.014)	(0.010)	(0.013)	(0.012)	(0.012)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.549	0.548	0.551	0.551	0.514	0.514
Mortality for preventable causes: people above 5 years of age						
MDP impact	0.017	0.017	0.020	0.015	0.014	0.014
	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.616	0.625	0.616	0.626	0.595	0.595
Live births rate						
MDP impact	0.025	-0.035	-0.025	0.002	-0.000	0.003
	(0.033)	(0.031)	(0.017)	(0.015)	(0.015)	(0.015)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.261	0.232	0.752	0.760	0.768	0.769
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes
Population weighting	No	No	No	No	Yes	Yes
PSF	No	No	No	No	No	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 12. The effect of MDP on Infant Mortality

	(1)	(2)	(3)	(4)	(5)	(6)
Infant mortality						
MDP impact	0.036	0.052	0.030	0.042	0.031	0.030
	(0.037)	(0.040)	(0.038)	(0.040)	(0.042)	(0.042)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.367	0.343	0.368	0.345	0.321	0.321
Infant mortality: infectious and parasitic diseases						
MDP impact	0.009	-0.010	-0.001	-0.016	-0.011	-0.011
	(0.012)	(0.018)	(0.012)	(0.019)	(0.017)	(0.017)

Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.166	0.154	0.169	0.158	0.143	0.143
Infant mortality: respiratory diseases						
MDP impact	0.017	0.035*	0.016	0.035*	0.023	0.023
	(0.013)	(0.019)	(0.013)	(0.019)	(0.016)	(0.016)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.201	0.185	0.203	0.188	0.155	0.155
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes
Population weighting	No	No	No	No	Yes	Yes
PSF	No	No	No	No	No	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

4.4 Robustness I: random participation

In addition to the models presented previously, we perform some robustness checks using placebo tests. Each municipality joined the Program in different months throughout 2013 and 2015.

The first test consisted of a randomization in the period that each municipality supposedly adhered to the Program. The idea is to verify whether random participation for the treated would still produce significant effects on the health inputs and hospitalization. Therefore, we randomize municipalities' participation keeping constant the number of participants but randomly assigning the participation dummy from a list of all municipalities in the previous sample in alphabetical order. We label this test as "placebo on the adhesion". The effect of the Program, in this case, is the interaction between the adherence dummy (placebo) and the true period dummy. We consider the same control variables as before including time trend of our intrest variables before the "new" program participation. We find no significant MDP effects on almost any health outcome.

Table 13. Results for placebo models: MPD's random adherence

	Coefficient	Observations	R^2
Basic healthcare indicators			
Appointments	-0.004 (0.032)	34,596	0.483
Appointments – childcare	-0.041 (0.043)	34,596	0.686
Appointments – prenatal	0.024 (0.034)	34,596	0.716
Appointments – preventive	-0.009 (0.031)	34,596	0.561

	Coefficient	Observations	R^2
Appointments – STD/AIDS	0.047 (0.057)	34,596	0.592
Consults	0.046 (0.034)	34,596	0.441
Consults – infant	0.029 (0.032)	34,596	0.685
Consults – adults	0.039 (0.033)	34,596	0.464
Consults – elderly	0.028 (0.032)	34,596	0.484
Referrals	0.012 (0.039)	34,596	0.638
Referrals – special attendance	0.002 (0.042)	34,596	0.659
Referrals – hospitalization	0.009 (0.045)	34,596	0.695
Referrals – emergency	0.018 (0.053)	34,596	0.631
Referrals – home hospitalization	0.028 (0.062)	34,596	0.415
Exams	0.005 (0.042)	34,596	0.575
Exams – obstetrical ultrasonography	-0.059 (0.038)	34,596	0.716
Home visits	0.159*** (0.041)	34,596	0.646
Morbidity indicators			
Hospitalization of children under 5 years	-0.012 (0.041)	34,596	0.469
Hospitalization of children under 5 years – pneumonia	-0.018 (0.039)	34,596	0.449
Hospitalization of children under 5 years – dehydration	-0.028 (0.039)	34,596	0.444
General Hospitalization	-0.029 (0.023)	34,596	0.942
Hospitalization – pregnancy, childbirth and puerperium	-0.037 (0.029)	34,596	0.829
Hospitalization – infectious and parasitic diseases	0.829	34,596	0.800
Hospitalization – respiratory diseases	-0.040* (0.023)	34,596	0.858
Mortality indicators			
General mortality	-0.004 (0.013)	34,596	0.576
Infant mortality	0.039 (0.066)	34,596	0.339
Infant mortality – infectious and parasitic diseases	-0.065*** (0.023)	34,596	0.151
Infant mortality – respiratory diseases	0.029 (0.031)	34,596	0.179
Elderly mortality	-0.012 (0.017)	34,596	0.370
Maternal mortality	0.003 (0.026)	34,596	0.137
Mortality for preventable causes – children under 5 years of age	-0.006 (0.021)	34,596	0.537
Mortality for preventable causes – people above 5 years of age	0.006 (0.022)	34,596	0.615
Live births rate	-0.028 (0.024)	34,596	0.237

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level.

Next, we address the case that these municipalities started participating in the MDP one semester before the effective semester of the adhesion. We kept all participating municipalities, but changing the timing of adhesion. We also run the same exercise but moving back more than one semester before the effective adhesion (see Tables B1-B33 in the Appendix). We also find no significant MDP

effects on any health outcome, which suggests that participating and non-participating municipalities have the same trajectory before the Program.

4.5 Robustness II: lagged impacts of MDP

We estimate the MDP lagged impact on health outcomes, since some indicators may take more than six months to produce a significant change with the presence of more physicians. For the basic healthcare indicators, none of the models resulted in significant coefficients[20]. So, we modifiy equation (1) to allow for impacts of the MDP program k, where $k \in \{1,2,3,4\}$ periods after MDP participation:

$$Y_{it+k} = \alpha_i + \gamma \text{Participation}_i + \delta \text{Period}_t + \theta \text{Treatment}_{it} + \beta \text{trend} * X_{it} + \mu_{sy} + \varepsilon_{it} \quad (2)$$

For hospitatlization, our lag-model showed significant effect on hospitalization of children under 5 years of age (decrease of 4.7%) and hospitalization of children under 5 years for pneumonia (decrease of 4.0%)[21]. This is consistent with Rocha and Soares (2009). Consistent with this finding, our lag-model also point out to significant negative effects on general mortality (1.3%), which is a suggestive evidence that MDP's impacts on mortality may take longer terms[22].

Table 14. Results of lagged effects on Appointments

	Total	Childcare	Prenatal	Preventive	STD/AIDS
T-1	0.007	0.040	-0.231	-0.027	0.016
	(0.031)	(0.095)	(0.176)	(0.050)	(0.076)
N	33,563	33,563	33,563	33,563	33,563
R^2	0.367	0.606	0.626	0.432	0.511
T-2	-0.004	0.003	0.015	0.008	-0.063*
	(0.031)	(0.029)	(0.025)	(0.024)	(0.037)
N	33,538	33,538	33,538	33,538	33,538
R^2	0.331	0.551	0.575	0.386	0.456
T-3	-0.043	-0.007	0.010	-0.034	-0.051
	(0.031)	(0.030)	(0.026)	(0.025)	(0.035)
N	33,537	33,537	33,537	33,537	33,537

[20] This result differs for some regional cuts and indicators.
[21] This result is similar for different regional cuts and other indicators, like hospitalization of children under 5 years for pneumonia and dehydration and hospitalization for pregnancy, childbirth and puerperium.
[22] This result is similar for different regional cuts and indicators.

R^2	0.302	0.510	0.534	0.346	0.417
T-4	0.000	0.002	0.014	0.012	-0.032
	(0.034)	(0.031)	(0.029)	(0.026)	(0.039)
N	33,536	33,536	33,536	33,536	33,536
R^2	0.282	0.482	0.507	0.319	0.382

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 15. Results of lagged effects on Consults

	Total	**Infants**	**Adults**	**Elderly**
T-1	0.007	-0.023	0.001	-0.000
	(0.035)	(0.022)	(0.031)	(0.028)
N	33,563	33,563	33,563	33,563
R^2	0.315	0.564	0.335	0.362
T-2	-0.025	-0.006	-0.025	-0.012
	(0.035)	(0.025)	(0.032)	(0.029)
N	33,538	33,538	33,538	33,538
R^2	0.281	0.498	0.299	0.322
T-3	-0.053	-0.015	-0.042	-0.051*
	(0.034)	(0.023)	(0.031)	(0.030)
N	33,537	33,537	33,537	33,537
R^2	0.255	0.452	0.272	0.292
T-4	-0.019	0.026	-0.000	-0.027
	(0.038)	(0.026)	(0.034)	(0.031)
N	33,536	33,536	33,536	33,536
R^2	0.237	0.419	0.253	0.268

Notes: (1) Controls vector: total expenditure per capita, health expenditure per Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 16. Results of lagged effects on Referrals

	Total	**Special attendance**	**Hospitalization**	**Emergency**	**Home hospitalization**
T-1	0.003	-0.008	-0.019	-0.024	0.025
	(0.027)	(0.028)	(0.030)	(0.032)	(0.032)
N	33,563	33,563	33,563	33,563	33,563
R^2	0.530	0.553	0.605	0.555	0.365
T-2	-0.022	-0.013	-0.028	-0.033	0.023
	(0.029)	(0.029)	(0.034)	(0.033)	(0.035)
N	33,538	33,538	33,538	33,538	33,538
R^2	0.470	0.496	0.531	0.491	0.327
T-3	-0.027	-0.019	-0.027	-0.034	0.042
	(0.029)	(0.030)	(0.034)	(0.035)	(0.036)
N	33,537	33,537	33,537	33,537	33,537

R^2	0.421	0.450	0.477	0.443	0.292
T-4	-0.025	-0.006	0.069**	0.015	0.035
	(0.032)	(0.033)	(0.035)	(0.034)	(0.034)
N	33,536	33,536	33,536	33,536	33,536
R^2	0.384	0.417	0.439	0.404	0.273

Notes: (1) Controls vector: total expenditure per capita, health expenditure per Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 17. Results of lagged effects on Exams and Home Visits

	Exams	**Exams – obstetrical ultrasonography**	**Home visits**
T-1	0.021	-0.012	-0.042
	(0.034)	(0.024)	(0.026)
N	33,563	33,563	33,563
R^2	0.450	0.627	0.540
T-2	-0.033	0.011	-0.045
	(0.034)	(0.026)	(0.029)
N	33,538	33,538	33,538
R^2	0.403	0.572	0.475
T-3	-0.046	0.042*	-0.056*
	(0.037)	(0.025)	(0.029)
N	33,537	33,537	33,537
R^2	0.360	0.523	0.429
T-4	-0.018	-0.012	-0.044
	(0.039)	(0.027)	(0.030)
N	33,536	33,536	33,536
R^2	0.327	0.491	0.396

Notes: (1) Controls vector: total expenditure per capita, health expenditure per Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 18. Results of lagged effects on Hospitalization

	Total	**Children under 5**	**Children under 5 – pneumonia**	**Children under 5 – dehydration**	**Pregnancy, childbirth and puerperium**	**Infectious and parasitic diseases**	**Respiratory diseases**
T-1	-0.017	-0.047*	-0.040*	-0.006	0.006	-0.005	-0.008
	(0.023)	(0.024)	(0.022)	(0.020)	(0.019)	(0.021)	(0.017)
N	33,563	33,563	33,563	33,563	33,563	33,563	33,563
R^2	0.813	0.364	0.355	0.359	0.701	0.679	0.740
T-2	0.026	-0.014	0.004	-0.014	-0.030	0.010	-0.014
	(0.028)	(0.025)	(0.022)	(0.021)	(0.023)	(0.023)	(0.021)

	Total	Children under 5	Children under 5 – pneumonia	Children under 5 – dehydration	Pregnancy, childbirth and puerperium	Infectious and parasitic diseases	Respiratory diseases
N	33,538	33,538	33,538	33,538	33,538	33,538	33,538
R^2	0.711	0.324	0.319	0.324	0.613	0.595	0.648
T-3	0.021	0.042*	0.020	0.003	-0.002	0.013	-0.006
	(0.033)	(0.025)	(0.023)	(0.020)	(0.027)	(0.025)	(0.023)
N	33,537	33,537	33,537	33,537	33,537	33,537	33,537
R^2	0.632	0.295	0.292	0.292	0.543	0.532	0.576
T-4	0.045	0.023	0.021	0.006	-0.007	0.016	-0.003
	(0.033)	(0.025)	(0.023)	(0.021)	(0.029)	(0.024)	(0.023)
N	33,536	33,536	33,536	33,536	33,536	33,536	33,536
R^2	0.576	0.274	0.273	0.271	0.495	0.486	0.527

Notes: (1) Controls vector: total expenditure per capita, health expenditure per Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 19. Results of lagged effects on mortality

	Total	Infant mortality	Infant infectious and parasitic diseases	Infant respiratory diseases	Maternal mortality	Elderly mortality	Preventable causes – children nder 5	Live births rate
T-1	-0.013**	-0.003	-0.016	-0.017	0.003	-0.012	0.011	0.031
	(0.007)	(0.041)	(0.014)	(0.016)	(0.017)	(0.008)	(0.010)	(0.030)
N	33,563	33,563	33,563	33,563	33,563	33,563	33,563	33,563
R^2	0.493	0.288	0.138	0.147	0.130	0.309	0.439	0.141
T-2	0.008	-0.002	-0.007	0.009	-0.014	0.004	-0.003	-0.007
	(0.007)	(0.039)	(0.014)	(0.015)	(0.016)	(0.008)	(0.013)	(0.030)
N	33,538	33,538	33,538	33,538	33,538	33,538	33,538	33,538
R^2	0.459	0.263	0.131	0.142	0.121	0.283	0.379	0.136
T-3	0.006	-0.002	-0.004	0.002	-0.004	0.006	-0.025*	-0.042
	(0.008)	(0.044)	(0.015)	(0.017)	(0.016)	(0.009)	(0.013)	(0.030)
N	33,537	33,537	33,537	33,537	33,537	33,537	33,537	33,537
R^2	0.432	0.248	0.133	0.138	0.118	0.261	0.341	0.127
T-4	0.001	0.017	-0.001	0.009	-0.024	0.007	-0.002	-0.017
	(0.007)	(0.041)	(0.015)	(0.014)	(0.015)	(0.009)	(0.013)	(0.033)
N	33,536	33,536	33,536	33,536	33,536	33,536	33,536	33,536
R^2	0.416	0.234	0.138	0.136	0.109	0.248	0.316	0.120

Notes: (1) Controls vector: total expenditure per capita, health expenditure per Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial

condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

4.6 Heterogeneity

Finally, this section analyzes the heterogeneous impacts on health inputs, hospitalization and mortality indicators considering the five Brazilian regions[23].

Our results indicates stronger effects on appointments, consults, and referrals in the municipalities located at Middle West and Northeast regions compared to the other municipalities. For instance, we estimate that municipalities that participate in MDP presents an increase in the systematic appointments of 16% for Middle West region versus 8.4% of the Northeast and only 5.9% for (our sample) Brazilian average. These two regions present the largest shortage of physicians, which seems to corroborate the Program's objectives.

We also estimate that Mideast region has exprienced an increase in three categories of systematic appointments (preventive – 15%, prenatal – 14.2% and childcare 27.8%). The estimated effect on appointments seems to be lead by preventive actions (13%) for the Northeast region. Moving to doctor consults, we estimate that these two regions experienced an increase of 17.9% and 17.4% respectively versus the average of 9.4% and in all regions those effects seem to be carried by doctor's conutls on infants.

[23] Tables A5-A9 show that the five regions in Brazil present different health status. Middle West region and Southeast region has better health indicators in general followed by the South. For instance, the total mortality index is 3.09 and 3.34 verus 3.42 in 2015 compared to the one in North and Northeast respectively. Note also that the Northeast region present the worst indicators in almost all of the variables.

Table 20. The regional effect of MDP on the number of Appointments

	Middle West	North	Northeast	South	Southeast
Appointments					
MDP impact	0.161**	0.112	0.084**	0.042	0.061
	(0.072)	(0.095)	(0.038)	(0.089)	(0.048)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.789	0.819	0.791	0.768	0.740
Appointments: childcare					
MDP impact	0.278**	0.088	0.029	-0.106	0.060
	(0.121)	(0.329)	(0.059)	(0.116)	(0.068)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.669	0.637	0.737	0.715	0.721
Appointments: prenatal					
MDP impact	0.142**	0.047	0.043	-0.006	0.092
	(0.061)	(0.078)	(0.027)	(0.113)	(0.064)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.720	0.763	0.778	0.714	0.756
Appointments: preventive					
MDP impact	0.154*	0.016	0.130***	-0.041	-0.005
	(0.082)	(0.130)	(0.039)	(0.067)	(0.048)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.642	0.557	0.658	0.689	0.706
Appointments: STD/AIDS					
MDP impact	0.021	0.001	0.043	-0.027	0.105
	(0.130)	(0.426)	(0.116)	(0.143)	(0.079)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.571	0.515	0.632	0.577	0.501
Fixed effects	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes
Matching	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Population weighting	Yes	Yes	Yes	Yes	Yes
PSF	Yes	Yes	Yes	Yes	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 21. The regional effect of MDP on the number of Consults

	Middle West	North	Northeast	South	Southeast
Consults					
MDP impact	0.179**	-0.073	0.174***	0.067	0.050
	(0.070)	(0.179)	(0.043)	(0.109)	(0.046)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.787	0.717	0.776	0.723	0.731
Consults: infants					
MDP impact	0.197**	-0.051	0.210***	0.066	0.028
	(0.092)	(0.128)	(0.058)	(0.086)	(0.053)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.684	0.659	0.711	0.704	0.741
Consults: adults					
MDP impact	0.143**	-0.079	0.170***	0.114	0.038
	(0.068)	(0.165)	(0.044)	(0.095)	(0.043)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.787	0.720	0.768	0.741	0.745
Consults: elderly					
MDP impact	0.151**	-0.065	0.155***	-0.002	0.039
	(0.069)	(0.165)	(0.039)	(0.095)	(0.042)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.726	0.704	0.741	0.678	0.717
Fixed effects	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes
Matching	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Population weighting	Yes	Yes	Yes	Yes	Yes
PSF	Yes	Yes	Yes	Yes	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

We must highlight the impact of MDP on our closest measure of quality improvement, medical referrals. We estimate a strongg impact on the poorest region, Northeast, of 17.2% (versus 12.3% for the Brazlian average) on general referrals. Moreover, that region has endured an improvement in almost all types of medical referrals. We estimate an increase of 16.4% for special attendance, 17.9% for hospitalization, and 21.4% for emergency procedures. Only for home hospitalization, we estimate a small negative impact of 11.6%. As expected, we do not find any impact on exams.

Table 22. The regional effect of MDP on the number of Referrals

	Middle West	North	Northeast	South	Southeast
Referrals					
MDP impact	0.205	-0.083	0.172**	0.071	0.088
	(0.125)	(0.202)	(0.076)	(0.101)	(0.059)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.688	0.709	0.704	0.736	0.693
Referrals: special attendance					
MDP impact	0.226*	0.309	0.164**	0.092	0.070
	(0.127)	(0.217)	(0.079)	(0.106)	(0.060)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.682	0.652	0.707	0.715	0.692
Referrals: hospitalization					
MDP impact	0.038	-0.216	0.179**	-0.030	0.017
	(0.139)	(0.207)	(0.080)	(0.084)	(0.063)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.672	0.677	0.636	0.738	0.638
Referrals: emergency					
MDP impact	0.046	0.115	0.214*	-0.075	0.089
	(0.182)	(0.326)	(0.111)	(0.121)	(0.075)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.571	0.735	0.629	0.690	0.587
Referrals: home hospitalization					
MDP impact	0.067	-0.188	-0.116*	-0.080	0.009
	(0.128)	(0.165)	(0.069)	(0.070)	(0.056)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.486	0.323	0.396	0.480	0.376
Fixed effects	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes
Matching	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Population weighting	Yes	Yes	Yes	Yes	Yes
PSF	Yes	Yes	Yes	Yes	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Another mechanical effect is the impact on home visist. With more doctors in each municipality, it is expected a natural increase in home visits. Again, the estimated largest impacts come from Northeast and Mideast, 38.2% and 40.0%, respectively.

Table 23. The regional effect of MDP on the number of Home Visits

	Middle West	North	Northeast	South	Southeast
Home visits					
MDP impact	0.400***	-0.015	0.382***	0.306***	0.132**
	(0.138)	(0.285)	(0.061)	(0.093)	(0.052)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.702	0.531	0.699	0.654	0.722
Fixed effects	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes
Matching	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Population weighting	Yes	Yes	Yes	Yes	Yes
PSF	Yes	Yes	Yes	Yes	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

The results on morbidity is determined by the (only) significant impact on for the South region. We estimate a reduction in mortality of 11.3%, larger than the Brazilian counterpart does (4.6%). When we look separately the reasons for hospitalization, we find that only those caused by infectious and parasitic diseases have decreased statistically, again determined by the impact for the South region, a reduction of 9.8%.

Table 24. The regional effect of MDP on the number of Hospitalization

	Middle West	North	Northeast	South	Southeast
Hospitalization					
MDP impact	-0.003	0.080	-0.091	-0.113**	-0.017
	(0.110)	(0.078)	(0.062)	(0.047)	(0.033)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.875	0.959	0.916	0.953	0.970
Hospitalization: pregnancy, childbirth and puerperium					
MDP impact	0.020	0.012	-0.100	-0.094	0.046
	(0.088)	(0.103)	(0.063)	(0.067)	(0.041)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.752	0.788	0.809	0.790	0.855
Hospitalization: infectious and parasitic diseases					
MDP impact	-0.095	0.008	-0.068	-0.098*	-0.013
	(0.105)	(0.086)	(0.068)	(0.056)	(0.033)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.651	0.817	0.833	0.720	0.797
Hospitalization: respiratory diseases					
MDP impact	-0.094	-0.006	-0.021	-0.067	-0.041
	(0.090)	(0.066)	(0.047)	(0.045)	(0.027)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.719	0.856	0.818	0.904	0.897
Fixed effects	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes
Matching	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Population weighting	Yes	Yes	Yes	Yes	Yes
PSF	Yes	Yes	Yes	Yes	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 25. The regional effect of MDP on the number of Hospitalization of children under 5 years

	Middle West	North	Northeast	South	Southeast
Hospitalization of children under 5 years					
MDP impact	-0.128	-0.059	-0.034	-0.082	0.012
	(0.120)	(0.166)	(0.053)	(0.064)	(0.044)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.470	0.369	0.458	0.474	0.463
Hospitalization of children under 5 years - pneumonia					
MDP impact	-0.015	-0.237	0.006	-0.089	0.009
	(0.103)	(0.154)	(0.051)	(0.057)	(0.040)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.410	0.355	0.384	0.462	0.434
Hospitalization of children under 5 years - dehydration					
MDP impact	-0.124	0.047	-0.023	-0.008	0.003
	(0.084)	(0.146)	(0.044)	(0.044)	(0.031)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.502	0.304	0.452	0.400	0.379
Fixed effects	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes
Matching	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Population weighting	Yes	Yes	Yes	Yes	Yes
PSF	Yes	Yes	Yes	Yes	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 26. The regional effect of MDP on the number of Exams

	Middle West	North	Northeast	South	Southeast
Exams					
MDP impact	0.040	-0.180	0.090	0.094	-0.032
	(0.118)	(0.272)	(0.063)	(0.114)	(0.069)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.747	0.751	0.738	0.751	0.696
Exams: obstetrical ultrasonography					
MDP impact	-0.026	-0.284	-0.014	-0.047	0.094*
	(0.101)	(0.184)	(0.053)	(0.094)	(0.056)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.596	0.626	0.687	0.679	0.696
Fixed effects	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes
Matching	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Population weighting	Yes	Yes	Yes	Yes	Yes
PSF	Yes	Yes	Yes	Yes	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

We do not find a significant impact on general mortality in any region, similar to the average effect. The only three different (from the average impact), but significant impact (at 5%) we find is that (i) a 33.7% (8.2%) redution in infant mortality (maternal mortality) for the Mideast region, and (ii) a positive effect (4.5%) on elderly mortality indicators for the South region. Although this last result seems counterintuitive at first, note that lack of a doctor may influence mortality's notifications of that municipality and our results suggest that this could be the case for the second richest region in Brazil.

Table 27. The regional effect of MDP on Mortality

	Middle West	North	Northeast	South	Southeast
General mortality					
MDP impact	-0.019	0.036	0.002	0.033*	-0.007
	(0.025)	(0.064)	(0.015)	(0.020)	(0.010)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.469	0.349	0.556	0.398	0.493
Elderly mortality					
MDP impact	-0.013	0.054	-0.010	0.045**	-0.000
	(0.043)	(0.097)	(0.018)	(0.020)	(0.012)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.279	0.247	0.414	0.267	0.308
Maternal mortality					
MDP impact	-0.082**	0.037	-0.029	0.016	-0.000
	(0.037)	(0.048)	(0.033)	(0.033)	(0.023)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.158	0.183	0.099	0.186	0.121
Mortality for preventable causes: children under 5 years of age					
MDP impact	-0.016	0.112	-0.015	-0.001	0.018
	(0.029)	(0.073)	(0.025)	(0.018)	(0.018)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.423	0.219	0.492	0.434	0.532
Mortality for preventable causes: people above 5 years of age					
MDP impact	-0.029	0.036	0.019	-0.002	0.023
	(0.043)	(0.081)	(0.026)	(0.031)	(0.020)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.445	0.304	0.484	0.584	0.651
Live births rate					
MDP impact	0.025	0.006	0.024	0.011	0.010
	(0.035)	(0.065)	(0.020)	(0.038)	(0.028)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.867	0.738	0.807	0.749	0.684
Fixed effects	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes

Matching	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Population weighting	Yes	Yes	Yes	Yes	Yes
PSF	Yes	Yes	Yes	Yes	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

Table 28. The regional effect of MDP on Infant Mortality

	Middle West	**North**	**Northeast**	**South**	**Southeast**
Infant mortality					
MDP impact	-0.337**	0.355	0.048	0.076	0.040
	(0.136)	(0.238)	(0.091)	(0.093)	(0.063)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.341	0.295	0.232	0.313	0.347
Infant mortality: infectious and parasitic diseases					
MDP impact	-0.051	0.004	-0.008	-0.050	0.016
	(0.046)	(0.097)	(0.027)	(0.043)	(0.022)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.178	0.186	0.131	0.160	0.137
Infant mortality: respiratory diseases					
MDP impact	-0.034	0.168	0.006	0.013	0.033
	(0.051)	(0.136)	(0.038)	(0.024)	(0.021)
Observations	2,556	756	10,164	7,884	10,440
R^2	0.277	0.199	0.133	0.133	0.166
Fixed effects	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes
Matching	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Population weighting	Yes	Yes	Yes	Yes	Yes
PSF	Yes	Yes	Yes	Yes	Yes

Notes: (1) Controls: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) Robust standard errors, in parentheses, are clustered at the municipality level. (3) All variables are in logarithm form and interacted with a linear trend.

5 CONCLUSION AND DISCUSSION

The literature regarding the physician's supply categorically shows that training, distributing, and retaining health professionals in regions of greater economic and social vulnerability is a problem that affects several countries in the world, and Brazil is no exception. Counting on an average of 2.1 physicians per thousand inhabitants and immense geographic vacuums in the provision of these professionals, the federal government implemented in 2013 the More

Doctors Program, whose main axis focuses on the emergency provision of physicians in regions of scarcity. This axis is the focus of evaluation of this work.

Recently, numerous studies evaluated the impacts of the MDP over population's access to primary healthcare, attendance and provision of professionals in the priority regions of the SUS and the perspective of the users of the public health system regarding the care provided by the doctors connected to the Program. The first studies deal with the qualitative and descriptive evaluation of the Program, and only recently the MDP was object of further analysis using quantitative evaluation methods, through econometric modeling. This study complements the results found by Carrillo and Feres (2018), Fontes *et al.* (2017) and Vieira, Costa and Lopes (2017) regarding the More Doctors Program.

The approach adopted by this paper is the use of differences-in-differences models with Propensity Score Matching, which allows for the evaluation of the Program over time in a scenario in which the municipalities' participation occurs by unobserved variables (non-random treatment). Based on municipal data collected between 2010 and 2015, the models indicate that, although the Program has not yet presented significant effects on mortality indicators, there are significant improve on basic healthcare indicators and reduction of some hospitalizations indicators.

The results show that the MDP has positive effects particularly on appointments, consults, referrals, and home visits, and negative effects on hospitalization. However, it does not seem to have been able to reduce mortality in the municipalities, but that could take longer terms as suggested by our lagged-effect model. For this lagged model, none of the health inputs seemed to be affected by MDP, but hospitalization of children under 5 years. Our results are robust to randomization of participation in the MDP implementation period, and participating and non-participating municipalities have their variables with the same trajectory before the Program's adoption.

The results suggest evidence that the More Doctors Program may have achieved its goal of providing access to medical care (healthcare inputs) and reducing hospitalization, but it has not generated a reduction in the indicators of mortality yet. Two reasons may explain such results.

Our results suggest that an increase in 4.2% in the number of physicians in Brazil for the period 2010-2015. According to SUS/Ministry of Health, MDP costs R$ 2,565,217,416.23 for 2015. However, only 80% of that amount goes to Basic Health Care (R$ 2,130,814,340.30). This represents only 0.12% of total public expenditures for that year[24]. This cost captures not only the wages of the doctors but also some direct costs such as ticket flights, students training etc.

As addressed by Carrillo and Feres (2018), the simple provision of physicians may not result in positive effects on the population's health solely. The quality of the medical care and the effectiveness of the treatment provided to the patients can be more important to improve the healthcare indicators. We find quality improvements on public health services in terms of appointments (preventive), referrals, and home visits after Program adoption. More importantly, we find an associated reduction in hospitalization by 4.6%. Each typical hospitalization costs in average R$ 1,612.74, and adding all hospitalization in Brazil for that year that sums up a cost of R$ 18,264,959,463.54. Those hospitalizations reductions correspond to a savings in the order of R$ 840,188,135.32, using 2015 as our benchmarck. This benefit corresponds to half of the cost of the Program. Still, the Program seem to have a (small) long-term effect. We find a reduction in 1.3% of the total mortality indicator, one semester after the adotption of the MDP.

Our results suggest that some indicators of better quality services are in place with this Program (referrals, systematic medical monitoring, etc). Santos *et al.* (2017), Oliveira, Sanchez and Santos (2016), and others, emphasized the importance of the policymakers keep the focus on priority municipalities to enahnce public health system, but this work has analyzed only three-year for MDP, including an initial phase where some procedures are implemented. Still, other measures may be necessary to ensure direct results on people's life quality in a municipality.

[24] Available at: <http://www.portaltransparencia.gov.br/programas-de-governo/35-mais-medicos?ano=2015>. Access in 07/06/2018.

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6ºB da Lei nº 10.260, de 12 de julho de 2001, no âmbito do Fundo de Financiamento Estudantil (FIES) e dá outras providências; as regras para abatimento do saldo devedor consolidado e a carência estendida.

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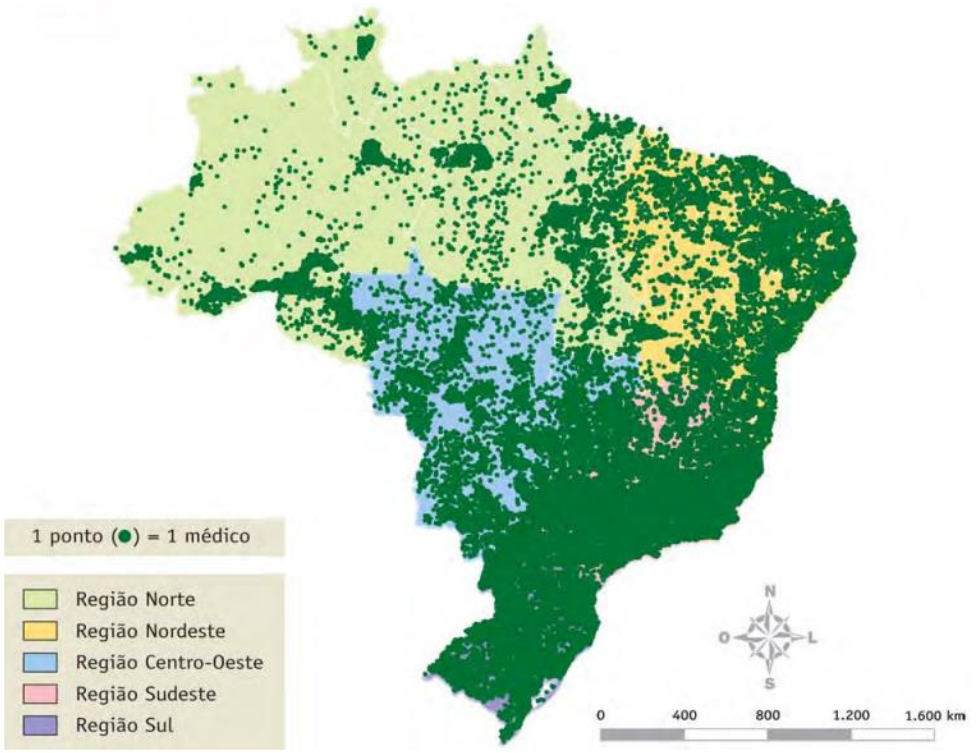
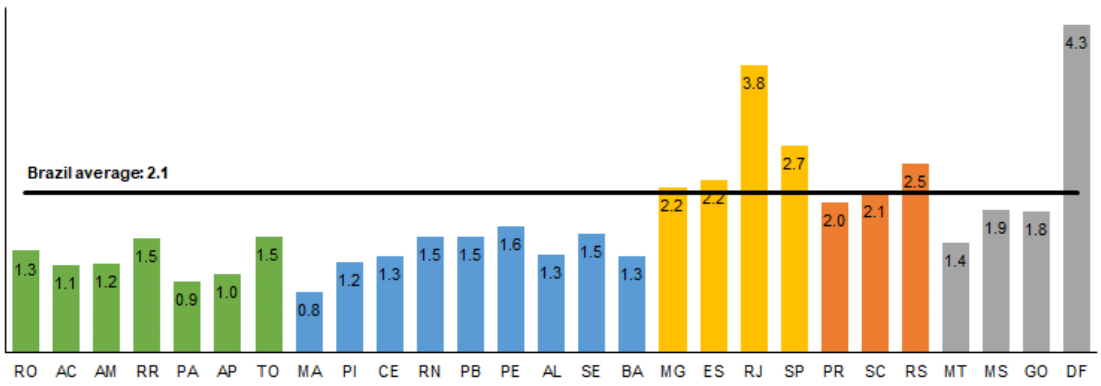
APPENDIX A

Map A1. Regional disparities: distribution of physicians in Brazil



Notes: (1) One point equals to one physician. (2) Bands equals number of physicians.
Source: Scheffer *et al.* (2015), p. 149.

Graph A1. Physicians per thousand inhabitants per Brazilian state



Source: graph drawn by the author from the data of Scheffer *et al.* (2015), p. 48.

Table A1. Variables, frequency and sources

Variable	Description	Source	Frequency
Gini index	Gini index	Censo 2010/IBGE	Anual, only for 2010
Literacy rate	Literacy rate	Censo 2010/IBGE	Anual, only for 2010
Percentage of the population of the municipality declared indigenous	Percentage of the population of the municipality declared indigenous	Censo 2010/IBGE	Anual, only for 2010
Percentage of the population of the municipality in rural area	Percentage of the population of the municipality in rural area	Censo 2010/IBGE	Anual, only for 2010
Number of beds	Number of beds, adding rest/observation, hospitalization, complementary and urgency/emergency beds	CNES	Monthly
Number of health facilities	Number of health facilities	CNES	Monthly
Number of health professionals working in the municipality per thousand inhabitants	Number of health professionals working in the municipality per thousand inhabitants. They include: anesthesiologist, general surgeon, general practitioner, gynecologist and obstetrician, family physician, pediatrician, psychiatrist, radiologist, sanitarist, other physicians, dentist surgeon, nurse, physiotherapist, speech pathologist, nutritionist, pharmacist, social worker, psychologist, nursing assistant and nursing technician. If the professional works in more than one municipality, he is counted twice (occupations)	CNES	Monthly
Number of health professionals working through SUS in the municipality per thousand inhabitants	Number of health professionals working through SUS in the municipality per thousand inhabitants. They include: anesthesiologist, general surgeon, general practitioner, gynecologist and obstetrician, family physician, pediatrician, psychiatrist, radiologist, sanitarist, other physicians, dentist surgeon, nurse, physiotherapist, speech pathologist, nutritionist, pharmacist, social worker, psychologist, nursing assistant and nursing technician. If the professional works in more than one municipality, he is counted twice (occupations)	CNES	Monthly
Number of hospital-level facilities	Number of middle and high complexity hospitals, state and municipal level	CNES	Monthly
Number of nursing professionals working in the municipality per thousand inhabitants	Number of nursing professionals working in the municipality per thousand inhabitants. They include: nurse, nursing assistant and nursing technician. If the nurse works in more than one municipality, it is counted twice (occupations)	CNES	Monthly
Number of nursing professionals working through SUS in the municipality per thousand inhabitants	Number of nursing professionals working through SUS in the municipality per thousand inhabitants. They include: nurse, nursing assistant and nursing technician. If the nurse works in more than one municipality, it is counted twice (occupations)	CNES	Monthly
Number of outpatient facilities	Number of outpatient facilities, medium and high complexity, state and municipal level	CNES	Monthly
Number of physicians working in the municipality per thousand inhabitants	Number of physicians working in the municipality per thousand inhabitants. If the physician works in more than one municipality, it is counted twice (occupations)	CNES	Monthly
Number of physicians working in the municipality through SUS per thousand inhabitants	Number of physicians working in the municipality through SUS per thousand inhabitants. If the physician works in more than one municipality, it is counted twice (occupations)	CNES	Monthly
Number of primary care physicians working in the municipality per thousand inhabitants	Number of primary care physicians working in the municipality per thousand inhabitants. They include: general surgeon, general practitioner, gynecologist and obstetrician, family physician and pediatrician. If the physician works in more than one municipality, it is counted twice (occupations)	CNES	Monthly

Variable	Description	Source	Frequency
Number of primary care physicians working through SUS in the municipality per thousand inhabitants	Number of primary care physicians working through SUS in the municipality per thousand inhabitants. They include: general surgeon, general practitioner, gynecologist and obstetrician, family physician and pediatrician. If the physician works in more than one municipality, it is counted twice (occupations)	CNES	Monthly
Deflated education expenditure (R$)	Annual municipal expenditure with education in real terms, deflated by IPCA (100=2016) (R$)	FINBRA	Anual
Deflated health expenditure (R$)	Annual municipal expenditure with health in real terms, deflated by IPCA (100=2016) (R$)	FINBRA	Anual
Deflated total expenditure (R$)	Total annual municipal expenditure in real terms, deflated by IPCA (100=2016) (R$)	FINBRA	Anual
Border Zone	Dummy variable that indicates whether the municipality is in Border Zone (1) or not (0)	IBGE	-
Deflated GDP (R$)	Municipal GDP in real terms, deflated by the national GDP deflator (100 = 2017), in Reais	IBGE	Anual
Legal Amazon	Dummy variable that indicates whether the municipality is in the Legal Amazon area (1) or not (0)	IBGE	-
Semi-arid	Dummy variable that indicates whether the municipality is in Semi-arid (1) or not (0)	IBGE	-
Number of schools per capita	Number of schools in Basic Education (Regular, Special and/or Youth and Adult Education) by municipality per capita	INEP	Anual
Number of teachers per capita	Number of teachers in Basic Education (Regular, Special and/or Youth and Adult Education) by municipality per capita	INEP	Anual
"Bolsa Família" Program benefits	Number of "Bolsa Família" Program benefits distributed in the municipality	IPEADATA	Anual, only for 2010
Altitude (m)	Municipality altitude (m)	IPEADATA	-
Area (km²)	Municipality area (km²)	IPEADATA	-
Distance from the municipality to the state capital (km)	Distance from the municipality to the state capital (km)	IPEADATA	-
Deflated salary mass	Municipal salary mass in real terms, deflated by IPCA (100=2016) (R$)	RAIS	Anual
Child population	Number of inhabitants under 10 years in the municipality	Ripsa e CGIAE/SVS/MS	Anual
Elderly population	Number of inhabitants above 60 years in the municipality	Ripsa e CGIAE/SVS/MS	Anual
Population	Number of inhabitants in the municipality	Ripsa e CGIAE/SVS/MS	Anual
Women population	Number of female inhabitantsin the municipality	Ripsa e CGIAE/SVS/MS	Anual
Youth population	Number of inhabitants between 15 and 19 years in the municipality	Ripsa e CGIAE/SVS/MS	Anual
Month of adhesion to MDP	Month of the adhesion edict in which the municipality decided to join the More Doctors Program	SGTES/MS	Monthly
Unscheduled month to MDP	Month in which the municipality asked for the unregistration of the More Doctors Program	SGTES/MS	Monthly
Primary care physicians in the SUS, except the MDP, per thousand inhabitants	Number of primary care physicians in SUS, except MDP physicians, per thousand inhabitants	SGTES/MS and CNES	Monthly

Variable	Description	Source	Frequency
Appointments per thousand inhabitants	Number of medical and nursing appointments per thousand inhabitants for residents in the municipality in diseases and conditions that should be followed systematically, including childcare, prenatal, preventive (papanicolau), STD/AIDS, diabetes, hypertension, leprosy, tuberculosis and work accident	SIAB	Monthly
Consultations per thousand inhabitants	Number of medical consultations of people residing in areas within and outside the scope of the Family Health Program (PSF)	SIAB	Monthly
Exams per thousand inhabitants	Number of medical requests for exams, including clinical pathology, radiodiagnostic, cytopathological, obstetrical ultrasonography and other examinations	SIAB	Monthly
Home visits	Number of home visits performed by the medical professional	SIAB	Monthly
Hospitalization of children under 5 years per thousand inhabitants	Number of children up to 5 years hospitalized for pneumonia or dehydration per thousand inhabitants under 5 years	SIAB	Monthly
Live births rate	Number of children born alive per thousand births	SIAB	Monthly
Number of diabetics	Number of people with diabetes registered	SIAB	Monthly
Number of expecting mothers	Number of expecting mothers registered	SIAB	Monthly
Number of hypertensive patients	Number of people with hypertension registered	SIAB	Monthly
Number of people with tuberculosis	Number of people with tuberculosis registered	SIAB	Monthly
Referrals per thousand inhabitants	Number of referrals for care or specialized treatment (including physiotherapy, speech therapy, occupational therapy, psychology and all medical specialties), for hospital admission, emergency care and home hospitalization	SIAB	Monthly
Hospitalization per thousand inhabitants	Number of hospitalizations, not considering the ones of extension (long stay), by place of hospitalization per thousand inhabitants	SIH	Monthly
Elderly mortality	Number of deaths of elderly people per thousand inhabitants in relation to the elderly population	SIM	Monthly
General mortality	Number of deaths per thousand inhabitants	SIM	Monthly
Infant mortality	Number of deaths of children up to 1 year per thousand live births	SIM	Monthly
Maternal mortality	Number of maternal deaths per thousand expecting mothers	SIM	Monthly
Mortality under 60 years	Number of deaths per thousand inhabitants, except deaths of people over 60	SIM	Monthly
Preventable deaths mortality - above 5 years	Number of deaths from preventable causes of people with more than 5 years per thousand inhabitants in relation to the population older than 5 years	SIM	Monthly
Preventable deaths mortality - under 5 years	Number of deaths from preventable causes of people with less than 5 years per thousand inhabitants in relation to the population younger than 5 years	SIM	Monthly
Sewage collection coverage	Proportion of people with sewage coverage	SNIS	Anual
Water coverage	Proportion of people with water supply	SNIS	Anual

Prepared by the author.

Table A2. Descriptive statistics (log): before and after

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Dependent variables						
Appointments	5.485	1.229	5.582	0.955	5.359	1.504
Childcare	3.256	1.394	3.298	1.357	3.202	1.439
Prenatal	3.026	1.252	3.040	1.231	3.008	1.279
Preventive	3.027	1.013	3.104	0.922	2.928	1.112
STD/AIDS	0.708	1.425	0.724	1.467	0.688	1.367
Consults	5.951	1.323	6.042	1.032	5.832	1.618
Under 1 year of age	2.220	1.085	2.275	1.048	2.150	1.129
Adults (15 to 59 years of age)	5.393	1.230	5.477	0.981	5.284	1.485
Elderly (above 60 years of age)	4.424	1.148	4.440	0.963	4.403	1.351
Referrals	3.225	1.332	3.222	1.279	3.229	1.397
Special attendance	2.908	1.361	2.882	1.331	2.942	1.398
Hospitalization	0.264	1.509	0.294	1.545	0.224	1.461
Emergency	0.807	1.455	0.746	1.474	0.886	1.425
Home hospitalization	-0.502	1.293	-0.508	1.306	-0.495	1.277
Exams	4.916	1.485	4.970	1.300	4.845	1.692
Obstetrical ultrasonography	1.719	1.207	1.715	1.213	1.723	1.199
Home visits	2.416	1.245	2.400	1.258	2.436	1.229
Hospitalization - Under 5 years old	0.770	0.987	0.898	1.000	0.603	0.943
Pneumonia	0.535	0.896	0.623	0.915	0.420	0.857
Dehydration	0.105	0.769	0.155	0.814	0.0398	0.701
Hospitalization	2.020	1.598	2.097	1.586	1.920	1.608
Pregnancy, childbirth and puerperium	0.707	1.133	0.766	1.120	0.629	1.145
Infectious and parasitic diseases	0.466	0.982	0.523	0.995	0.390	0.960
Respiratory diseases	0.847	1.019	0.911	1.022	0.763	1.008
Infant mortality	1.781	1.474	1.789	1.434	1.770	1.526
Infectious and parasitic diseases	0.126	0.489	0.128	0.486	0.122	0.494
Respiratory diseases	0.132	0.511	0.135	0.509	0.128	0.513
General mortality	1.077	0.324	1.055	0.327	1.107	0.317
Elderly mortality	2.766	0.341	2.770	0.350	2.762	0.329
Maternal mortality	0.128	0.496	0.121	0.473	0.136	0.525
Preventable causes mortality (above 5 years of age)	0.0642	0.580	0.0940	0.581	0.0253	0.577
Preventable causes mortality (under 5 years of age)	0.00165	0.490	0.0104	0.507	-0.00978	0.465
Live births	6.006	1.063	6.130	0.594	5.844	1.447
Explanatory variables						
SUS physicians	0.437	0.678	0.427	0.683	0.450	0.673
SUS physician, except MDP physicians, in AB	0.173	0.606	0.183	0.583	0.161	0.635
SUS nursing staff	0.624	0.469	0.539	0.455	0.733	0.465
SUS health professionals	1.588	0.473	1.538	0.474	1.653	0.464
Water coverage	-0.476	0.468	-0.502	0.478	-0.442	0.454
Teachers per capita	-4.377	0.216	-4.386	0.212	-4.365	0.220
Health facilities	-6.551	0.545	-6.619	0.553	-6.463	0.522
Total expenditure per capita	7.891	0.374	7.854	0.377	7.939	0.364
Health expenditure per capita	6.386	0.578	6.303	0.667	6.495	0.413
Education expenditure per capita	6.649	0.470	6.591	0.545	6.723	0.334
Population	9.592	1.113	9.607	1.109	9.573	1.119

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Child population	7.732	1.171	7.783	1.160	7.666	1.181
Elderly population	7.458	1.039	7.432	1.037	7.493	1.041
Women population	8.885	1.125	8.900	1.120	8.866	1.131
Expecting mothers	4.108	1.094	4.142	1.082	4.061	1.110
Gini index	-0.231	0.0561	-0.228	0.0559	-0.235	0.0562
Perc. black and brown	-0.849	0.665	-0.846	0.663	-0.853	0.667
Perc. indigenous	-3.981	3.373	-4.003	3.369	-3.952	3.378
People in rural area	-1.362	0.952	-1.361	0.957	-1.363	0.947
Literacy rate	-0.157	0.103	-0.157	0.104	-0.156	0.103
Area	6.202	1.157	6.214	1.158	6.187	1.155
Altitude	5.596	1.388	5.586	1.395	5.609	1.379
Distance to the state capital	5.272	0.829	5.270	0.830	5.274	0.827
Temperature	3.107	0.136	3.108	0.136	3.107	0.136
Rainfall	4.683	0.336	4.682	0.338	4.685	0.333
Inicial condition	-2.208	0.698	-2.280	0.608	-2.114	0.790
GDP per capita	2.794	0.680	2.759	0.685	2.839	0.671

Prepared by the author.

Table A3. Descriptive statistics (log): treated and control groups

Variable	Total		Control		Treatment	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Dependent variables						
Appointments	5.485	1.229	5.632	1.276	5.436	1.209
Childcare	3.256	1.394	3.213	1.527	3.270	1.347
Prenatal	3.026	1.252	2.941	1.335	3.054	1.222
Preventive	3.027	1.013	3.136	1.040	2.992	1.001
STD/AIDS	0.708	1.425	0.662	1.410	0.724	1.429
Consults	5.951	1.323	6.169	1.340	5.879	1.309
Under 1 year of age	2.220	1.085	2.308	1.185	2.192	1.049
Adults (15 to 59 years of age)	5.393	1.230	5.619	1.245	5.319	1.216
Elderly (above 60 years of age)	4.424	1.148	4.670	1.142	4.343	1.138
Referrals	3.225	1.332	3.526	1.376	3.126	1.301
Special attendance	2.908	1.361	3.195	1.423	2.813	1.327
Hospitalization	0.264	1.509	0.627	1.525	0.144	1.485
Emergency	0.807	1.455	0.971	1.504	0.752	1.434
Home hospitalization	-0.502	1.293	-0.255	1.114	-0.584	1.337
Exams	4.916	1.485	5.137	1.553	4.843	1.454
Obstetrical ultrasonography	1.719	1.207	1.716	1.254	1.719	1.191
Home visits	2.416	1.245	2.654	1.216	2.337	1.245
Hospitalization - Under 5 years old	0.770	0.987	0.809	0.995	0.757	0.984
Pneumonia	0.535	0.896	0.606	0.895	0.511	0.896
Dehydration	0.105	0.769	0.190	0.674	0.0770	0.796
Hospitalization	2.020	1.598	1.571	1.634	2.169	1.558
Pregnancy, childbirth and puerperium	0.707	1.133	0.458	0.997	0.789	1.163
Infectious and parasitic diseases	0.466	0.982	0.371	0.894	0.497	1.008
Respiratory diseases	0.847	1.019	0.702	0.973	0.894	1.029
Infant mortality	1.781	1.474	1.413	1.516	1.902	1.440
Infectious and parasitic diseases	0.126	0.489	0.0772	0.421	0.142	0.509
Respiratory diseases	0.132	0.511	0.0889	0.450	0.146	0.529
General mortality	1.077	0.324	1.117	0.340	1.064	0.317
Elderly mortality	2.766	0.341	2.745	0.397	2.773	0.320
Maternal mortality	0.128	0.496	0.0902	0.451	0.140	0.510
Preventable causes mortality (above 5 years of age)	0.0642	0.580	-0.0268	0.585	0.0943	0.576

Variable	Total		Control		Treatment	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Preventable causes mortality (under 5 years of age)	0.00165	0.490	0.0262	0.381	-0.00646	0.520
Live births	6.006	1.063	5.981	1.136	6.014	1.038
Explanatory variables						
SUS physicians	0.437	0.678	0.470	0.653	0.426	0.686
SUS physician, except MDP physicians, in AB	0.173	0.606	0.268	0.571	0.142	0.614
SUS nursing staff	0.624	0.469	0.688	0.472	0.602	0.466
SUS health professionals	1.588	0.473	1.690	0.446	1.554	0.477
Water coverage	-0.476	0.468	-0.410	0.399	-0.498	0.487
Teachers per capita	-4.377	0.216	-4.356	0.219	-4.384	0.214
Health facilities	-6.551	0.545	-6.462	0.511	-6.581	0.553
Total expenditure per capita	7.891	0.374	8.038	0.412	7.842	0.347
Health expenditure per capita	6.386	0.578	6.552	0.571	6.332	0.570
Education expenditure per capita	6.649	0.470	6.707	0.443	6.629	0.477
Population	9.592	1.113	9.052	0.971	9.771	1.099
Child population	7.732	1.171	7.137	1.036	7.929	1.146
Elderly population	7.458	1.039	6.996	0.908	7.611	1.035
Women population	8.885	1.125	8.340	0.980	9.065	1.112
Expecting mothers	4.108	1.094	3.637	1.011	4.263	1.076
Gini index	-0.231	0.0561	-0.222	0.0614	-0.234	0.0539
Perc. black and brown	-0.849	0.665	-0.929	0.684	-0.822	0.656
Perc. indigenous	-3.981	3.373	-3.311	3.448	-4.203	3.318
People in rural area	-1.362	0.952	-1.364	0.806	-1.361	0.996
Literacy rate	-0.157	0.103	-0.141	0.0926	-0.162	0.106
Area	6.202	1.157	5.876	1.039	6.310	1.174
Altitude	5.596	1.388	5.869	1.166	5.506	1.443
Distance to the state capital	5.272	0.829	5.339	0.773	5.249	0.845
Temperature	3.107	0.136	3.098	0.132	3.111	0.137
Rainfall	4.683	0.336	4.717	0.275	4.672	0.353
Inicial condition	-2.208	0.698	-1.990	0.614	-2.279	0.709
GDP per capita	2.794	0.680	2.872	0.663	2.768	0.684

Prepared by the author.

Table A4. Results for Propensity Score Matching (PSM) model: municipality's adhesion

Variables	Coefficients
SUS physicians	0.183***
	(0.017)
SUS nursing staff	0.043**
	(0.019)
SUS health professionals	-0.127***
	(0.014)
Water coverage	-0.461***
	(0.061)
Teachers per capita	-0.196
	(3.219)
Health facilities	34.277***
	(12.824)
Total expenditure per capita	-0.000***
	(0.000)
Health expenditure per capita	-0.000***
	(0.000)
Education expenditure per capita	0.000***
	(0.000)
Population	0.000***
	(0.000)
Gini index	-2.800***
	(0.558)
Perc. black and brown	0.360***
	(0.063)
Perc. indigenous	0.647**
	(0.303)

Variables	Coefficients
People in rural area	0.251***
	(0.069)
Literacy rate	-0.612***
	(0.217)
Area	0.000***
	(0.000)
Altitude	-0.001***
	(0.000)
Distance to the state capital	0.000***
	(0.000)
Temperature	-0.060***
	(0.006)
Rainfall	0.003***
	(0.000)
Legal Amazon	-0.231***
	(0.039)
Semi-Arid Zone	0.398***
	(0.034)
Inicial condition	0.009
	(0.061)
GDP per capita	0.003***
	(0.001)
Constant	4.101***
	(0.392)
Observations	35,280
Pseudo R^2	0.1156

Notes: (1) All variables are in logarithm form, except the dummies Legal Amazon and Semi-Arid Zone. (2) It is the Probit regression on the variable of MDP's adoption. (3) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table A5. The effect of MDP on the number of Doctors

	(1)	(2)	(3)	(4)	(5)	(6)
MDP impact	0.023**	0.032***	0.036***	0.048***	0.042***	0.042***
	(0.011)	(0.012)	(0.010)	(0.011)	(0.011)	(0.011)
Observations	35,280	34,536	35,280	34,536	33,540	33,540
R^2	0.912	0.917	0.930	0.935	0.932	0.932
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes
Population weighting	No	No	No	No	Yes	Yes
PSF	No	No	No	No	No	Yes
Lag	No	No	No	No	No	No

	Brazil	Middle West	North	Northeast	South	Southeast
MDP impact	0.042***	0.033	0.001	0.043**	0.074***	0.032**
	(0.011)	(0.029)	(0.045)	(0.021)	(0.024)	(0.015)
Observations	33,540	2,556	756	10,164	7,884	10,440
R^2	0.932	0.910	0.926	0.881	0.920	0.929
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Non-linear trend	Yes	Yes	Yes	Yes	Yes	Yes
Matching	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Population weighting	Yes	Yes	Yes	Yes	Yes	Yes
PSF	Yes	Yes	Yes	Yes	Yes	Yes
Lag	No	No	No	No	No	No

Notes: (1) Controls vector: total expenditure per capita, health expenditure per capita, educational expenditure per capita, GDP per capita, water coverage, SUS health professionals, SUS nursing staff, SUS physician except MDP physicians, initial condition, population, child population, elderly population, woman population, and expecting mother's population. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table A6. Descriptive statistics for Middle West region (level)

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Dependent variables						
Appointments	355.8	580.4	367.9	604.0	340.3	548.5
Childcare	48.60	246.3	44.67	194.6	53.65	300.0
Prenatal	43.49	250.8	42.81	230.4	44.37	275.0
Preventive	31.26	126.5	35.63	167.8	25.64	17.81
STD/AIDS	6.335	18.65	7.168	23.56	5.262	8.914
Consults	711.4	1,330	704.9	1,332	719.8	1,329
Under 1 year of age	17.05	32.76	17.08	12.30	17.02	47.54
Adults (15 to 59 years of age)	403.5	787.9	383.0	373.2	430.0	1,113
Elderly (above 60 years of age)	163.4	955.1	167.8	1,146	157.9	630.0
Referrals	49.29	263.2	51.77	344.0	46.09	78.77
Special attendance	29.49	33.25	28.48	29.90	30.80	37.09
Hospitalization	5.952	16.07	6.770	19.01	4.899	11.11
Emergency	7.864	36.60	6.648	15.67	9.428	52.38
Home hospitalization	6.771	256.0	10.60	341.2	1.851	8.885
Exams	319.4	1,535	298.4	1,627	346.5	1,407
Obstetrical ultrasonography	11.70	10.07	11.62	9.977	11.80	10.20
Home visits	21.80	32.81	22.23	31.18	21.24	34.81
Hospitalization - Under 5 years old	4.449	7.138	5.164	7.915	3.528	5.868
Pneumonia	2.861	3.952	3.155	3.964	2.483	3.905
Dehydration	2.223	4.862	2.588	5.878	1.755	3.035
Hospitalization	22.04	17.99	23.16	17.84	20.60	18.08
Pregnancy, childbirth and puerperium	3.621	3.306	3.647	3.251	3.587	3.376
Infectious and parasitic diseases	3.186	3.357	3.464	3.475	2.828	3.165
Respiratory diseases	4.514	3.998	4.840	4.084	4.095	3.845
Infant mortality	18.65	48.21	16.21	39.11	21.78	57.71
Infectious and parasitic diseases	1.581	3.484	1.521	3.013	1.658	4.009
Respiratory diseases	2.150	6.677	1.986	5.956	2.360	7.502
General mortality	2.833	0.854	2.759	0.835	2.927	0.870
Elderly mortality	15.92	4.900	16.05	4.998	15.76	4.768
Maternal mortality	1.613	3.481	1.471	2.578	1.795	4.372
Preventable causes mortality (above 5 years of age)	1.285	0.636	1.288	0.633	1.281	0.639
Preventable causes mortality (under 5 years of age)	1.144	0.759	1.127	0.682	1.166	0.848
Live births	483.3	145.1	489.3	110.3	475.5	179.9
Explanatory variables						
SUS physicians	1.797	1.112	1.746	1.046	1.863	1.189
SUS physician, except MDP physicians, in AB	1.370	0.673	1.355	0.644	1.389	0.709
SUS nursing staff	2.359	1.071	2.167	0.953	2.607	1.160
SUS health professionals	5.473	2.220	5.166	1.983	5.867	2.437
Water coverage	0.745	0.152	0.732	0.151	0.761	0.153
Teachers per capita	0.0114	0.00266	0.0114	0.00250	0.0115	0.00284
Health facilities	0.00181	0.000810	0.00170	0.000765	0.00194	0.000845
Total expenditure per capita	3,307	1,448	3,184	1,395	3,465	1,499
Health expenditure per capita	756.6	306.3	707.7	288.6	819.5	316.8
Education expenditure per capita	837.4	346.2	796.4	347.0	890.1	338.0
Population	24,789	49,065	24,561	47,960	25,082	50,469
Child population	4,061	8,173	4,155	8,237	3,939	8,090
Elderly population	2,232	3,824	2,116	3,527	2,381	4,172
Women population	12,216	24,604	12,097	24,039	12,368	25,321

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Expecting mothers	85.95	119.7	89.91	121.3	80.85	117.5
Gini index	0.758	0.0481	0.759	0.0486	0.756	0.0474
Perc. black and brown	0.560	0.102	0.560	0.102	0.559	0.102
Perc. indigenous	0.0126	0.0582	0.0129	0.0592	0.0123	0.0570
People in rural area	0.247	0.152	0.248	0.152	0.247	0.152
Literacy rate	0.890	0.0354	0.890	0.0355	0.890	0.0353
Area	3,160	5,558	3,201	5,640	3,107	5,453
Altitude	523.4	232.9	523.2	233.5	523.6	232.3
Distance to the state capital	225.0	150.1	226.2	150.8	223.5	149.3
Temperature	24.21	1.106	24.21	1.110	24.22	1.101
Rainfall	135.9	16.57	135.9	16.61	136.0	16.53
Legal Amazon	0.214	0.410	0.216	0.412	0.211	0.408
Semi-Arid Zone	0	0	0	0	0	0
Border Zone	0.0299	0.170	0.0310	0.173	0.0285	0.166
Inicial condition	0.125	0.153	0.105	0.0816	0.151	0.209
GDP per capita	29.67	27.97	29.01	29.62	30.52	25.67

Prepared by the author.

Table A7. Descriptive statistics for Southeast region (level)

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Dependent variables						
Appointments	420.0	2,244	406.5	1,583	437.0	2,866
Childcare	46.24	249.8	48.51	282.6	43.38	201.3
Prenatal	22.44	130.3	20.27	20.49	25.15	194.2
Preventive	28.88	253.7	26.64	21.87	31.70	380.2
STD/AIDS	6.281	254.7	4.064	35.65	9.064	380.4
Consults	638.2	2,004	592.8	1,250	695.2	2,663
Under 1 year of age	12.86	15.24	12.73	15.02	13.02	15.51
Adults (15 to 59 years of age)	337.2	811.0	327.5	704.8	349.3	927.3
Elderly (above 60 years of age)	196.6	1,689	160.9	814.0	241.3	2,366
Referrals	66.12	1,021	52.59	80.22	83.11	1,530
Special attendance	50.11	262.3	45.06	70.27	56.45	385.9
Hospitalization	5.009	253.0	2.585	5.995	8.052	379.9
Emergency	7.400	253.7	4.770	20.62	10.70	380.3
Home hospitalization	4.592	276.3	1.135	3.144	8.931	414.9
Exams	347.9	2,128	306.1	1,663	400.3	2,595
Obstetrical ultrasonography	8.940	253.1	6.278	8.315	12.28	380.0
Home visits	22.81	53.63	22.62	40.94	23.06	66.21
Hospitalization - Under 5 years old	16.77	1,397	3.794	5.685	33.07	2,097
Pneumonia	16.05	1,396	2.973	4.097	32.47	2,097
Dehydration	1.405	2.409	1.456	2.481	1.341	2.313
Hospitalization	18.27	21.12	18.81	20.91	17.59	21.36
Pregnancy, childbirth and puerperium	3.663	4.180	3.814	4.193	3.475	4.155
Infectious and parasitic diseases	1.804	2.088	1.813	2.070	1.793	2.111
Respiratory diseases	3.301	3.428	3.468	3.547	3.090	3.262
Infant mortality	19.83	66.16	18.69	48.09	21.26	83.46
Infectious and parasitic diseases	1.600	6.230	1.612	7.370	1.584	4.398
Respiratory diseases	1.609	5.620	1.580	3.432	1.644	7.514
General mortality	3.354	0.887	3.301	0.882	3.421	0.888
Elderly mortality	17.09	4.385	17.30	4.513	16.81	4.203
Maternal mortality	1.530	5.621	1.381	2.361	1.718	8.013
Preventable causes mortality (above 5 years of age)	1.354	0.864	1.421	0.897	1.271	0.813
Preventable causes mortality (under 5 years of age)	1.159	0.840	1.187	0.839	1.125	0.841
Live births	482.2	142.3	485.0	115.4	478.6	170.1
Explanatory variables						

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
SUS physicians	2.574	1.764	2.560	1.730	2.592	1.806
SUS physician, except MDP physicians, in AB	1.766	0.958	1.760	0.937	1.773	0.983
SUS nursing staff	2.173	1.236	1.986	1.086	2.409	1.365
SUS health professionals	6.506	3.211	6.233	3.003	6.848	3.423
Water coverage	0.757	0.182	0.748	0.180	0.767	0.184
Teachers per capita	0.0123	0.00259	0.0122	0.00254	0.0125	0.00263
Health facilities	0.00181	0.000964	0.00171	0.000934	0.00194	0.000986
Total expenditure per capita	3,138	1,567	3,041	1,488	3,260	1,653
Health expenditure per capita	758.8	354.9	707.9	325.5	822.8	379.1
Education expenditure per capita	817.2	372.4	783.7	354.2	859.3	390.1
Population	37,824	66,956	38,549	67,473	36,915	66,298
Child population	5,433	9,573	5,694	9,898	5,105	9,139
Elderly population	4,626	8,318	4,513	8,016	4,768	8,681
Women population	18,999	34,237	19,366	34,496	18,537	33,907
Expecting mothers	97.58	151.9	100.3	141.4	94.16	164.0
Gini index	0.842	0.0289	0.845	0.0282	0.839	0.0295
Perc. black and brown	0.453	0.184	0.454	0.184	0.453	0.184
Perc. indigenous	0.000887	0.00193	0.000889	0.00189	0.000885	0.00197
People in rural area	0.242	0.177	0.241	0.177	0.242	0.176
Literacy rate	0.904	0.0482	0.904	0.0484	0.904	0.0480
Area	618.4	833.3	624.3	841.3	611.1	823.2
Altitude	592.9	278.1	591.7	279.5	594.3	276.4
Distance to the state capital	259.7	155.8	257.6	155.2	262.4	156.7
Temperature	21.33	1.878	21.32	1.873	21.33	1.884
Rainfall	114.1	19.40	114.2	19.58	114.1	19.18
Legal Amazon	0	0	0	0	0	0
Semi-Arid Zone	0.0466	0.211	0.0469	0.211	0.0462	0.210
Border Zone	0	0	0	0	0	0
Inicial condition	0.164	0.169	0.146	0.136	0.186	0.202
GDP per capita	24.29	23.43	23.94	22.06	24.73	25.04

Prepared by the author.

Table A8. Descriptive statistics for South region (level)

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Dependent variables						
Appointments	385.8	1,769	403.5	2,032	362.5	1,350
Childcare	49.28	828.0	39.71	139.2	61.82	1,249
Prenatal	27.09	197.9	28.72	261.7	24.96	26.38
Preventive	31.17	25.39	32.36	25.30	29.61	25.41
STD/AIDS	6.997	34.16	6.277	31.58	7.941	37.25
Consults	810.1	5,277	863.4	6,773	740.0	2,046
Under 1 year of age	16.23	18.40	17.20	20.42	14.95	15.25
Adults (15 to 59 years of age)	433.5	2,886	471.7	3,730	383.3	1,003
Elderly (above 60 years of age)	241.3	2,621	248.4	3,155	232.1	1,680
Referrals	74.58	289.8	78.72	370.7	69.14	117.7
Special attendance	55.22	280.9	58.39	363.2	51.06	96.70
Hospitalization	7.231	12.55	7.869	13.24	6.394	11.55
Emergency	11.42	40.78	11.63	41.11	11.14	40.36
Home hospitalization	1.597	3.880	1.614	3.733	1.574	4.066
Exams	434.8	2,145	414.7	1,674	461.2	2,638
Obstetrical ultrasonography	9.744	184.4	11.32	244.6	7.680	9.693
Home visits	22.16	53.03	23.93	59.04	19.84	43.81
Hospitalization - Under 5 years old	4.822	8.491	5.533	9.255	3.888	7.265
Pneumonia	3.805	6.255	4.280	6.841	3.182	5.327
Dehydration	1.747	3.973	1.939	4.577	1.496	2.983

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Hospitalization	21.72	22.32	22.01	21.09	21.35	23.83
Pregnancy, childbirth and puerperium	3.227	3.465	3.291	3.331	3.143	3.633
Infectious and parasitic diseases	2.128	2.254	2.155	2.169	2.092	2.360
Respiratory diseases	5.522	5.523	5.778	5.481	5.185	5.560
Infant mortality	15.88	46.56	14.04	31.29	18.30	60.97
Infectious and parasitic diseases	1.376	4.528	1.347	4.727	1.413	4.253
Respiratory diseases	1.425	3.971	1.384	2.833	1.479	5.091
General mortality	3.418	0.926	3.374	0.904	3.476	0.952
Elderly mortality	16.92	4.643	17.30	4.736	16.43	4.470
Maternal mortality	1.657	6.308	1.600	4.213	1.733	8.289
Preventable causes mortality (above 5 years of age)	1.363	0.753	1.429	0.762	1.276	0.732
Preventable causes mortality (under 5 years of age)	1.187	0.786	1.208	0.822	1.158	0.735
Live births	480.6	167.5	488.5	119.2	470.2	214.5
Explanatory variables						
SUS physicians	2.383	1.626	2.353	1.589	2.422	1.672
SUS physician, except MDP physicians, in AB	1.770	0.989	1.761	0.975	1.783	1.006
SUS nursing staff	2.282	1.151	2.095	1.007	2.527	1.275
SUS health professionals	6.488	2.853	6.242	2.678	6.811	3.037
Water coverage	0.714	0.209	0.693	0.206	0.741	0.210
Teachers per capita	0.0132	0.00276	0.0128	0.00260	0.0137	0.00289
Health facilities	0.00221	0.000975	0.00209	0.000937	0.00237	0.00100
Total expenditure per capita	3,243	1,211	3,100	1,151	3,431	1,261
Health expenditure per capita	731.8	276.4	673.0	253.5	808.9	286.1
Education expenditure per capita	783.3	251.4	738.2	235.7	842.3	258.9
Population	23,567	47,612	23,769	47,458	23,302	47,819
Child population	3,299	6,614	3,423	6,763	3,136	6,410
Elderly population	2,952	5,669	2,844	5,391	3,094	6,011
Women population	11,866	24,354	11,967	24,276	11,734	24,459
Expecting mothers	67.61	120.3	69.64	119.3	64.94	121.5
Gini index	0.782	0.0162	0.786	0.0187	0.777	0.0103
Perc. black and brown	0.225	0.128	0.225	0.127	0.225	0.129
Perc. indigenous	0.00555	0.0336	0.00556	0.0335	0.00553	0.0338
People in rural area	0.350	0.208	0.348	0.208	0.351	0.208
Literacy rate	0.928	0.0344	0.928	0.0344	0.928	0.0344
Area	491.8	646.1	497.9	652.2	483.8	637.9
Altitude	485.1	282.5	484.0	283.6	486.5	281.1
Distance to the state capital	272.9	137.1	272.6	137.5	273.2	136.7
Temperature	19.20	1.617	19.20	1.615	19.20	1.619
Rainfall	136.1	16.20	136.1	16.23	136.1	16.15
Legal Amazon	0	0	0	0	0	0
Semi-Arid Zone	0	0	0	0	0	0
Border Zone	0.0396	0.195	0.0416	0.200	0.0370	0.189
Inicial condition	0.170	0.234	0.139	0.209	0.211	0.257
GDP per capita	29.78	17.23	28.56	18.42	31.36	15.39

Prepared by the author.

Table A9. Descriptive statistics for Northeast region (level)

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Dependent variables						
Appointments	429.8	1,317	450.3	1,591	402.3	814.9
Childcare	94.45	554.4	101.9	642.0	84.44	407.6
Prenatal	46.04	28.02	46.19	26.13	45.84	30.38
Preventive	30.57	18.92	31.52	19.30	29.29	18.31
STD/AIDS	14.21	621.9	19.69	820.7	6.826	14.40
Consults	553.0	3,641	519.7	926.4	598.0	5,474

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Under 1 year of age	14.62	49.96	14.84	12.58	14.32	75.15
Adults (15 to 59 years of age)	302.3	2,372	290.3	811.7	318.5	3,510
Elderly (above 60 years of age)	130.2	1,508	101.7	239.8	168.5	2,293
Referrals	33.47	81.08	32.42	103.0	34.87	33.80
Special attendance	23.87	76.99	22.91	99.29	25.16	25.04
Hospitalization	2.630	5.800	2.720	6.209	2.509	5.195
Emergency	6.640	14.09	6.381	14.60	6.989	13.37
Home hospitalization	1.079	6.396	1.146	8.029	0.988	3.026
Exams	294.6	3,211	232.4	591.4	378.4	4,870
Obstetrical ultrasonography	12.84	26.54	12.82	10.06	12.87	38.95
Home visits	21.90	29.99	20.97	29.40	23.16	30.74
Hospitalization - Under 5 years old	3.324	6.769	3.792	7.771	2.693	5.050
Pneumonia	2.159	4.989	2.389	6.028	1.849	3.047
Dehydration	1.698	2.920	1.871	3.269	1.464	2.349
Hospitalization	17.06	21.87	17.96	22.04	15.84	21.59
Pregnancy, childbirth and puerperium	3.950	5.526	4.147	5.526	3.686	5.515
Infectious and parasitic diseases	3.725	5.150	4.071	5.324	3.259	4.869
Respiratory diseases	3.259	4.593	3.492	4.718	2.944	4.401
Infant mortality	11.52	22.67	10.80	11.44	12.49	32.08
Infectious and parasitic diseases	1.453	2.984	1.442	1.598	1.468	4.179
Respiratory diseases	1.412	2.186	1.385	1.844	1.449	2.575
General mortality	2.791	0.759	2.705	0.743	2.908	0.764
Elderly mortality	16.71	4.766	16.49	4.849	16.99	4.638
Maternal mortality	1.448	2.549	1.387	1.845	1.531	3.265
Preventable causes mortality (above 5 years of age)	1.098	0.604	1.103	0.610	1.092	0.597
Preventable causes mortality (under 5 years of age)	1.072	0.803	1.086	0.847	1.052	0.740
Live births	488.3	106.9	492.0	70.23	483.5	141.9
Explanatory variables						
SUS physicians	1.260	0.865	1.273	0.873	1.242	0.854
SUS physician, except MDP physicians, in AB	0.952	0.527	0.983	0.540	0.910	0.505
SUS nursing staff	1.755	0.829	1.602	0.705	1.961	0.933
SUS health professionals	3.981	1.828	3.769	1.726	4.268	1.920
Water coverage	0.576	0.225	0.559	0.220	0.598	0.230
Teachers per capita	0.0135	0.00322	0.0135	0.00314	0.0136	0.00333
Health facilities	0.00118	0.000536	0.00110	0.000493	0.00128	0.000571
Total expenditure per capita	2,319	832.8	2,233	828.3	2,436	824.8
Health expenditure per capita	512.5	196.7	482.2	183.9	553.4	205.7
Education expenditure per capita	869.3	259.0	827.1	251.7	926.3	257.7
Population	28,510	39,332	28,555	39,047	28,449	39,716
Child population	5,177	6,885	5,342	7,007	4,954	6,711
Elderly population	2,823	3,514	2,752	3,381	2,919	3,685
Women population	14,358	20,225	14,367	20,061	14,345	20,445
Expecting mothers	152.9	188.5	160.0	193.6	143.4	181.1
Gini index	0.780	0.0225	0.782	0.0220	0.777	0.0231
Perc. black and brown	0.705	0.105	0.705	0.105	0.704	0.106
Perc. indigenous	0.00346	0.0185	0.00349	0.0187	0.00340	0.0184
People in rural area	0.429	0.189	0.429	0.189	0.428	0.189
Literacy rate	0.760	0.0572	0.760	0.0573	0.759	0.0570
Area	878.1	1,300	888.7	1,312	863.8	1,284
Altitude	282.2	232.1	283.4	233.1	280.6	230.6
Distance to the state capital	228.9	154.4	229.6	154.7	227.8	153.9
Temperature	25.19	1.516	25.18	1.517	25.20	1.514
Rainfall	83.68	32.04	83.63	32.05	83.75	32.04
Legal Amazon	0.0578	0.233	0.0581	0.234	0.0574	0.233
Semi-Arid Zone	0.619	0.486	0.620	0.486	0.618	0.486
Border Zone	0	0	0	0	0	0
Inicial condition	0.119	0.153	0.104	0.137	0.140	0.169
GDP per capita	10.45	10.69	10.17	10.83	10.83	10.49

Prepared by the author.

Table A10. Descriptive statistics for North region (level)

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Dependent variables						
Appointments	329.5	1,220	347.1	1,523	306.6	637.9
Childcare	62.96	231.5	65.11	120.5	60.16	323.3
Prenatal	43.88	27.99	46.07	31.28	41.03	22.73
Preventive	24.85	19.76	27.03	17.90	22.01	21.63
STD/AIDS	6.447	20.04	7.405	25.08	5.202	10.17
Consults	602.4	1,797	620.0	1,939	579.4	1,596
Under 1 year of age	17.34	15.03	17.96	15.62	16.52	14.20
Adults (15 to 59 years of age)	316.0	1,201	351.0	1,589	270.4	170.7
Elderly (above 60 years of age)	128.7	1,180	97.82	781.1	168.9	1,553
Referrals	36.05	48.51	34.44	45.08	38.15	52.58
Special attendance	20.47	27.73	19.05	25.69	22.32	30.10
Hospitalization	5.187	10.64	5.490	11.10	4.792	9.989
Emergency	9.806	18.95	9.096	17.57	10.73	20.57
Home hospitalization	1.548	5.457	1.706	6.468	1.341	3.747
Exams	241.6	474.9	234.5	360.5	251.0	591.5
Obstetrical ultrasonography	12.97	10.52	13.34	10.79	12.49	10.14
Home visits	22.14	32.14	22.50	34.57	21.68	28.69
Hospitalization - Under 5 years old	67.83	2,868	4.274	7.337	150.5	4,350
Pneumonia	66.63	2,868	2.747	4.433	149.7	4,350
Dehydration	1.783	4.044	2.039	5.075	1.449	1.984
Hospitalization	17.86	25.45	18.98	26.53	16.40	23.92
Pregnancy, childbirth and puerperium	4.311	6.338	4.450	6.415	4.129	6.235
Infectious and parasitic diseases	3.530	4.389	3.985	4.844	2.939	3.634
Respiratory diseases	3.192	3.858	3.369	4.011	2.962	3.640
Infant mortality	24.41	111.8	19.66	63.58	30.60	153.2
Infectious and parasitic diseases	2.722	23.35	2.195	6.527	3.408	34.62
Respiratory diseases	2.730	19.33	2.371	6.700	3.196	28.31
General mortality	2.175	0.736	2.125	0.722	2.239	0.748
Elderly mortality	14.62	5.507	14.64	5.642	14.60	5.328
Maternal mortality	1.638	4.373	1.513	2.414	1.800	6.033
Preventable causes mortality (above 5 years of age)	0.971	0.574	0.993	0.589	0.942	0.554
Preventable causes mortality (under 5 years of age)	1.277	0.942	1.353	1.079	1.178	0.714
Live births	483.4	142.4	489.9	88.61	475.0	190.7
Explanatory variables						
SUS physicians	0.985	0.753	0.955	0.724	1.023	0.789
SUS physician, except MDP physicians, in AB	0.801	0.499	0.791	0.486	0.815	0.515
SUS nursing staff	2.370	1.402	2.114	1.229	2.704	1.538
SUS health professionals	4.217	2.323	3.822	2.048	4.731	2.549
Water coverage	0.496	0.256	0.479	0.247	0.518	0.266
Teachers per capita	0.0129	0.00338	0.0130	0.00331	0.0129	0.00347
Health facilities	0.000905	0.000468	0.000809	0.000400	0.00103	0.000518
Total expenditure per capita	2,795	8,144	2,945	10,794	2,601	1,021
Health expenditure per capita	584.0	1,750	603.9	2,319	558.0	236.1
Education expenditure per capita	945.8	2,815	997.6	3,735	878.4	287.8
Population	33,832	71,041	34,088	70,688	33,498	71,537
Child population	6,906	13,488	7,176	13,820	6,554	13,044
Elderly population	2,234	4,355	2,153	4,120	2,339	4,644
Women population	16,587	35,566	16,703	35,387	16,437	35,817
Expecting mothers	121.5	207.0	135.3	224.1	103.6	180.8
Gini index	0.723	0.0375	0.727	0.0396	0.718	0.0340
Perc. black and brown	0.734	0.0991	0.734	0.0998	0.735	0.0984
Perc. indigenous	0.0212	0.0730	0.0215	0.0736	0.0207	0.0723
People in rural area	0.391	0.189	0.392	0.189	0.388	0.188
Literacy rate	0.847	0.0525	0.847	0.0530	0.847	0.0519

Variable	Total		Before		After	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Area	6,579	13,499	6,731	13,687	6,382	13,257
Altitude	178.3	134.5	176.2	134.9	181.0	134.1
Distance to the state capital	289.8	213.7	292.7	215.5	285.9	211.3
Temperature	26.19	0.507	26.19	0.509	26.19	0.504
Rainfall	157.5	28.36	158.1	28.55	156.8	28.11
Legal Amazon	1	0	1	0	1	0
Semi-Arid Zone	0	0	0	0	0	0
Border Zone	0.0898	0.286	0.0927	0.290	0.0861	0.281
Inicial condition	0.0984	0.158	0.0717	0.0583	0.133	0.226
GDP per capita	15.31	7.833	14.84	7.573	15.92	8.122

Prepared by the author.

APPENDIX B – TESTING FOR TREND

Table B1. Results for trend tests for basic healthcare indicators: Appointments

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.159	0.000	-0.042	0.000
	(0.000)	(0.000)	(0.151)	(0.000)	(0.292)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.752	0.677	0.615	0.640	0.771	0.749
Two semesters back						
Coefficient	0.010	-0.210	-0.199	-0.030	0.098	-0.005
	(0.032)	(0.144)	(0.272)	(0.037)	(0.091)	(0.053)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.753	0.682	0.619	0.644	0.773	0.749
Three semesters back						
Coefficient	0.000	-0.098	-0.137	-0.055	0.096	-0.039
	(0.027)	(0.094)	(0.169)	(0.051)	(0.076)	(0.043)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.753	0.681	0.618	0.642	0.773	0.749
Four semesters back						
Coefficient	0.018	-0.065	-0.049	-0.046	0.097	-0.014
	(0.025)	(0.078)	(0.128)	(0.043)	(0.069)	(0.043)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.753	0.678	0.620	0.641	0.773	0.748
Five semesters back						
Coefficient	0.008	-0.049	-0.008	-0.030	0.047	-0.058
	(0.028)	(0.069)	(0.131)	(0.045)	(0.069)	(0.050)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.753	0.682	0.619	0.642	0.774	0.749
Six semesters back						
Coefficient	-0.007	-0.082	0.005	-0.031	-0.015	-0.041
	(0.028)	(0.070)	(0.135)	(0.041)	(0.066)	(0.063)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.754	0.692	0.615	0.645	0.776	0.750

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B2. Results for trend tests for basic healthcare indicators: Appointments – childcare

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.044	0.000	0.316*	0.000
	(0.000)	(0.000)	(0.339)	(0.000)	(0.168)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.819	0.670	0.760	0.770	0.798	0.817
Two semesters back						
Coefficient	-0.031	-0.288	-0.144	-0.062	-0.072	-0.029
	(0.044)	(0.181)	(0.340)	(0.056)	(0.127)	(0.063)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.819	0.671	0.761	0.771	0.799	0.817
Three semesters back						
Coefficient	-0.025	-0.050	-0.444*	-0.017	-0.051	-0.035
	(0.040)	(0.184)	(0.241)	(0.054)	(0.110)	(0.056)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.819	0.674	0.764	0.770	0.799	0.818
Four semesters back						
Coefficient	-0.008	-0.091	-0.405*	-0.005	-0.049	-0.007
	(0.037)	(0.177)	(0.230)	(0.053)	(0.101)	(0.053)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.819	0.672	0.766	0.770	0.799	0.818
Five semesters back						
Coefficient	-0.010	0.034	-0.308	0.004	-0.056	-0.055
	(0.038)	(0.183)	(0.260)	(0.061)	(0.097)	(0.058)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.819	0.680	0.762	0.771	0.798	0.819
Six semesters back						
Coefficient	-0.038	-0.072	-0.058	-0.010	-0.107	-0.057
	(0.038)	(0.150)	(0.285)	(0.064)	(0.100)	(0.064)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.820	0.696	0.747	0.772	0.800	0.820

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B3. Results for trend tests for basic healthcare indicators: Appointments – prenatal

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.020	0.000	0.495	0.000
	(0.000)	(0.000)	(0.082)	(0.000)	(0.425)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.861	0.700	0.510	0.678	0.799	0.852
Two semesters back						
Coefficient	0.015	-0.032	-0.143	-0.023	0.069	-0.025
	(0.035)	(0.104)	(0.214)	(0.028)	(0.111)	(0.061)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.861	0.700	0.514	0.680	0.799	0.852
Three semesters back						
Coefficient	-0.010	-0.039	-0.133	-0.018	-0.004	-0.069
	(0.032)	(0.089)	(0.137)	(0.024)	(0.105)	(0.052)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.861	0.702	0.516	0.679	0.799	0.852
Four semesters back						
Coefficient	0.017	-0.027	-0.019	-0.020	-0.004	-0.022
	(0.029)	(0.098)	(0.107)	(0.022)	(0.097)	(0.049)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.861	0.701	0.517	0.678	0.799	0.852
Five semesters back						
Coefficient	0.008	0.009	-0.002	-0.020	-0.039	-0.029
	(0.030)	(0.081)	(0.109)	(0.028)	(0.095)	(0.053)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.862	0.706	0.502	0.679	0.798	0.853
Six semesters back						
Coefficient	0.010	-0.039	-0.035	-0.029	-0.095	0.055
	(0.031)	(0.081)	(0.101)	(0.038)	(0.104)	(0.061)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.863	0.712	0.490	0.678	0.798	0.854

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B4. Results for trend tests for basic healthcare indicators: Appointments – preventive

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.993**	0.000	0.411**	0.000
	(0.000)	(0.000)	(0.441)	(0.000)	(0.198)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.741	0.622	0.494	0.678	0.729	0.778
Two semesters back						
Coefficient	0.004	-0.141	-0.168	-0.022	0.012	-0.027
	(0.029)	(0.094)	(0.233)	(0.048)	(0.072)	(0.049)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.744	0.632	0.482	0.687	0.730	0.780
Three semesters back						
Coefficient	-0.006	-0.002	-0.123	-0.025	0.024	-0.074*
	(0.025)	(0.073)	(0.170)	(0.038)	(0.073)	(0.043)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.742	0.633	0.477	0.682	0.729	0.779
Four semesters back						
Coefficient	-0.004	-0.051	-0.192	0.007	-0.019	-0.030
	(0.024)	(0.073)	(0.121)	(0.036)	(0.075)	(0.043)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.741	0.621	0.487	0.681	0.729	0.778
Five semesters back						
Coefficient	-0.007	-0.035	-0.190	0.021	-0.035	-0.069
	(0.026)	(0.068)	(0.158)	(0.038)	(0.072)	(0.046)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.741	0.624	0.476	0.680	0.728	0.779
Six semesters back						
Coefficient	-0.015	-0.078	-0.127	0.030	-0.010	-0.095*
	(0.029)	(0.073)	(0.205)	(0.047)	(0.083)	(0.052)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.741	0.627	0.477	0.681	0.728	0.780

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B5. Results for trend tests for basic healthcare indicators: Appointments – STD/AIDS

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.490	0.000	0.291	0.000
	(0.000)	(0.000)	(0.395)	(0.000)	(0.273)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.716	0.698	0.629	0.743	0.671	0.647
Two semesters back						
Coefficient	0.065	-0.053	0.078	-0.003	0.066	0.176**
	(0.052)	(0.155)	(0.292)	(0.117)	(0.126)	(0.085)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.716	0.699	0.631	0.744	0.671	0.648
Three semesters back						
Coefficient	0.017	-0.018	-0.033	-0.059	-0.021	0.138
	(0.050)	(0.126)	(0.258)	(0.114)	(0.108)	(0.085)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.716	0.694	0.629	0.743	0.671	0.648
Four semesters back						
Coefficient	0.018	-0.076	0.193	-0.087	0.031	0.147*
	(0.048)	(0.130)	(0.260)	(0.101)	(0.116)	(0.081)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.716	0.693	0.632	0.744	0.671	0.648
Five semesters back						
Coefficient	0.015	-0.160	-0.002	-0.012	-0.039	0.082
	(0.049)	(0.153)	(0.302)	(0.095)	(0.111)	(0.083)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.716	0.695	0.627	0.743	0.673	0.648
Six semesters back						
Coefficient	0.016	-0.054	-0.243	0.026	-0.027	-0.002
	(0.054)	(0.165)	(0.385)	(0.103)	(0.126)	(0.095)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.717	0.698	0.623	0.745	0.676	0.648

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B6. Results for trend tests for basic healthcare indicators: Consults

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.062	0.000	0.021	0.000
	(0.000)	(0.000)	(0.161)	(0.000)	(0.266)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.746	0.601	0.446	0.673	0.783	0.743
Two semesters back						
Coefficient	0.008	-0.060	-0.397	-0.047	0.092	-0.008
	(0.036)	(0.153)	(0.346)	(0.039)	(0.105)	(0.057)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.747	0.607	0.455	0.676	0.783	0.743
Three semesters back						
Coefficient	-0.004	0.018	-0.358*	-0.062	0.083	-0.043
	(0.029)	(0.099)	(0.211)	(0.043)	(0.078)	(0.049)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.746	0.604	0.458	0.675	0.783	0.743
Four semesters back						
Coefficient	0.032	0.059	-0.279*	-0.021	0.101	0.000
	(0.026)	(0.090)	(0.166)	(0.032)	(0.064)	(0.052)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.746	0.601	0.458	0.674	0.784	0.743
Five semesters back						
Coefficient	0.032	0.085	-0.183	-0.016	0.087	-0.032
	(0.027)	(0.086)	(0.193)	(0.035)	(0.060)	(0.055)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.746	0.603	0.454	0.675	0.785	0.743
Six semesters back						
Coefficient	0.036	-0.020	0.180	-0.009	0.022	0.027
	(0.028)	(0.076)	(0.284)	(0.040)	(0.062)	(0.061)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.747	0.606	0.443	0.675	0.786	0.742

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B7. Results for trend tests for basic healthcare indicators: Consults – infant

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.100	0.000	0.211*	0.000
	(0.000)	(0.000)	(0.135)	(0.000)	(0.123)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.821	0.758	0.714	0.790	0.790	0.830
Two semesters back						
Coefficient	0.007	-0.042	-0.227	-0.096**	0.143	0.030
	(0.030)	(0.079)	(0.170)	(0.040)	(0.093)	(0.051)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.821	0.759	0.718	0.790	0.791	0.830
Three semesters back						
Coefficient	-0.002	-0.036	-0.316**	-0.072*	0.149*	-0.006
	(0.027)	(0.079)	(0.139)	(0.038)	(0.086)	(0.046)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.821	0.761	0.725	0.790	0.791	0.831
Four semesters back						
Coefficient	0.014	0.005	-0.286**	-0.043	0.149*	-0.015
	(0.026)	(0.092)	(0.141)	(0.038)	(0.078)	(0.046)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.821	0.760	0.723	0.790	0.792	0.830
Five semesters back						
Coefficient	-0.006	0.018	-0.218	-0.030	0.093	-0.072
	(0.027)	(0.092)	(0.131)	(0.038)	(0.075)	(0.050)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.822	0.761	0.728	0.791	0.790	0.831
Six semesters back						
Coefficient	-0.017	-0.008	-0.088	-0.017	0.040	-0.040
	(0.028)	(0.085)	(0.148)	(0.046)	(0.076)	(0.058)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.823	0.765	0.715	0.792	0.791	0.831

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B8. Results for trend tests for basic healthcare indicators: Consults – adults

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.015	0.000	-0.019	0.000
	(0.000)	(0.000)	(0.130)	(0.000)	(0.251)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.763	0.652	0.512	0.683	0.799	0.762
Two semesters back						
Coefficient	0.005	-0.121	-0.404	-0.044	0.118	-0.015
	(0.035)	(0.142)	(0.361)	(0.038)	(0.097)	(0.052)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.763	0.656	0.521	0.686	0.800	0.762
Three semesters back						
Coefficient	0.003	-0.008	-0.329	-0.063	0.122	-0.036
	(0.029)	(0.091)	(0.214)	(0.044)	(0.075)	(0.046)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.763	0.655	0.521	0.685	0.800	0.762
Four semesters back						
Coefficient	0.030	0.024	-0.223	-0.025	0.114*	-0.000
	(0.025)	(0.085)	(0.158)	(0.032)	(0.061)	(0.048)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.763	0.654	0.516	0.684	0.801	0.761
Five semesters back						
Coefficient	0.024	0.024	-0.178	-0.025	0.098*	-0.032
	(0.026)	(0.072)	(0.170)	(0.033)	(0.057)	(0.051)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.763	0.656	0.514	0.685	0.802	0.762
Six semesters back						
Coefficient	0.024	-0.023	0.102	-0.012	0.037	0.012
	(0.028)	(0.064)	(0.278)	(0.039)	(0.061)	(0.056)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.763	0.661	0.508	0.685	0.802	0.761

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B9. Results for trend tests for basic healthcare indicators: Consults – elderly

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.002	0.000	0.039	0.000
	(0.000)	(0.000)	(0.326)	(0.000)	(0.232)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.756	0.594	0.656	0.715	0.754	0.760
Two semesters back						
Coefficient	-0.001	0.042	-0.096	-0.056	0.030	-0.020
	(0.031)	(0.128)	(0.176)	(0.040)	(0.093)	(0.051)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.756	0.599	0.657	0.717	0.754	0.760
Three semesters back						
Coefficient	-0.005	0.046	-0.229*	-0.047	0.023	-0.037
	(0.026)	(0.103)	(0.124)	(0.037)	(0.073)	(0.045)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.756	0.592	0.659	0.716	0.754	0.760
Four semesters back						
Coefficient	0.032	0.073	-0.169	-0.015	0.037	0.002
	(0.024)	(0.099)	(0.137)	(0.031)	(0.061)	(0.045)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.756	0.592	0.656	0.715	0.755	0.760
Five semesters back						
Coefficient	0.036	0.125	-0.106	0.003	0.021	-0.033
	(0.027)	(0.111)	(0.162)	(0.036)	(0.062)	(0.049)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.756	0.589	0.656	0.717	0.755	0.760
Six semesters back						
Coefficient	0.030	-0.006	0.048	0.009	-0.076	0.011
	(0.030)	(0.103)	(0.215)	(0.044)	(0.064)	(0.054)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.757	0.586	0.647	0.718	0.755	0.761

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B10. Results for trend tests for basic healthcare indicators: Referrals

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.131	0.000	0.133	0.000
	(0.000)	(0.000)	(0.241)	(0.000)	(0.395)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.789	0.742	0.732	0.774	0.802	0.764
Two semesters back						
Coefficient	0.034	-0.188	-0.483**	0.049	0.147	0.012
	(0.038)	(0.137)	(0.219)	(0.068)	(0.092)	(0.057)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.790	0.744	0.737	0.776	0.804	0.764
Three semesters back						
Coefficient	0.007	-0.164	-0.585***	0.041	0.135	-0.054
	(0.036)	(0.133)	(0.200)	(0.071)	(0.088)	(0.056)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.790	0.743	0.744	0.775	0.803	0.765
Four semesters back						
Coefficient	0.014	-0.138	-0.575***	0.024	0.109	-0.042
	(0.033)	(0.124)	(0.179)	(0.061)	(0.080)	(0.057)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.789	0.744	0.750	0.775	0.803	0.764
Five semesters back						
Coefficient	-0.009	-0.086	-0.583**	0.030	0.034	-0.086
	(0.033)	(0.113)	(0.221)	(0.056)	(0.086)	(0.058)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.790	0.742	0.747	0.775	0.803	0.765
Six semesters back						
Coefficient	-0.022	-0.166	-0.435*	0.005	-0.021	-0.051
	(0.035)	(0.125)	(0.248)	(0.054)	(0.105)	(0.068)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.790	0.752	0.743	0.774	0.803	0.767

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B11. Results for trend tests for basic healthcare indicators: Referrals – special attendance

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.288	0.000	-0.180	0.000
	(0.000)	(0.000)	(0.370)	(0.000)	(0.163)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.801	0.731	0.720	0.792	0.803	0.772
Two semesters back						
Coefficient	0.040	-0.154	-0.502**	0.017	0.174*	-0.004
	(0.039)	(0.140)	(0.223)	(0.071)	(0.091)	(0.058)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.802	0.731	0.724	0.793	0.805	0.773
Three semesters back						
Coefficient	0.011	-0.111	-0.618**	-0.018	0.190**	-0.067
	(0.037)	(0.130)	(0.235)	(0.068)	(0.087)	(0.057)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.802	0.732	0.731	0.792	0.805	0.773
Four semesters back						
Coefficient	0.013	-0.123	-0.623***	-0.024	0.162*	-0.050
	(0.035)	(0.128)	(0.198)	(0.064)	(0.083)	(0.059)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.802	0.733	0.738	0.792	0.805	0.773
Five semesters back						
Coefficient	-0.011	-0.084	-0.591**	-0.024	0.098	-0.090
	(0.035)	(0.125)	(0.234)	(0.058)	(0.091)	(0.059)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.802	0.733	0.733	0.792	0.804	0.773
Six semesters back						
Coefficient	-0.025	-0.169	-0.406*	-0.057	0.000	-0.029
	(0.039)	(0.160)	(0.227)	(0.069)	(0.109)	(0.065)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.802	0.734	0.738	0.791	0.804	0.776

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B12. Results for trend tests for basic healthcare indicators: Referrals – hospitalization

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.244	0.000	0.290	0.000
	(0.000)	(0.000)	(0.270)	(0.000)	(0.384)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.772	0.775	0.774	0.698	0.784	0.705
Two semesters back						
Coefficient	-0.035	-0.128	-0.486**	-0.025	0.218	-0.118
	(0.053)	(0.162)	(0.232)	(0.098)	(0.137)	(0.088)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.772	0.775	0.777	0.698	0.785	0.705
Three semesters back						
Coefficient	-0.034	-0.140	-0.388*	0.035	0.154	-0.158**
	(0.046)	(0.143)	(0.198)	(0.078)	(0.136)	(0.072)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.772	0.774	0.777	0.698	0.785	0.705
Four semesters back						
Coefficient	-0.010	-0.073	-0.468**	0.025	0.112	-0.075
	(0.043)	(0.164)	(0.214)	(0.073)	(0.110)	(0.071)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.772	0.774	0.785	0.698	0.785	0.704
Five semesters back						
Coefficient	-0.019	-0.183	-0.519**	0.055	-0.010	-0.056
	(0.044)	(0.162)	(0.251)	(0.092)	(0.104)	(0.067)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.773	0.773	0.778	0.699	0.784	0.705
Six semesters back						
Coefficient	-0.030	-0.207	-0.305	0.094	-0.110	-0.047
	(0.047)	(0.159)	(0.230)	(0.093)	(0.110)	(0.081)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.773	0.775	0.769	0.702	0.785	0.705

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B13. Results for trend tests for basic healthcare indicators: Referrals – emergency

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.160	0.000	0.511	0.000
	(0.000)	(0.000)	(0.306)	(0.000)	(0.509)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.734	0.721	0.818	0.726	0.760	0.684
Two semesters back						
Coefficient	-0.010	-0.106	-0.472*	0.036	0.119	-0.047
	(0.053)	(0.155)	(0.263)	(0.101)	(0.140)	(0.077)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.735	0.721	0.821	0.728	0.761	0.684
Three semesters back						
Coefficient	-0.000	-0.083	-0.564**	0.063	0.053	-0.019
	(0.050)	(0.152)	(0.243)	(0.095)	(0.137)	(0.072)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.734	0.721	0.823	0.727	0.761	0.684
Four semesters back						
Coefficient	-0.021	-0.159	-0.666***	0.018	0.019	-0.019
	(0.045)	(0.141)	(0.217)	(0.087)	(0.110)	(0.070)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.734	0.723	0.827	0.727	0.761	0.684
Five semesters back						
Coefficient	-0.029	0.015	-0.815***	0.010	-0.046	-0.032
	(0.046)	(0.151)	(0.253)	(0.094)	(0.106)	(0.074)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.734	0.724	0.833	0.727	0.760	0.683
Six semesters back						
Coefficient	-0.019	0.050	-0.775**	0.026	-0.011	-0.043
	(0.049)	(0.157)	(0.293)	(0.092)	(0.130)	(0.079)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.735	0.715	0.831	0.727	0.762	0.684

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B14. Results for trend tests for basic healthcare indicators: Referrals – home hospitalization

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.011	0.000	-0.402	0.000
	(0.000)	(0.000)	(0.255)	(0.000)	(0.403)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.502	0.585	0.470	0.446	0.570	0.438
Two semesters back						
Coefficient	-0.034	0.027	0.218	-0.003	-0.152	-0.035
	(0.066)	(0.175)	(0.415)	(0.151)	(0.096)	(0.103)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.502	0.584	0.473	0.447	0.570	0.438
Three semesters back						
Coefficient	0.026	-0.155	-0.125	0.151	-0.025	-0.010
	(0.057)	(0.135)	(0.209)	(0.140)	(0.089)	(0.085)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.502	0.586	0.469	0.447	0.570	0.438
Four semesters back						
Coefficient	0.019	-0.080	-0.199	0.102	-0.080	0.018
	(0.059)	(0.149)	(0.165)	(0.113)	(0.098)	(0.094)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.502	0.587	0.477	0.447	0.570	0.438
Five semesters back						
Coefficient	0.028	0.159	-0.116	0.096	-0.092	-0.014
	(0.065)	(0.164)	(0.216)	(0.131)	(0.113)	(0.090)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.502	0.592	0.470	0.447	0.569	0.439
Six semesters back						
Coefficient	0.049	0.224	-0.066	0.059	-0.063	-0.034
	(0.068)	(0.161)	(0.254)	(0.125)	(0.125)	(0.108)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.501	0.615	0.439	0.447	0.569	0.437

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B15. Results for trend tests for basic healthcare indicators: Exams

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.004	0.000	-0.239	0.000
	(0.000)	(0.000)	(0.266)	(0.000)	(0.424)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.774	0.742	0.828	0.743	0.789	0.751
Two semesters back						
Coefficient	0.003	-0.181	-0.239	0.020	0.145	-0.047
	(0.050)	(0.125)	(0.260)	(0.062)	(0.121)	(0.074)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.774	0.746	0.830	0.745	0.789	0.751
Three semesters back						
Coefficient	0.016	-0.072	-0.188	0.042	0.184*	-0.084
	(0.048)	(0.098)	(0.212)	(0.065)	(0.102)	(0.069)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.774	0.742	0.829	0.744	0.790	0.750
Four semesters back						
Coefficient	0.047	-0.047	-0.185	0.039	0.193*	-0.033
	(0.039)	(0.102)	(0.169)	(0.047)	(0.103)	(0.067)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.774	0.742	0.833	0.744	0.790	0.750
Five semesters back						
Coefficient	0.005	-0.065	-0.153	-0.001	0.146	-0.116*
	(0.039)	(0.096)	(0.173)	(0.052)	(0.111)	(0.068)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.774	0.744	0.825	0.744	0.789	0.751
Six semesters back						
Coefficient	0.001	-0.149	-0.135	-0.018	0.150	-0.065
	(0.042)	(0.092)	(0.223)	(0.078)	(0.124)	(0.071)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.775	0.723	0.819	0.745	0.790	0.752

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B16. Results for trend tests for basic healthcare indicators: Exams – obstetrical ultrasonography

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.226	0.000	-0.015	0.000
	(0.000)	(0.000)	(0.370)	(0.000)	(0.231)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.815	0.693	0.744	0.749	0.743	0.789
Two semesters back						
Coefficient	-0.021	-0.197*	-0.194	-0.082*	0.027	0.006
	(0.036)	(0.105)	(0.242)	(0.044)	(0.116)	(0.063)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.815	0.695	0.746	0.751	0.743	0.789
Three semesters back						
Coefficient	-0.015	-0.124	-0.230	-0.063	0.072	-0.046
	(0.034)	(0.113)	(0.175)	(0.041)	(0.119)	(0.055)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.815	0.695	0.744	0.750	0.743	0.789
Four semesters back						
Coefficient	0.011	-0.022	-0.202	-0.032	0.031	-0.027
	(0.030)	(0.123)	(0.170)	(0.036)	(0.108)	(0.053)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.815	0.692	0.740	0.750	0.743	0.789
Five semesters back						
Coefficient	-0.021	-0.024	-0.212	-0.065	-0.068	-0.051
	(0.034)	(0.129)	(0.149)	(0.043)	(0.115)	(0.054)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.816	0.697	0.736	0.751	0.742	0.790
Six semesters back						
Coefficient	-0.058	-0.083	-0.172	-0.079*	-0.185	-0.025
	(0.035)	(0.123)	(0.165)	(0.044)	(0.123)	(0.055)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.816	0.694	0.735	0.753	0.742	0.790

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B17. Results for trend tests for basic healthcare indicators: Home visits

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	-0.095	-0.478	0.000	0.000	0.000
	(0.000)	(0.211)	(0.517)	(0.000)	(0.000)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.799	0.823	0.704	0.783	0.772	0.807
Two semesters back						
Coefficient	-0.047	-0.139	-0.414*	-0.120*	0.073	-0.059
	(0.038)	(0.122)	(0.246)	(0.061)	(0.096)	(0.058)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.799	0.824	0.706	0.784	0.773	0.808
Three semesters back						
Coefficient	-0.018	-0.069	-0.528*	-0.078	0.101	-0.031
	(0.033)	(0.117)	(0.270)	(0.050)	(0.087)	(0.053)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.799	0.827	0.710	0.783	0.772	0.807
Four semesters back						
Coefficient	0.006	-0.122	-0.399	-0.044	0.054	0.021
	(0.033)	(0.113)	(0.261)	(0.050)	(0.090)	(0.051)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.799	0.825	0.710	0.783	0.773	0.807
Five semesters back						
Coefficient	0.014	-0.082	-0.503	-0.010	0.090	-0.003
	(0.035)	(0.115)	(0.319)	(0.056)	(0.089)	(0.056)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.799	0.831	0.711	0.783	0.772	0.808
Six semesters back						
Coefficient	0.044	-0.119	-0.249	0.019	0.066	0.068
	(0.036)	(0.113)	(0.389)	(0.072)	(0.087)	(0.061)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.800	0.838	0.721	0.783	0.771	0.810

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B18. Results for trend tests for morbidity indicators: Hospitalization of children under 5 years

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.145	0.000	0.166	0.000
	(0.000)	(0.000)	(0.463)	(0.000)	(0.327)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.557	0.590	0.447	0.513	0.531	0.562
Two semesters back						
Coefficient	-0.057	-0.257*	-0.113	-0.109	0.094	-0.014
	(0.045)	(0.154)	(0.352)	(0.097)	(0.099)	(0.065)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.557	0.593	0.454	0.513	0.533	0.564
Three semesters back						
Coefficient	-0.062	-0.173	-0.029	-0.097	0.043	0.007
	(0.038)	(0.130)	(0.276)	(0.085)	(0.082)	(0.052)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.557	0.595	0.451	0.513	0.532	0.562
Four semesters back						
Coefficient	-0.033	-0.135	-0.312	-0.035	0.075	-0.008
	(0.035)	(0.118)	(0.229)	(0.070)	(0.078)	(0.052)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.558	0.594	0.447	0.515	0.533	0.561
Five semesters back						
Coefficient	-0.021	-0.140	-0.345	0.059	0.074	-0.060
	(0.037)	(0.128)	(0.272)	(0.066)	(0.084)	(0.056)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.557	0.594	0.441	0.513	0.533	0.562
Six semesters back						
Coefficient	0.014	-0.153	-0.462	0.141	0.093	-0.050
	(0.042)	(0.129)	(0.318)	(0.087)	(0.111)	(0.065)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.558	0.596	0.439	0.514	0.535	0.563

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B19. Results for trend tests for morbidity indicators: Hospitalization of children under 5 years – pneumonia

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.120	0.000	0.061	0.000
	(0.000)	(0.000)	(0.385)	(0.000)	(0.323)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.535	0.534	0.452	0.468	0.512	0.533
Two semesters back						
Coefficient	-0.027	-0.295**	0.199	-0.076	0.095	-0.002
	(0.042)	(0.136)	(0.221)	(0.086)	(0.088)	(0.062)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.536	0.537	0.454	0.468	0.515	0.536
Three semesters back						
Coefficient	-0.034	-0.259**	-0.040	-0.037	0.035	0.034
	(0.035)	(0.108)	(0.180)	(0.077)	(0.071)	(0.049)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.536	0.541	0.456	0.468	0.514	0.533
Four semesters back						
Coefficient	-0.020	-0.173*	-0.289	-0.011	0.050	0.018
	(0.034)	(0.099)	(0.211)	(0.072)	(0.066)	(0.051)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.537	0.543	0.460	0.476	0.515	0.532
Five semesters back						
Coefficient	-0.001	-0.158	-0.221	0.063	0.044	-0.026
	(0.035)	(0.109)	(0.220)	(0.069)	(0.071)	(0.054)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.538	0.539	0.450	0.472	0.516	0.534
Six semesters back						
Coefficient	0.006	-0.102	-0.062	0.001	0.038	0.001
	(0.040)	(0.135)	(0.251)	(0.077)	(0.097)	(0.063)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.538	0.543	0.442	0.473	0.518	0.536

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B20. Results for trend tests for morbidity indicators: Hospitalization of children under 5 years – dehydration

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.061	0.000	0.079	0.000
	(0.000)	(0.000)	(0.259)	(0.000)	(0.090)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.524	0.624	0.403	0.512	0.432	0.468
Two semesters back						
Coefficient	-0.062	-0.079	-0.345	-0.045	-0.045	-0.070
	(0.041)	(0.120)	(0.390)	(0.081)	(0.071)	(0.056)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.525	0.626	0.426	0.513	0.432	0.468
Three semesters back						
Coefficient	-0.059*	-0.007	0.003	-0.057	-0.059	-0.051
	(0.033)	(0.100)	(0.240)	(0.062)	(0.059)	(0.046)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.525	0.626	0.403	0.512	0.432	0.467
Four semesters back						
Coefficient	-0.044	0.022	-0.100	-0.038	-0.070	-0.053
	(0.034)	(0.100)	(0.231)	(0.053)	(0.062)	(0.044)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.525	0.624	0.398	0.514	0.433	0.469
Five semesters back						
Coefficient	-0.022	0.005	-0.177	0.045	-0.021	-0.056
	(0.035)	(0.114)	(0.175)	(0.059)	(0.064)	(0.047)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.525	0.626	0.394	0.515	0.432	0.468
Six semesters back						
Coefficient	-0.028	-0.117	-0.396*	0.105	-0.008	-0.092
	(0.041)	(0.099)	(0.223)	(0.089)	(0.085)	(0.062)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.525	0.622	0.401	0.515	0.430	0.469

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B21. Results for trend tests for morbidity indicators: Hospitalization

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.087*	0.000	-0.052	0.000
	(0.000)	(0.000)	(0.050)	(0.000)	(0.110)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.962	0.913	0.963	0.935	0.968	0.987
Two semesters back						
Coefficient	-0.045*	-0.015	-0.062	-0.139**	-0.065**	0.002
	(0.026)	(0.112)	(0.109)	(0.061)	(0.033)	(0.021)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.962	0.914	0.963	0.935	0.968	0.987
Three semesters back						
Coefficient	-0.046**	-0.055	-0.042	-0.125**	-0.065**	-0.001
	(0.022)	(0.106)	(0.120)	(0.053)	(0.032)	(0.016)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.962	0.913	0.963	0.935	0.968	0.987
Four semesters back						
Coefficient	-0.018	-0.059	0.016	-0.036	-0.059*	-0.004
	(0.020)	(0.105)	(0.113)	(0.045)	(0.031)	(0.018)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.962	0.913	0.963	0.935	0.968	0.987
Five semesters back						
Coefficient	-0.010	-0.081	0.014	-0.006	-0.077**	-0.021
	(0.020)	(0.090)	(0.089)	(0.051)	(0.031)	(0.018)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.962	0.912	0.964	0.935	0.968	0.987
Six semesters back						
Coefficient	-0.006	-0.107	-0.011	0.030	-0.087***	-0.030
	(0.019)	(0.074)	(0.086)	(0.046)	(0.031)	(0.020)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.962	0.914	0.962	0.936	0.969	0.987

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B22. Results for trend tests for morbidity indicators: Hospitalization – pregnancy, childbirth and puerperium

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	-1.264***	-0.005	0.000	0.035	0.000
	(0.000)	(0.444)	(0.087)	(0.000)	(0.191)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.884	0.837	0.812	0.860	0.842	0.908
Two semesters back						
Coefficient	-0.035	0.034	-0.193**	-0.067	-0.054	-0.032
	(0.032)	(0.102)	(0.095)	(0.076)	(0.063)	(0.036)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.884	0.836	0.810	0.860	0.842	0.908
Three semesters back						
Coefficient	-0.031	-0.028	-0.171	-0.027	-0.030	-0.038
	(0.027)	(0.090)	(0.130)	(0.065)	(0.057)	(0.033)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.884	0.836	0.805	0.860	0.842	0.909
Four semesters back						
Coefficient	-0.030	-0.012	-0.090	-0.026	-0.026	-0.055
	(0.024)	(0.093)	(0.123)	(0.048)	(0.060)	(0.034)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.884	0.833	0.794	0.859	0.842	0.908
Five semesters back						
Coefficient	-0.025	-0.037	-0.158	0.041	-0.054	-0.064*
	(0.027)	(0.086)	(0.158)	(0.052)	(0.072)	(0.033)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.884	0.832	0.791	0.859	0.842	0.909
Six semesters back						
Coefficient	-0.024	-0.111	-0.141	0.041	-0.014	-0.057
	(0.026)	(0.102)	(0.143)	(0.050)	(0.061)	(0.040)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.884	0.836	0.777	0.859	0.842	0.909

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B23. Results for trend tests for morbidity indicators: Hospitalization – infectious and parasitic diseases

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.158*	0.000	0.222	0.000
	(0.000)	(0.000)	(0.082)	(0.000)	(0.215)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.851	0.764	0.861	0.864	0.788	0.841
Two semesters back						
Coefficient	-0.045*	0.043	-0.229	-0.107	-0.075	-0.016
	(0.027)	(0.121)	(0.140)	(0.066)	(0.060)	(0.033)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.851	0.764	0.862	0.864	0.789	0.841
Three semesters back						
Coefficient	-0.012	-0.037	-0.188	-0.030	-0.043	0.007
	(0.028)	(0.091)	(0.130)	(0.064)	(0.051)	(0.031)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.851	0.763	0.859	0.864	0.788	0.841
Four semesters back						
Coefficient	-0.013	-0.061	-0.127	0.020	-0.047	-0.015
	(0.025)	(0.083)	(0.092)	(0.054)	(0.044)	(0.033)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.851	0.767	0.854	0.864	0.789	0.841
Five semesters back						
Coefficient	0.014	-0.037	-0.132	0.089*	-0.057	-0.013
	(0.025)	(0.099)	(0.096)	(0.051)	(0.046)	(0.037)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.851	0.762	0.854	0.865	0.789	0.841
Six semesters back						
Coefficient	0.011	-0.103	-0.206*	0.113**	-0.124**	-0.006
	(0.028)	(0.114)	(0.120)	(0.057)	(0.049)	(0.044)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.851	0.761	0.838	0.865	0.791	0.842

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B24. Results for trend tests for morbidity indicators: Hospitalization – respiratory diseases

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.059	0.000	-0.058	0.000
	(0.000)	(0.000)	(0.070)	(0.000)	(0.086)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.888	0.787	0.910	0.852	0.928	0.922
Two semesters back						
Coefficient	-0.050*	0.025	-0.157	-0.119*	-0.016	-0.012
	(0.026)	(0.118)	(0.096)	(0.065)	(0.039)	(0.029)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.888	0.787	0.911	0.852	0.929	0.922
Three semesters back						
Coefficient	-0.045*	0.016	-0.107	-0.071	-0.035	-0.013
	(0.025)	(0.103)	(0.108)	(0.056)	(0.035)	(0.029)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.888	0.786	0.910	0.852	0.929	0.922
Four semesters back						
Coefficient	-0.049*	-0.016	-0.010	-0.055	-0.026	-0.037
	(0.027)	(0.103)	(0.090)	(0.050)	(0.035)	(0.036)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.889	0.788	0.909	0.853	0.930	0.922
Five semesters back						
Coefficient	-0.028	-0.047	-0.006	-0.018	-0.037	-0.035
	(0.021)	(0.097)	(0.074)	(0.046)	(0.035)	(0.026)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.889	0.785	0.908	0.853	0.929	0.921
Six semesters back						
Coefficient	-0.017	-0.129	0.011	-0.025	-0.021	-0.018
	(0.024)	(0.080)	(0.069)	(0.049)	(0.034)	(0.029)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.889	0.783	0.904	0.853	0.930	0.922

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B25. Results for trend tests for mortality indicators: General mortality

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.301	0.000	0.046	0.000
	(0.000)	(0.000)	(0.228)	(0.000)	(0.047)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.627	0.488	0.389	0.620	0.444	0.579
Two semesters back						
Coefficient	-0.007	-0.020	0.097	-0.041**	0.018	0.002
	(0.011)	(0.044)	(0.095)	(0.020)	(0.029)	(0.016)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.629	0.488	0.388	0.625	0.446	0.582
Three semesters back						
Coefficient	-0.018*	-0.119***	-0.051	-0.021	-0.007	0.000
	(0.009)	(0.037)	(0.102)	(0.018)	(0.021)	(0.015)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.628	0.496	0.393	0.622	0.446	0.576
Four semesters back						
Coefficient	-0.015	-0.106***	-0.048	-0.018	-0.000	-0.016
	(0.010)	(0.040)	(0.089)	(0.020)	(0.017)	(0.014)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.629	0.493	0.389	0.628	0.445	0.576
Five semesters back						
Coefficient	-0.017	-0.070	-0.168	-0.030	-0.004	-0.006
	(0.011)	(0.051)	(0.112)	(0.023)	(0.021)	(0.015)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.627	0.489	0.398	0.621	0.446	0.577
Six semesters back						
Coefficient	-0.007	-0.048	-0.136	-0.034	0.030	-0.003
	(0.014)	(0.057)	(0.159)	(0.029)	(0.028)	(0.019)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.626	0.498	0.409	0.620	0.446	0.577

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B26. Results for trend tests for mortality indicators: Infant mortality

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	0.010	0.000	0.031	0.000
	(0.000)	(0.000)	(0.836)	(0.000)	(0.390)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.402	0.438	0.331	0.285	0.342	0.410
Two semesters back						
Coefficient	0.003	-0.387*	0.425	-0.119	0.003	0.046
	(0.066)	(0.224)	(0.450)	(0.118)	(0.181)	(0.116)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.403	0.440	0.338	0.285	0.342	0.410
Three semesters back						
Coefficient	-0.048	-0.022	-0.046	-0.064	0.015	-0.115
	(0.054)	(0.221)	(0.398)	(0.096)	(0.135)	(0.083)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.403	0.434	0.334	0.285	0.342	0.409
Four semesters back						
Coefficient	-0.003	-0.135	-0.071	0.056	0.057	-0.105
	(0.054)	(0.189)	(0.404)	(0.106)	(0.127)	(0.084)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.402	0.438	0.340	0.285	0.341	0.410
Five semesters back						
Coefficient	0.014	-0.273	-0.149	0.023	0.110	-0.048
	(0.057)	(0.203)	(0.435)	(0.106)	(0.132)	(0.085)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.403	0.440	0.337	0.285	0.340	0.410
Six semesters back						
Coefficient	0.008	-0.066	-0.552	-0.049	0.163	-0.042
	(0.070)	(0.247)	(0.473)	(0.135)	(0.175)	(0.112)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.403	0.440	0.354	0.286	0.340	0.412

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B27. Results for trend tests for mortality indicators: Infant mortality – infectious and parasitic diseases

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.930	0.000	-0.168	0.000
	(0.000)	(0.000)	(0.674)	(0.000)	(0.197)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.239	0.213	0.312	0.198	0.177	0.206
Two semesters back						
Coefficient	-0.016	-0.074	-0.004	-0.060	0.019	-0.046
	(0.029)	(0.121)	(0.201)	(0.071)	(0.054)	(0.040)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.239	0.217	0.300	0.199	0.177	0.206
Three semesters back						
Coefficient	-0.016	-0.007	0.084	-0.050	-0.008	-0.062*
	(0.024)	(0.073)	(0.180)	(0.052)	(0.037)	(0.036)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.239	0.216	0.294	0.199	0.177	0.207
Four semesters back						
Coefficient	-0.013	0.002	0.074	-0.059	-0.010	-0.041
	(0.021)	(0.062)	(0.202)	(0.049)	(0.031)	(0.033)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.240	0.219	0.303	0.199	0.177	0.207
Five semesters back						
Coefficient	-0.036	0.021	-0.207	-0.068	0.002	-0.035
	(0.022)	(0.072)	(0.143)	(0.047)	(0.030)	(0.035)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.241	0.212	0.303	0.199	0.178	0.207
Six semesters back						
Coefficient	-0.072***	-0.041	-0.186	-0.092*	-0.036	-0.092**
	(0.025)	(0.064)	(0.154)	(0.053)	(0.028)	(0.041)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.241	0.251	0.293	0.199	0.179	0.209

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B28. Results for trend tests for mortality indicators: Infant mortality – respiratory diseases

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.254	0.000	0.000	0.000
	(0.000)	(0.000)	(0.184)	(0.000)	(0.000)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.255	0.200	0.272	0.200	0.169	0.238
Two semesters back						
Coefficient	0.012	-0.132	0.018	-0.061	0.035	0.016
	(0.033)	(0.159)	(0.221)	(0.072)	(0.039)	(0.044)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.255	0.200	0.272	0.201	0.170	0.238
Three semesters back						
Coefficient	-0.004	-0.016	-0.190	-0.052	0.010	0.027
	(0.026)	(0.104)	(0.172)	(0.051)	(0.035)	(0.043)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.255	0.198	0.274	0.201	0.170	0.239
Four semesters back						
Coefficient	0.001	-0.082	-0.062	-0.020	0.011	0.018
	(0.026)	(0.084)	(0.212)	(0.051)	(0.033)	(0.035)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.255	0.199	0.281	0.201	0.169	0.239
Five semesters back						
Coefficient	0.020	0.007	-0.080	-0.020	0.031	0.040
	(0.027)	(0.088)	(0.198)	(0.051)	(0.036)	(0.036)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.256	0.204	0.273	0.200	0.169	0.240
Six semesters back						
Coefficient	0.009	-0.097	-0.403	0.024	-0.011	0.060
	(0.032)	(0.098)	(0.318)	(0.067)	(0.045)	(0.045)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.256	0.203	0.288	0.198	0.167	0.243

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B29. Results for trend tests for mortality indicators: Elderly mortality

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.473	0.000	0.007	0.000
	(0.000)	(0.000)	(0.303)	(0.000)	(0.050)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.442	0.357	0.243	0.490	0.296	0.416
Two semesters back						
Coefficient	-0.011	0.019	0.208	-0.054*	-0.002	0.016
	(0.016)	(0.076)	(0.141)	(0.030)	(0.033)	(0.021)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.444	0.358	0.242	0.495	0.299	0.421
Three semesters back						
Coefficient	-0.020*	-0.132**	-0.052	-0.022	-0.014	0.013
	(0.012)	(0.053)	(0.126)	(0.024)	(0.025)	(0.018)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.443	0.363	0.240	0.491	0.298	0.416
Four semesters back						
Coefficient	-0.021*	-0.131**	-0.032	-0.027	0.006	-0.017
	(0.013)	(0.063)	(0.151)	(0.028)	(0.022)	(0.018)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.444	0.362	0.239	0.498	0.298	0.414
Five semesters back						
Coefficient	-0.029*	-0.087	-0.250	-0.040	0.002	-0.007
	(0.016)	(0.065)	(0.183)	(0.036)	(0.027)	(0.018)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.443	0.359	0.248	0.492	0.298	0.415
Six semesters back						
Coefficient	-0.018	-0.180*	-0.110	-0.044	0.070**	-0.020
	(0.018)	(0.096)	(0.244)	(0.035)	(0.034)	(0.023)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.442	0.371	0.258	0.493	0.303	0.415

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B30. Results for trend tests for mortality indicators: Maternal mortality

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.116*	-0.002	0.000	0.003	0.000
	(0.000)	(0.068)	(0.060)	(0.000)	(0.156)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.212	0.205	0.226	0.171	0.223	0.216
Two semesters back						
Coefficient	-0.031	-0.049	0.020	0.011	-0.057	-0.035
	(0.034)	(0.056)	(0.063)	(0.061)	(0.076)	(0.046)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.212	0.209	0.225	0.171	0.223	0.217
Three semesters back						
Coefficient	-0.012	-0.013	0.003	0.006	-0.002	-0.015
	(0.023)	(0.050)	(0.081)	(0.045)	(0.042)	(0.030)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.212	0.208	0.225	0.171	0.223	0.217
Four semesters back						
Coefficient	0.001	0.019	0.040	0.008	-0.027	-0.000
	(0.021)	(0.053)	(0.082)	(0.040)	(0.045)	(0.030)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.212	0.208	0.231	0.171	0.223	0.217
Five semesters back						
Coefficient	-0.018	0.016	-0.018	0.036	-0.061	0.001
	(0.022)	(0.059)	(0.107)	(0.045)	(0.048)	(0.027)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.212	0.207	0.223	0.172	0.222	0.217
Six semesters back						
Coefficient	0.006	0.077	-0.067	0.067	-0.048	0.039
	(0.028)	(0.083)	(0.119)	(0.070)	(0.057)	(0.039)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.213	0.213	0.222	0.171	0.219	0.219

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B31. Results for trend tests for mortality indicators: Mortality for preventable causes – children under 5 years of age

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.032	0.000	0.135*	0.000
	(0.000)	(0.000)	(0.081)	(0.000)	(0.074)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.604	0.470	0.407	0.531	0.452	0.593
Two semesters back						
Coefficient	0.006	-0.041	0.106	0.036	-0.061	-0.003
	(0.025)	(0.068)	(0.126)	(0.056)	(0.047)	(0.038)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.604	0.467	0.409	0.532	0.453	0.594
Three semesters back						
Coefficient	-0.036*	-0.041	0.069	-0.060	-0.022	-0.041
	(0.020)	(0.065)	(0.116)	(0.040)	(0.030)	(0.033)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.604	0.467	0.406	0.531	0.452	0.594
Four semesters back						
Coefficient	-0.016	-0.007	0.026	-0.028	0.001	0.002
	(0.017)	(0.056)	(0.090)	(0.039)	(0.027)	(0.028)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.604	0.466	0.401	0.531	0.451	0.594
Five semesters back						
Coefficient	-0.008	0.045	0.078	-0.019	-0.009	-0.009
	(0.017)	(0.060)	(0.096)	(0.038)	(0.028)	(0.028)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.604	0.467	0.402	0.531	0.449	0.594
Six semesters back						
Coefficient	-0.006	0.028	-0.014	-0.015	-0.024	0.042
	(0.023)	(0.065)	(0.121)	(0.050)	(0.038)	(0.032)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.603	0.464	0.392	0.529	0.447	0.596

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B32. Results for trend tests for mortality indicators: Mortality for preventable causes – people above 5 years of age

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	0.000	-0.281	0.000	-0.085	0.000
	(0.000)	(0.000)	(0.444)	(0.000)	(0.084)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.666	0.498	0.347	0.547	0.621	0.704
Two semesters back						
Coefficient	-0.016	-0.019	0.018	-0.036	0.019	-0.029
	(0.023)	(0.102)	(0.154)	(0.046)	(0.053)	(0.034)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.667	0.498	0.345	0.549	0.621	0.705
Three semesters back						
Coefficient	-0.028	-0.069	-0.003	-0.024	-0.027	-0.028
	(0.018)	(0.075)	(0.130)	(0.034)	(0.035)	(0.028)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.666	0.499	0.349	0.548	0.621	0.704
Four semesters back						
Coefficient	-0.030*	-0.047	-0.078	-0.019	-0.034	-0.034
	(0.016)	(0.060)	(0.127)	(0.031)	(0.034)	(0.026)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.666	0.498	0.361	0.549	0.621	0.705
Five semesters back						
Coefficient	-0.008	0.007	-0.114	-0.027	-0.062*	0.012
	(0.019)	(0.064)	(0.158)	(0.042)	(0.035)	(0.030)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.666	0.494	0.357	0.546	0.618	0.705
Six semesters back						
Coefficient	-0.009	0.002	-0.192	-0.008	-0.084*	0.010
	(0.022)	(0.083)	(0.215)	(0.050)	(0.045)	(0.032)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.664	0.488	0.359	0.543	0.612	0.705

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.

Table B33. Results for trend tests for mortality indicators: Live births rate

	Brazil	Middle West	North	Northeast	South	Southeast
One semester back						
Coefficient	0.000	-0.028	-0.011	0.000	-0.096	0.000
	(0.000)	(0.051)	(0.150)	(0.000)	(0.304)	(0.000)
Observations	19,541	1,303	421	5,682	4,096	5,736
R^2	0.339	0.322	0.094	0.250	0.333	0.370
Two semesters back						
Coefficient	-0.002	-0.101	-0.180	-0.013	0.011	0.055
	(0.024)	(0.104)	(0.274)	(0.025)	(0.055)	(0.055)
Observations	19,541	1,303	421	5,682	4,089	5,736
R^2	0.340	0.330	0.124	0.256	0.333	0.372
Three semesters back						
Coefficient	0.000	-0.059	-0.117	-0.002	0.031	0.009
	(0.016)	(0.044)	(0.114)	(0.014)	(0.045)	(0.034)
Observations	19,541	1,303	421	5,682	4,089	5,743
R^2	0.340	0.330	0.102	0.252	0.334	0.372
Four semesters back						
Coefficient	0.006	-0.070	-0.027	-0.012	0.061	0.044
	(0.020)	(0.043)	(0.075)	(0.018)	(0.060)	(0.040)
Observations	19,522	1,310	422	5,682	4,089	5,743
R^2	0.339	0.326	0.094	0.249	0.336	0.371
Five semesters back						
Coefficient	0.002	-0.025	-0.057	0.009	0.022	0.034
	(0.025)	(0.037)	(0.057)	(0.021)	(0.064)	(0.042)
Observations	19,541	1,311	415	5,689	4,088	5,750
R^2	0.341	0.331	0.106	0.250	0.338	0.374
Six semesters back						
Coefficient	0.012	-0.054	-0.040	-0.005	0.004	0.005
	(0.023)	(0.044)	(0.096)	(0.021)	(0.068)	(0.058)
Observations	19,522	1,325	415	5,661	4,072	5,737
R^2	0.341	0.332	0.101	0.248	0.345	0.377

Notes: (1) All models include fixed effects and non-linear trend, and matching. (2) All variables are in logarithm form and interacted with a linear trend. (3) Robust standard errors, in parentheses, are clustered at the municipality level. (4) Significance: *** p<0.01, ** p<0.05, * p<0.1. Prepared by the author.