Quantifying political effects in the spatial allocation of public services

MAY 2023

Anders Fredriksson & Maria Sylvia Macchione Saes
CORS — Center for Organization Studies, FEA-USP, University of São Paulo, Av. Prof. Luciano Gualberto, 908, São Paulo CEP 05508-900, SP, Brazil, Tel: +55-11-30910616,
E-mail: anders.fredriksson@usp.br (corresponding author) & ssaes@usp.br
ORCID-IDs: 0000-0002-6446-1610 & 0000-0002-6344-0113

ABSTRACT

The spatial allocation of citizen-accessed public services is typically influenced by factors related to citizen demand, but also by other factors, including political considerations. We develop a method to quantify how political factors influence citizens' spatial access to services. A regression model of the allocation of a public service is first built, using citizen demand and related variables as explanatory factors. The model fit improves once political variables are added to the model, with some part of the spatial allocation of service units being explained by the political variables. By using Operational Research methods, we then show that, had these same politically explained units instead been optimally allocated, citizen access would have improved. The effect is quantified in terms of citizen travel distance, which is one measure of welfare in spatial allocation problems. We apply the method to two different public services in the state of São Paulo, Brazil. We show that, for both services, after controlling for citizen demand and related variables, and after incorporating as explanatory variables the official program objectives, there is evidence of politically induced allocations. The resulting effect for citizens is longer travel distances, on average. Interestingly, for the two different public services studied, there is a degree of similarity in which regions are underserved, rather than a case where municipalities or regions not getting one service being "compensated" by getting the other service.

Keywords: Public service; Spatial allocation; Political effect; Citizen Service Center; Outpatient healthcare

JEL Classification: C44, D72, H40, I18, R53

We thank Ilídio Machado, Cristina Onaga and Carlos Torres at Poupatempo; Daniel Annenberg at DETRAN and Guido Stocco at PRODESP/DETRAN; Danilo Cesar Fiore and Osmar Mikio Moriwaki at the São Paulo state health ministry; Eliana Dias da Silva Ribeiro de Souza Ribas for providing valuable information and context with respect to the AME reform; Matheus Albergaria, Love Ekenberg, Wouter Gelade, Catherine Guirkinger, Gustavo Magalhães de Oliveira, Bernardo Müller, Rubens Nunes, Thiago Paixão, Imran Rasul, Yasser Hassan Saleh, Rohini Somanathan and Leonardo Augusto de Vasconcelos Gomes for feedback and discussions; and participants at the Research Workshop on Institutions and Organizations (RWIO, Brazil), the CRED workshop (UNamur, Belgium), the CSAE/Oxford development economics workshop, the Nordic Conference in Development Economics, the annual conference of the Latin American and Caribbean Economic Association, the CORS workshop at the University of São Paulo, the Swedish Conference in Economics and the Association of Swedish Development Economists conference. Fredriksson acknowledges funding from the Swedish Research Council (Vetenskapsrådet, Grant No. D0014601) and from the Lars Hierta Memorial Foundation (Grant No. FO 2016-0640). Computational resources have been provided by the Consortium des Équipements de Calcul Intensif (CÉCI), funded by the Belgian National Fund for Scientific Research (Fonds de la Recherche Scientifique – FRS/FNRS) under Grant No. 2.5020.11. Any errors are our own.

1. Introduction

It is well documented that the provision and allocation of different types of public services is affected by political motives. An example is that public spending may increase close to elections, especially for public goods that directly target citizens (e.g. Shi and Svensson, 2006; Drazen and Eslava, 2010). For services where the spatial allocation is important, another effect is that some municipalities/regions/locations are favored, as there is more political leverage from allocating a service in a certain region than if allocating it elsewhere. In line with this argument, different entities of the public administration, such as states and municipalities, may be involved in a mutually beneficial political exchange, which affects the spatial distribution of centrally administered programs. These and other political effects can certainly be of relevance for the spatial allocation of a wide range of public services. Golden and Min (2013) review the theoretical and empirical literature on such "distributive politics", with additional references in Lara and Toro (2019).

The goal of this paper is to develop and illustrate a method to evaluate whether other factors than those related to citizen demand, in particular political motives, affect the spatial allocation of public services, and to assess the implications for citizens' spatial access thereof. Regression analysis is used to build a model to explain which criteria de facto determine how the public service offices are allocated. We then use the fact that some of the public service units implemented are discerned, in the regression analysis, as primarily "political". This fact is incorporated into a location-allocation problem, from Operational Research (OR), where we compare a measure of citizens' spatial access in the actual allocation to the spatial access if the politically determined public service units had instead been allocated optimally. Comparing with an optimum allocation follows the argument of Golden and Min (2013) that, in order to evaluate political effects and politically induced "misallocation", a benchmark should first be established.

We analyze these questions through the study of two different centrally administered public services in the state of São Paulo, Brazil. The first public service is the One Stop Shop program Poupatempo (“Savetime”), a Citizen Service Center program that gathers many personal document- and also social services in the same physical location and that is implemented in some of the state’s municipalities (Paulics, 2003; Fredriksson, 2020). The second public service is AME, an acronym for Ambulatório Médico de Especialidades, a network of Specialty Outpatient Medical Clinics, implemented in some of the state’s municipalities and healthcare regions (Yamada, 2008; Barradas Barata et al., 2010). Both programs are administered by centralized state level planning offices, each in its own department of the state’s central bureaucracy. Although Poupatempo had been first established in the end of the 1990’s, the two programs were implemented, at scale, in the entire state, from around 2007 until 2012, which is the period with which the study is concerned. Each program is analyzed separately.

We first analyze the determinants of where the two public services are allocated, using a regression framework. We therefore scrutinize the official objectives of the programs in terms of improving access to public services. These objectives are translated into citizen demand-related variables and used as explanatory variables in the regression model. We also include other variables that are typically discussed in the literature on the allocation of public services (with some variation as to which variables are included in the Poupatempo and AME regressions). Some public service units are not explained by the citizen demand- (and related) factors only. Based on well-established political economy theories on the allocation of centrally administered public goods, we add political variables to the models and again assess how well the allocations observed are explained. The fit is now better. In particular, having a local political leadership from the same party as the state governor helps explaining the observed variation in the public service allocations. One output from the analyses is, for each of the two services, a (small) set of actual public service units for which, in the planner's choice between alternative locations, we primarily see a political rather than a citizen demand-related motivation.

Second, we use location-allocation analysis to determine an optimal spatial allocation of the public service units, given the officially stated criteria of the two public services. More specifically, for the units considered politically determined, in the regression analysis, we construct a counterfactual allocation, which is the allocation obtained if these units had been optimally placed. The average travel distance is one measure of welfare in spatial allocation problems, and the average travel distance is compared between the politically constrained- and unconstrained allocations. We thus compare the average travel distance in the actual allocation to the average distance in the allocation that, instead of allocating service units in the locations considered politically motivated, makes an optimal spatial choice of the same (number of) units. The method suggests that there are modest yet non-negligible costs, in terms of citizens' spatial access, of politically motivated allocations of Poupatempo and AME.

In the paper, we complement the analytical models with evidence from interviews conducted with relevant actors involved in São Paulo state politics and in the two public service programs. These interviews corroborate the paper's findings of political influence in how public service units are spatially allocated.

The paper proceeds as follows. Section 2 reviews the literature on political influence in the spatial allocation of public goods and services and highlights our contributions in relation to the literature. Section 3 briefly discusses the Poupatempo and AME programs and in section 4 a regression analysis is conducted, aiming to determine which factors influence where these two public services are implemented, including political factors. Section 5 uses location-allocation analysis to construct counterfactual spatial allocations to the units, from section 4, that are primarily discerned as politically motivated. An impact measure is then derived, quantifying the impact of politically motivated allocations on citizens' travel distances. Section 6 draws on the literature on model selection to develop further robustness results. Section 7 discusses and concludes. The Appendix has additional details on some of the analyses.

2. Political effects in the spatial allocation of public goods and services

There is a large empirical literature on political effects in the allocation of centrally administered public goods and services, much of which is summarized by Golden and Min (2013). Several different political motives behind allocations have been scrutinized, based on theories of distributive politics, and a range of centrally administered public goods and services have been studied, with intergovernmental grants probably being the most common study object. In many studies, citizen demand, the official policy objectives and other related factors are first incorporated into a regression model, after which political motives are studied, using the same model. Such an approach is followed by e.g. Schady (2000), Case (2001), Dahlberg and Johansson (2002), Tavits (2009), Dellmuth and Stoffel (2012) and Jarocinska (2022), who analyze, respectively, the allocation of Peruvian social funds, Albanian block grants, Swedish environmental grants, government grants in Nordic countries, intergovernmental grants in Germany, and intergovernmental grants in Spain. Although the demand related (and political) variables may differ from study to study, a similar "politics after controlling for other factors" approach is followed also in studies of other outcomes, in e.g. Castells and Solé-Ollé (2005), studying infrastructure allocation in Spain; Banerjee and Somanathan (2007), studying the provision of education, health services, water, electricity and other public goods in India; Min (2011), studying electrification in India; and Carlitz (2017), studying water provision in Tanzania. The point of departure of our analysis will be similar to these studies. Although virtually all papers study spatial allocations (e.g. regional, municipal), there is a difference in how explicit the spatial argument and analysis is, a point to which we return below.

In addition to having a similar set-up in terms of analyzing demand-related and political variables, a common denominator in the literature is that studies often aim at determining whether politicians allocate resources according to either of two competing models of distributive politics – targeting of public goods and services to swing constituencies or to core constituencies. The swing vs. core debate is summarized by Golden and Min (2013), with early theoretical references being Cox and McCubbins (1986), Lindbeck and Weibull (1993) and Dixit and Londregan (1996).[2,3] We follow e.g. Schady (2000), Case (2001) and Dahlberg and Johansson (2002), cited above, in that political variables enabling a study of both hypotheses are defined and analyzed. In our case, the political effects favor the core voter hypothesis, and the study of political effects in the spatial allocation of in-person public service offices is, to the best of our knowledge, a novelty in itself. A second focus and contribution of our study, however, is assessing the impact on citizens from such political allocations.

Depending on the public good and the outcome variable studied (e.g. central government grants to regions, or local school resources) and the data sources used (central government

[2] The Lindbeck and Weibull (1993) and Dixit and Londregan (1996) models entail a swing voter prediction. Voters value not only public goods but also ideology, preferring different points on a left-right scale. A candidate seeking to maximize votes will target the least ideological voters, as these are easier to persuade ("cheaper to buy"). In empirical work, the density of such "swing voters" is typically proxied by the difference between the candidate's vote share and 50%, in a past election (the closer the election, the more swing voters). More resources should then go to regions with closer past elections. Cox and McCubbins (1986) instead reach a core voter prediction. Assuming risk averse candidates and different risk in investing in core vs. swing voters, candidates favor their own supporters. Golden and Min (2013) have a fuller discussion, including the issues raised by the fact that the models are based on individual behavior whereas the data is typically at the constituency level.

[3] An additional theoretical reference is Grossman (1994), who explicitly models the question of political alignment between different levels of government, as a determining factor in the allocation of grants.

data on grants, or household surveys and census data on local public goods provision), there is a difference in what conclusions can be drawn from a study finding political effects. Data on grants to regions do not directly inform on public goods provision in those regions, hence political allocation effects do not directly translate into an effect on the level of public goods and services, or welfare.[4] Data from lower administrative levels on public goods allocations, on the other hand (as in Banerjee and Somanathan, 2007), perhaps better reflect beneficiary welfare, but may be harder to link to politically determined allocations. The difficulty to link political effects to a measure of welfare is exacerbated by the fact that benchmark (or counterfactual, or optimal) allocations are typically not derived (Golden and Min, 2013). It is therefore difficult to assess whether politically induced allocations ultimately result in a different level of beneficiary welfare than if there had been no political effects. The present study, through the type of public services studies, and the measures and methods used, takes steps in overcoming some of these challenges.

Compared to the allocation of e.g. intergovernmental grants, the allocation of centers for in-person service delivery, as in the current study, is a problem in which the spatial aspect is more explicit. One component of welfare evaluations of such allocations is related to individuals' spatial access (through travel distance or travel time). With a large Operational Research literature and established methods to derive optimal spatial allocations of such services (refer to e.g. Marianov and Serra, 2002; Revelle and Eiselt, 2005; and de Smith et al., 2018), it is both possible to establish a counterfactual allocation and to link political effects to individuals' travel distances. An additional feature of the spatial allocation problems here studied is that, with citizens' not being restricted to use the public service in the home municipality/region only, investments in one municipality benefit also other

[4] Some studies on grant allocation have additional data on how grants were used, e.g. Palaniswamy and Krishnan (2008).

municipalities. Such spillover effects are automatically incorporated in the analysis when travel distances are evaluated. Differently, in a study of e.g. infrastructure grants to regions or municipalities, spillovers such as that a road does not only benefit the region in which it is built, are typically not accounted for.[5]

The above said, it should be stressed that some studies do analyze counterfactual allocations and/or welfare. Castells and Solé-Ollé (2005) use a theoretical model to derive a suggested optimum for infrastructure investments in Spain, based on an equity-efficiency tradeoff. Political variables are then added and the model is estimated. Parameter estimates from such a model could potentially be used to estimate by how much political considerations "distort" allocations based on an equity-efficiency tradeoff only. Burgess et al. (2015) study ethnic favoritism (a literature related to the distributive politics discussion) and road building in Kenya. A counterfactual "optimal" road network is derived, and regressions show that ethnic favoritism influence the actual but not the counterfactual network. Finan and Mazzocco (2021) study the allocation of discretionary federal legislator grants in the Brazilian state of Roraima, also deriving a suggested social planner allocation of said grants. The authors find quite a large difference between the actual allocation (influenced by e.g. election motives) and the suggested optimal allocation. In a rich literature on distributive politics in Brazil, our work also relates to the study by Ferraz (2007) on environmental licensing, in that São Paulo state is the study object and that a policy implemented by the state bureaucracy (rather than the executive or legislative branch directly) is under scrutiny. Ferraz (2007) finds that, among other explanatory factors, election motives affect the approval of environmental licenses.[6]

[5] Compared to some other studies of public goods and services allocations, there are also enhanced possibilities to control for spatial correlations in the regression analysis.

[6] Other studies on distributive politics in Brazil include Ames (1995), Alston and Mueller (2006) and Firpo et al. (2015), studying federal budget amendments, which may favor certain municipalities; Arretche and Rodden (2004), Ferreira and Bugarin (2005, 2007), Brollo and Nannicini (2012) and Bugarin and Marciunik (2017), studying transfers (federal-to-state, federal-to-municipality, or state-to-municipality); and Litschig (2012) studying how rules-based transfers partially become discretionary. Golden and Min (2013) refer to yet other studies.

One critique of the distributive politics literature, discussed in e.g. Banerjee and Somanathan (2007), Golden and Min (2013) and Kramon and Posner (2013), is that studies of a single public good may suffer from a substantial shortcoming in that governments distribute many different goods and services, and a municipality/region favored in terms of one good, is perhaps disfavored in terms of another good. In the present study we study the allocation of two rather different public services, administered by two different state ministries, but rather find that there is a degree of similarity in which regions are underserved by the two public services.

3. The Poupatempo and AME programs

We study the determinants of the spatial allocations of two different public services, Poupatempo and AME, for the years 2007-2012. The programs are briefly described in sections 3.1 and 3.2. The determinants of the spatial allocations are then analyzed in a regression framework, in sections 4.1 and 4.2.

The study concerns the interior and coastal areas of the state of São Paulo, an area typically referred to as "interior São Paulo", comprising 97% of the state's 248.000 km^2 area, 606 of its 645 municipalities, and home to half of its 45 million inhabitants.[7]

3.1 Poupatempo

Obtaining personal documents and social services in Brazil has long been plagued by overly complicated and formalistic processes, petty corruption, a flourishing intermediary sector, and a de facto limited access for those with little resources (Rosenn 1971; Castor 2002; Fredriksson 2014). Against this background, the São Paulo state government program Poupatempo was initiated in 1997 as an effort to improve citizens´ access to personal documents as well as to certain social services. A first Poupatempo unit was implemented in

[7] The excluded area is metropolitan São Paulo.

the municipality of São Paulo. It was positively received by citizens and other units followed, mainly within the São Paulo metropolitan area. Through the physical co-location and back-office coordination of different state government authorities, Poupatempo intends to allow citizens to resolve errands such as obtaining an ID, getting an excerpt from criminal records, renewing a driver's license and registering for unemployment benefits, in less time and in fewer visits. The reform is implemented in addition to the legacy bureaucracy for attending to citizens, and a citizen can use any Poupatempo unit. By the mid 2000's, Poupatempo had gained considerable usage in the areas where it had been implemented, and had received mostly positive evaluations (Ferrer and Lima, 2006; Mota Prado and da Matta Chasin, 2011). For one of the most common errands at the Brazilian bureaucracy, driver's license renewal, at least 80% of individuals used Poupatempo rather than the legacy bureaucracy, shortly after the implementation of the Poupatempo units (Fredriksson, 2020). Take-up rates are very high also for other services.

The 2008–2011 expansion of Poupatempo implemented 16 new units in interior São Paulo, with the overall goal of giving citizens across the state access to the service. In 2007 only four out of 606 municipalities in this region possessed Poupatempo units. The planning of the expansion was done by the "New Operations" unit, which belongs to a secretariat close to the São Paulo state governor's cabinet (the Secretary of Public Management).[8] Among the spatial criteria used, for the planning of where to place new Poupatempo units, were that the units should be spread across the state, not be placed in municipalities with too little population (only municipalities with more than 100.000 inhabitants should be considered), that the region of placement should also have certain economic activity as measured by the number of

[8] The name of the Secretary and the placement of New Operations has varied slightly over the years. Laws from 1997, 1998 and 2008 contain Poupatempo placement guidelines (high demand regions, public transport proximity) and establish who should identify, analyze and propose locations (New Operations), and who decides (head of the Secretary) (Governo do Estado de São Paulo, 2016). There are no specific geographical- or other criteria however, and the secretary (who reports to the governor) has some discretion in the implementation decisions.

firms, and that, all else equal, regions with many populous cities together should be under-weighted. The latter criterion was used to assure that not all units would end up in the densely populated highway corridor stretching north-northwest from metropolitan São Paulo.[9]

Figure 1A displays the Poupatempo expansion on a map. Appendix Table A1 lists the new units, including the date of the announcement of each unit and the date of implementation/opening.

3.2 AME

The Brazilian Federal Constitution of 1988 created the Unified Health System (SUS in Portuguese[10]), inspired by the United Kingdom's National Health Service. SUS aims to guarantee universal, equal and free access to healthcare for the Brazilian population. São Paulo is considered one of the Brazilian states that comes closest to the SUS objective, with respect to comprehensive healthcare for all citizens. In the early 2000s, bottlenecks were still present, however, mainly due to the inadequate access to specialized outpatient services, and with patients, due to lack of options, seeking such care in the hospital network. Patients often needed to visit several hospital service units, in different locations, which could lead to a worsening of the clinical condition (Barradas Barata et al., 2009, 2010).

In 2008 the São Paulo state government instituted the network of Specialized Outpatient Medical Clinics (AME) (Diário Oficial Estado de São Paulo, 2008). The main motivation for the creation of AME was to improve access and quality, for the entire state population, to specialized outpatient care, and to reduce the existence of queues and delays in providing such care. An AME unit is a secondary diagnostic and therapeutic guidance service with high resolution in medical specialties (exams and minor surgeries). AME units further the

[9] Based on September 2012 interview with the New Operations director, about the 16-unit implementation.
[10] Sistema Unico de Saúde.

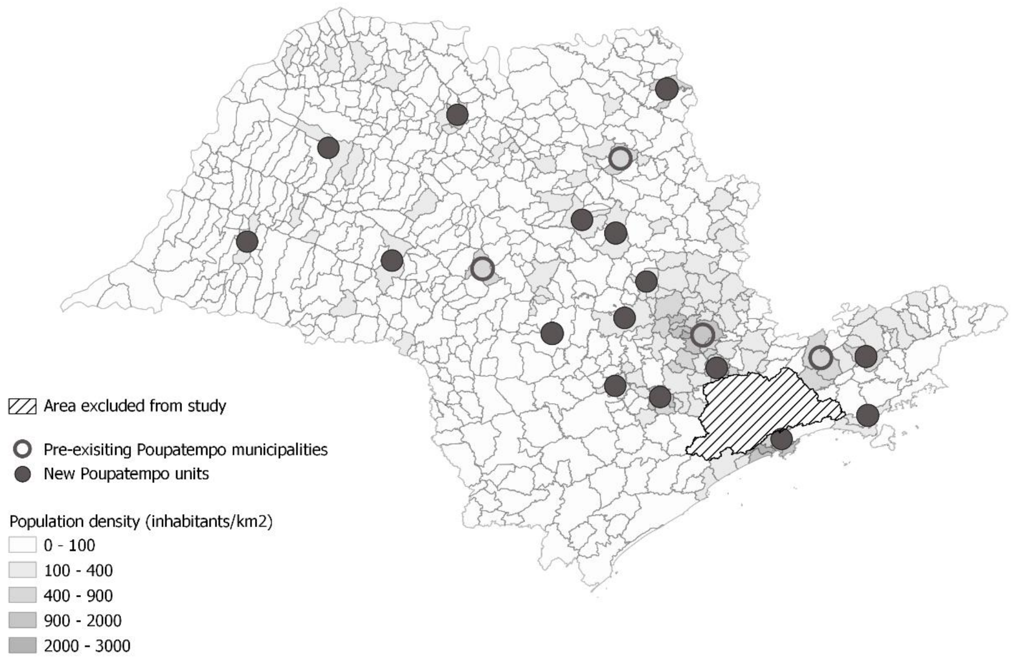

Figure 1A. Map of São Paulo, with 606 municipalities in the study area, displaying 2007 population density, pre-existing Poupatempo municipalities (hollow circles) and 16 new Poupatempo units, implemented 2008-2011 (solid circles).

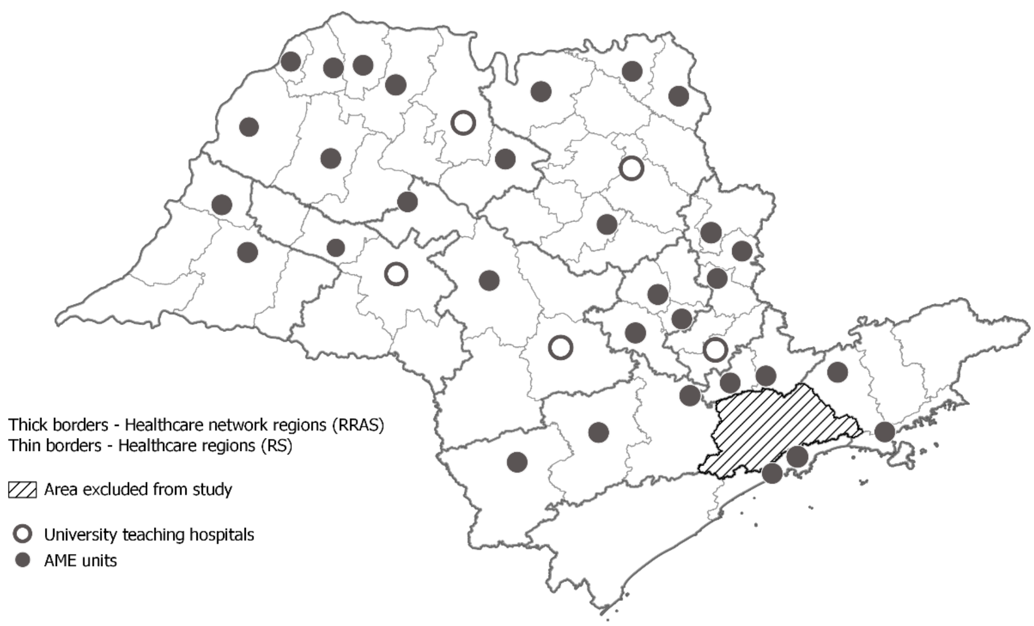

Figure 1B. Map of São Paulo, with 11 regional healthcare network regions (thick borders), 57 healthcare regions (thin borders), pre-existing university teaching hospitals (hollow circles) and 31 AME units implemented 2007-2012 (solid circles).

integration, and constitute a middle complexity level, between primary healthcare units and the hospital network, for those seeking specialized outpatient care.[11]

AME units are implemented at the healthcare region level and 31 of the 57 healthcare regions in interior São Paulo obtained an AME unit in the 2007-2012 period.[12] The 57 healthcare regions constitute a middle level of the healthcare administration, with the lower level being municipalities and the higher level being healthcare network regions (11 in the study area of interest).[13] In general, an AME unit, located in a certain municipality in a certain healthcare region, attends to patients referred from the municipal primary healthcare network, from within the larger area covered by the healthcare network region to which the healthcare region belongs.[14]

The planning of the network of AME units involves at least two decision levels.[15] The decision to implement a new unit, and its placement, is decided centrally by the head of the São Paulo state Health Secretary, a function appointed by the state governor. Input to these decisions is provided by the state coordinator for the regional healthcare departments and the state coordinator for the management of health service contracts. The planning of the exact services an AME unit should contain, once decided upon, is done at a more local level, using

[11] All AME units discussed in the text are "general" units (AME Geral in Portuguese). Two specialized surgical AME units, implemented in the study area in the time period of interest, are excluded from the analysis, as they serve a slightly different purpose.

[12] Additional units were then only added from 2016 and onwards, hence there is a well-defined "first wave" of implementation in the 2007-2012 period. The very first unit was implemented in 2007, before the program had been officially announced, in April 2008.

[13] There is thus an average of 5.2 healthcare regions per healthcare network region, with numbers ranging from two to 12. An additional division exists – healthcare departments, which, in São Paulo, sometimes coincide with the healthcare network regions (but will not be discussed in the paper). The regionalization of healthcare thus consists of healthcare regions (Regiões de Saúde - RS), healthcare network regions (Redes Regionais de Atenção à Saúde - RRAS) and healthcare departments (Departamentos Regionais de Saúde– DRS).

[14] We have reviewed, for each AME unit, the municipalities it attends to. To the best of our knowledge there is only one unit (Promissão) that attends to municipalities in another healthcare network region than where the AME is situated. The case concerns a few "border municipalities", situated close to the healthcare network region in question.

[15] This section builds on interviews with directors at the Sao Paulo state Health Secretary, in 2021, about the situation in 2007-2012, and Yamada (2008).

local health and service data and inputs. Among the data used in the (pre-implementation) planning processes are the epidemiological profile of a region, indicators of demand not attended to (through e.g. a comparison of medical visits per capita in different regions) and indicators of the healthcare supply capacity of different regions.

Figure 1B displays the AME implementation. Importantly, before and during the period with which the study is concerned, a few large university teaching hospitals performed a de facto function similar to the new AME units (Barradas Barata et al, 2009; Bittar & Magalhães, 2010). These hospitals are also displayed in Figure 1B, and are further discussed in the below analysis. Appendix Table A2 lists the healthcare regions and municipalities with AME units implemented during 2007-2012, including the date of opening.[16]

4. Using regression analysis to study the determinants of the spatial allocation of Poupatempo and AME

The analysis is done in a similar way for the two public services under study. We first define the relevant data to analyze. For Poupatempo we use municipality level data, restricting the dataset to large enough municipalities that were candidates to get a Poupatempo unit. For the AME analysis we use data at the healthcare region level. The data is pre-reform (typically from 2007), in order to capture the situation when allocations were decided upon. For each of the two public services, we first add, in the regression analysis, data reflecting the official program objectives and citizen demand. We also use spatial variables. These variables are adapted to the problem analyzed, and, in the case of AME, take the regionalization of healthcare into account. Additional variables, typically discussed in the literature on the

[16] There are some differences in the information presented in Appendix tables A1 and A2 (and in the political analysis that follows), with respect to dates. For Poupatempo, a well-known program around 2007, we consider the most relevant date and time period to be the announcement of the Poupatempo units. At the time, many municipalities had requested units, and “being awarded” a unit carried a certain political importance. For AME, virtually unknown in 2007, and although a technical planning list of units existed in 2008 (Yamada, 2008) (all of which were not implemented), we consider the actual implementation of the unit as the event that could carry a certain political importance. The program only became known, gradually, starting in 2007/2008.

allocation of public services and healthcare, respectively, are also analyzed. After these steps, political variables are added to the analysis.

For each of the two public services, a logit regression specification is estimated using data from the candidate locations to get the public service (municipalities and healthcare regions, respectively, indexed by i). The dependent variable y is the probability of a location getting the service, which is modeled as a function of variables representing the official program objectives, demand-related variables, spatial variables, other variables hypothesized to influence the allocation, and political variables (the vector of variables x). β are the coefficients to be estimated and ε is an error term,

$$\ln\left(\frac{y_i}{1-y_i}\right) = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} .. + \varepsilon_i \qquad (1)$$

The fit is assessed with the (pseudo) R-squared, and, more importantly, through the allocation predicted by the estimated model. Taking Poupatempo as an example, we thus estimate the model and use it to predict each municipality's probability of getting a Poupatempo (i.e. the propensity score). We then compare the predicted "top 16", i.e. the 16 municipalities with the highest propensity score, to the allocation actually implemented. If an actual Poupatempo municipality is consistently in the top 16, we consider it explained by the model. The exercise is repeated for each inclusion of additional explanatory factors, including political variables. A corresponding propensity score analysis is done with AME units and healthcare regions.[17]

4.1 Poupatempo

The analysis of Poupatempo is done with municipality level data. A pre-reform (2007) population threshold of 80.000 inhabitants is used, for a municipality to be included, which

[17] In addition to the standard logit regression model, we also use Firth's (1993) penalized maximum likelihood estimation to handle small-sample bias, and, in the Poupatempo analysis, a spatial lag model (Appendix 3),

results in a dataset of 52 candidate municipalities to get a Poupatempo unit.[18] Table 1 summarizes variables related to official program objectives, citizen demand and spatial accessibility, and also a political variable, for the 16 municipalities that obtained a Poupatempo unit, and for the 36 municipalities that did not.

As planned and stated by the São Paulo state government, the Citizen Service Centers were implemented in mostly larger cities (Table 1, row i). Also in line with the stated objectives, Poupatempo was placed in municipalities where the surrounding region on average is less dense, as seen by comparing the regional density variables in Table 1 (rows xii-xiv), for Poupatempo and non-Poupatempo municipalities. A model with two variables, representing population and surrounding regional density, should therefore fare quite well in explaining the Poupatempo allocation. In terms of implementation in the regression analysis, we use the (pre-reform) number of driver's license renewals in a municipality (Table 1, row iii), rather than population. This variable (further discussed in Fredriksson, 2020) is a measure of actual demand of bureaucracy services provided at Poupatempo and is highly correlated with both population and the number of firms. For regional density, we follow Weibull (1976) and use a standard accessibility measure, which equals the sum of the population/distance ratios for surrounding municipalities.[19] The less dense is a surrounding region, the smaller the number. Two such measures, with different distance cutoffs (30 km and 50 km), are in Table 1, rows xvii-xviii.[20]

The results from including, in regression (1), only the renewal and accessibility variables are in Table 2, column 1. From the R-squared, one can infer that about half of the variation in the

[18] One Poupatempo unit was implemented in a municipality of 94.000 inhabitants (Caraguatatuba), which was slightly counterfactual to the stated 100.000-threshold, which is why we chose a population threshold below 100.000.

[19] For each candidate municipality *i*, we calculate $P_A/d_{Ai}+P_B/d_{Bi}+...$, where P_A is the population of surrounding municipality A and d_{Ai} the distance between the centers of municipalities A and *i*, and so forth. A, B, .. are municipality *i*:s surrounding municipalities, up to a distance cutoff.

[20] The corresponding variables are called Accessibility30 and Accessibility50.

Poupatempo dummy is explained. Based on the propensity score, 12 of the actual Poupatempo municipalities are among the top 16, a result which is robust to changes in which of the different demand-related and spatial variables from Table 1 that are included.[21]

We also included other variables that could impact demand for the Citizen Service Centers, variables typically discussed in the public services literature, but not explicitly mentioned by Poupatempo. We thus checked if population growth, income/capita, GDP/capita, years of education, Human Development Index, number of vehicles/capita, fraction without birth certificate and illiteracy rate were significant in regression 1 (added one at a time). Only illiteracy rate and (sometimes) population growth are significant and hence included in column 2 of Table 2. The predicted allocation does not change much from when only including a demand and a spatial accessibility variable.

The results so far indicate that the above simple models correctly predict 12 out of 16 Poupatempo units. These units are exactly the first 12 units of the expansion to be announced by the São Paulo state government, up until 2007 (Table A1). Four of the 16 units were instead announced later (2008/2009), and at least two units, Caraguatatuba and Tatuí (refer to Figure 2 in section 5), are not explained by the simple model.

Political variables

A state government program such as Poupatempo will depend on cooperation at the local level, i.e. with municipalities, for a successful implementation. This may concern finding the land or the appropriate physical space, building permits, etc. Municipalities and their political leadership may also differ in their attitudes towards the program. Poupatempo was initiated

[21] The regressions shown use the Accessibility30 variable (Table 1, row xvii). Based on interviews with Poupatempo officials we initially included also an indicator of whether a municipality is a regional capital (within the state) and a "highway-dummy" (whether the north-northwest highways Anhanguera and Bandeirantes, starting in metropolitan São Paulo, pass through the municipality). Once controlling for demand and regional density, however, these variables were insignificant and excluded from the model.

	1	2	3	4	5
Sample: All 52 municipalities that are considered to have been candidates, in 2007, to get a Poupatempo unit		**Poupatempo** N=16	**No Poupatempo** N=36	**Difference significant?** (Columns 2&3)	**Data sources**
Demand related variables					
i	Population (in 2007)	260k	138k	Yes	SEADE
ii	Number of businesses (in 2007)	6581	2704	Yes	SEADE
iii	Number of driver's license renewals (Q1-Q2, 2008)	7161	3297	Yes	DETRAN
iv	Population growth (average yearly rate from 1997 to 2007)	0.0149	0.0164	No	SEADE
v	Income/capita (in 2000, household income divided by no. of household members, in min. salaries)	3.04	2.41	Yes	SEADE
vi	GDP/capita (in 2009), in 2009 Reais)	23434	19730	No	SEADE
vii	Education (in 2000, average years pf study of individuals aged 15-64)	8.02	7.30	Yes	SEADE
viii	Human Development Index (in 2000)	0.832	0.811	Yes	SEADE
ix	Vehicles/capita (in 2009)	0.540	0.472	Yes	SEADE
x	Fraction without birth certificate (in 2000)	0.0046	0.0058	Yes	IBGE
xi	Illiteracy rate (in 2000, individuals 15 or older)	0.056	0.071	Yes	SEADE
Spatial variables					
	Separate population and distance measures				
xii	Population of municipalities within 30km road distance, excluding own	181k	319k	No	SEADE, MapQuest
xiii	Population of municipalities within 50km road distance, excluding own	476k	733k	(Yes)	SEADE, MapQuest
xiv	Number of municipalities within 30km radius with more than 50000 inhabitants	1.44	2.56	No	SEADE
xv	Road distance to the closest other candidate municipality (or preexisting Poupatempo)	50.9 km	33.4 km	(Yes)	MapQuest
xvi	Road distance to closest bigger municipality	88.5 km	39.6 km	Yes	MapQuest
	Accessibility: Sum of surrounding municipalities' population (in thousands)/distance (in km) ratios				
xvii	Accessibility measure, municipalities within 30km	12.31	24.14	No (t=1.49)	SEADE, MapQuest
xviii	Accessibility measure, municipalities within 50km	22.08	38.18	No (t=1.64)	SEADE, MapQuest
Political variable					
xix	Share of municipalities with PSDB mayor, 2005-2008	0.50	0.22	Yes	TSE

Table 1. Variables related to official program objectives, citizen demand and spatial accessibility for the 16 municipalities that obtained a Poupatempo unit, and for the 36 municipalities that did not obtain a unit. Column 4 indicates if differences are significant at the 5% (10%) level. SEADE is the São Paulo state data entity, DETRAN the state department of transit, IBGE the Brazilian statistical agency and TSE (Tribunal Superior Eleitoral) is the federal election authority.

Dependent variable: Poupatempo dummy

	1	2	3	4	5	6
Renewals (in thousands)	0.00103***	0.000789**	0.000904**	0.000887***	0.000633**	0.000616*
	(0.000299)	(0.000310)	(0.000419)	(0.000273)	(0.000270)	(0.000324)
Accessibility30	-0.0000699**	-0.0000847**	-0.000126**	-0.0000602**	-0.0000684**	-0.0000840*
	(0.0000312)	(0.0000361)	(0.0000570)	(0.0000285)	(0.0000325)	(0.0000449)
Illiteracy rate		-91.31	-231.3**		-76.43	-159.6*
		(58.77)	(112.1)		(53.07)	(84.05)
Population growth		17.25	42.10		14.60	37.02
		(75.03)	(77.36)		(64.71)	(65.55)
PSDB mayor (dummy) (period: 2005-2008)			4.111*			2.790*
			(2.207)			(1.618)
Constant	-4.555***	2.240	9.361	-4.004***	1.939	6.319
	(1.235)	(4.470)	(6.464)	(1.111)	(4.018)	(5.191)
Estimation method	ML	ML	ML	PML	PML	PML
N	52	52	52	52	52	52
pseudo R^2	0.504	0.546	0.637			
AIC	37.84	39.12	35.29	-1.573	16.30	14.25

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. ML – Maximum Likelihood, PML – Penalized ML.

Table 2. Logit regressions of the Poupatempo dummy on the number of driver's license renewals (our preferred measure of municipality level demand for bureaucracy services) and the spatial accessibility measure (column 1); then adding adult illiteracy rate and average yearly population growth (column2), subsequently adding a dummy for whether the 2005-08 mayor was from the PSDB party (column 3). Columns 4-6 are robustness regressions estimated using Firth's (1993) Penalized maximum likelihood (PML) method, to deal with potential small-sample bias.

by PSDB (the Social Democracy Party), which held the presidency in Brazil 1994-2002, and which held the governor position in the state of São Paulo for 28 years, from 1995 until 2022. Mota Prado and da Matta Chasin (2011) argue, based on interviews with Poupatempo officials, that having a political ally as mayor helped the PSDB state government implement the project in one of the pre-2007 Poupatempo municipalities. Brazil has a four-year electoral cycle, with state governor (and state parliament) elections in 2002, 2006, 2010, and so on, and a municipal election calendar that is staggered by two years (e.g. mayor elections in 2004 and 2008). Table 1 shows a large and significant difference in the fraction of PSDB mayors between the municipalities obtaining and those not obtaining a Poupatempo unit, for the years 2005-2008[22], the period during which most of the new Poupatempo units were announced. Table A1 provides additional data on potential political effects in how fast Poupatempo units were implemented, once announced. The units seem to be implemented faster, once announced, in municipalities with PSDB mayors.

We next follow the above discussed papers on distributive politics to asses if there is any support for either the swing- or core voter hypotheses and if some Poupatempo units are explained by political effects (with the initial evidence presented in Table 1 pointing towards the core- rather than the swing voter hypothesis). Political variables are thus added to the regression model, and the degree to which the 16 implemented units are explained is once again assessed.

In the theoretical models, a candidate or political party makes a promise before an election, on which citizens then vote. Subsequently, promises are implemented, perhaps because of a reelection motive. Alternatively, and more relevant here, there is an incumbent (party,

[22] Mayors being elected in 2004 serve from January 2005 until December 2008.

politician, governor) (in our case the PSDB governor elected in 2006) deciding on the distribution of public programs in the current period, to affect future election outcomes.

The empirical analysis is similar to the analysis in Case (2001), Tavits (2009), and several other papers. To test the swing voter prediction, we study if the degree of electoral competition in the 2004 municipal election determines subsequent Poupatempo allocations.[23] We use two alternative measures of electoral competition: the PSDB vote margin, and a measure of the "effective number of mayor candidates".[24] As for the core voter prediction, we use a 2005-2008 PSDB mayor dummy as an indicator of potential alignment with the central level. A potential favoring of municipalities with PSDB mayors can, in addition to the above discussed theoretical models, be justified as follows: i) the state government would selectively allocate public programs to "core" municipalities, to affect mayors' reelection probabilities and ii) the mayors would, in turn, rally for the governor in elections. Such a channel of mutually beneficial governor-mayor exchange gives predictions similar to the core voter models.[25]

We do not find support of the swing voter theory, i.e. that municipalities with more contested elections are prioritized. The estimated coefficient on the municipal election closeness variable is always positive, rather than negative. The effective number of mayor candidates also has, if anything, a negative effect on the probability of getting a Poupatempo (the swing voter regressions are discussed in Appendix 3). Table 2, column 3, instead adds the 2005-

[23] The objective would be to affect the election outcome of such municipalities in the 2008 municipal election, which in turn could help the state government in the 2010 elections.
[24] We defined the PSDB vote (i.e. win/lose) margin as the difference between the PSDB- and runner-up vote percentages, if PSDB won, otherwise as the difference between the winner and PSDB. Both are positive. 20% of municipalities had no PSDB candidate; we then used the coalition PSDB belonged to. The effective number of candidates, a measure inspired by Laakso and Taagepara (1979), is $\frac{1}{\sum_{i=1}^{n} p_j^2}$. n is the number of candidates receiving votes, p_j candidate j's vote share.
[25] Core PSDB municipalities would be those with incumbent PSDB mayors, who may have rallied for the governor in 2006, then being provided the public program as a "reward", which in turn could affect the mayor's 2008 reelection probability. Alternatively, municipalities are first awarded the program, then committed to rally for the governor in 2010. Both sequences of events are plausible.

2008 PSDB mayor dummy to the above regressions. This variable is typically significant at the 5-10 percent level, lending some support to the core voter theory, i.e. that PSDB strongholds may have been favored. The model in Table 2 now gives higher predicted scores for Caraguatatuba and Tatuí, the previously “least explained” units. This is natural, as both municipalities had PSDB mayors. The interpretation of the column 3 estimates is somewhat unclear, however, as three Poupatempo units, including Caraguatatuba and Tatuí, were announced in the next municipal election period (Table A1). Interpreting these units as support to the 2005-2008 mayor party is hence troublesome. Both municipalities are part of a group, however, of nine candidate municipalities that had a PSDB mayor in the two election periods between 2005 and 2012. Six of these got a Poupatempo. Furthermore, Caraguatatuba and Tatuí are the only two candidate locations with a PSDB mayor in 2009-2012 who had previously served also as a state legislature PSDB parliamentarian. Adding this variable to the regression model correctly predicts all Poupatempo units (regression not shown). We investigated the channel further through an in-depth interview with a long term PSDB politician with relevant hands-on experience from the São Paulo municipal- and state politics machinery, from the municipalities in the coastal areas of the state, from decisions related to Poupatempo, and from municipal-, state- and federal election campaigns.[26] One pattern that emerged is that state-level experience is very important, as it results in contacts at different ministries and entities involved in implementing programs in the municipalities. If municipal staff has experience from state level functions, they can speed up internal handling at the state level. The mayor+parliamentarian dummy for Caraguatatuba and Tatuí is likely to capture this effect, in addition to a favoring of the municipalities per se.[27]

[26] Interview in May, 2015.

[27] It is interesting that Caraguatatuba and Tatuí were the most expensive units per capita, of the 16 units, in the Poupatempo cost data gathered in Fredriksson (2020) for driver’s license renewals. The per capita cost relations can be inferred from the rather flat cost curve (Figure F1 in Fredriksson, 2020) and the relatively small population of Caraguatatuba and Tatuí (Table A1 in the present paper).

4.2 AME

The analysis of AME is done with data at the healthcare region level, for the 57 healthcare regions in interior São Paulo.[28] Similar to the analysis of Poupatempo, we start with a regression model including data on population and spatial variables. A first spatial variable is a dummy for which healthcare region, within a healthcare network region, is the most central. A second spatial variable instead proxies for the remoteness of a healthcare region (through a distance measure). We also include two dummy variables for whether a healthcare region has a university teaching hospital, or is bordering a healthcare region with a university teaching hospital (Barradas Barata et al, 2009; Bittar & Magalhães, 2010), as access to such a hospital should be negatively related to obtaining an AME unit. These and other variables are further explained in Table 3, and summarized for the 31 healthcare regions that obtained an AME unit and for the 26 healthcare regions that did not.

Regressing the AME dummy on the above variables explains 16% of the variation in the AME dummy, as shown in column 1 of Table 4. The regressions suggest that AME units were allocated in both central as well as remote healthcare regions and that having access to a university teaching hospital substitutes for obtaining an AME unit.

We proceed in the analysis by adding to the regression, one variable at a time, per capita measures of the following (pre-reform) variables (also listed in Table 3): number of beds for inpatient hospitalizations (overall and in the SUS system, respectively), number of licensed healthcare personnel (doctors, nurses, nursing assistants and nursing technicians, respectively) [29], number of outpatient procedures and number of inpatient hospitalizations. We also include data on mortality and GDP/capita. Most of the variables are not significant in

[28] We aggregate municipality level data into healthcare region data, using either simple summation (for e.g. population), or a population weighted average (e.g. GDP/capita), as appropriate.
[29] Doctors are licensed at the São Paulo medical association (Conselho Regional de Medicina, CRM-SP), the other professions at the São Paulo nursing association (Conselho Regional de Enfermagem, COREN-SP). Licensing is compulsory.

the regression and only those variables that are typically significant are maintained in the analysis. The results are reported in column 2 of Table 4. Approximately 36% of the variation in the AME dummy is now explained by the model. The overall picture is that AMEs have been placed both in healthcare regions with slightly higher levels of healthcare demand (for which mortality is a proxy) but also in somewhat richer regions and where there is a higher level of pre-existing healthcare infrastructure (for which the number of doctors is a proxy).

Political variables

Allocating an AME unit in a certain geographical location may depend on political support at the local level. Somewhat differently from the case of Poupatempo, there are several regional levels and entities that could potentially matter in the decisions of where to allocate an AME unit, including municipalities, healthcare regions and healthcare network regions. Neither healthcare regions or healthcare network regions are important political entities however, which differs from municipalities. Whereas the different levels of healthcare regionalizations have a more technical planning role, the political articulation related to resource allocation will involve the local political leadership, and especially mayors.

Rows xvii-xviii in Table 3 show large and significant differences in the fraction of PSDB mayors between the healthcare regions obtaining and those not obtaining an AME unit, for the years 2009-2012[30], the period during which most of the new AME units were implemented. Row xvii uses data from the most populous municipality[31], whereas row xviii instead uses the population weighted average from all municipalities within a healthcare

[30] Mayors being elected in 2008 serve from January 2009 until December 2012.
[31] With 57 healthcare regions in interior São Paulo, the most populous municipality is often the one large city in the region. These cities carry a certain political importance and are, by their population, natural candidates for placement of public services (although exceptions exist, as indicated in Table A2). The notion that the most populous municipality in a healthcare region is a candidate for AME placement is supported by an early planning presentation by the São Paulo state Health Secretary (Yamada, 2008).

	1	2	3	4	5
Sample: All 57 healthcare regions in interior São Paulo.		**AME** N=31	**No AME** N=26	**Difference significant?** (Columns 2&3)	**Data sources**
Demand and supply-related variables					
i	Population (in 2007)	392k	335k	No	SEADE
ii	Population growth (average yearly rate from 1997 to 2007)	0.0115	0.0115	No	SEADE
iii	Dummy for: whether the healthcare region has a teaching hospital;	0.0322	0.154	No (t=1.63)	Barradas Barata et al. (2009), own calculations
iv	whether the region borders a region (within healthcare department) with a teaching hospital	0.161	0.308	No	
v	Number of beds for inpatient hospitalizations, per 1000 inhabitants (in 2008)	2.95	2.57	No	SEADE
vi	Number of beds for inpatient hospitalizations, in the SUS system, per 1000 inhabitants (in 2008)	2.01	1.83	No	SEADE
vii	Number of licensed doctors, per 1000 inhabitants (in 2007)	1.53	1.47	No	SEADE (CRM-SP)
viii	Number of licensed nurses, per 1000 inhabitants (in 2007)	0.933	1.01	No	SEADE (COREN-SP)
ix	Number of licensed nursing assistants, per 1000 inhabitants (in 2007)	3.51	3.26	No	SEADE (COREN-SP)
x	Number of licensed nursing technicians, per 1000 inhabitants (in 2007)	1.80	1.62	No	SEADE (COREN-SP)
xi	Number of outpatient procedures, per 1000 inhabitants	1154	1053	No	SUS
xii	Number of inpatient hospitalizations, individuals per 1000 inhabitants	66.7	64.3	No	SUS
xiii	Mortality, per 1000 inhabitants (in 2008)	6.82	6.50	(Yes)	SEADE
xiv	GDP/capita, Reais (in 2008, current value)	18400	17200	No	SEADE
Spatial variables					
xv	Dummy for the most central healthcare region within each healthcare network region	0.258	0.115	No	Caliper Maptitude
xvi	Total citizen distance to most central healthcare region within each healthcare network region	21.9 Mkm	18.4 Mkm	No	Caliper Maptitude
Political variables					
xvii	Share of healthcare regions' most populous municipalities that had a PSDB mayor, 2009-2012	0.45	0.15	Yes	TSE
xviii	Population weighted share of municipalities, in healthcare region, with PSDB mayor, 2009-2012	0.40	0.21	Yes	TSE

Table 3. Averages of demand and supply-related variables, spatial accessibility variables and other variables for the 31 healthcare regions that obtained an AME unit, and for the 26 healthcare regions that did not. Column 4 indicates if the difference in the average is significant at the 5% (10%) level. Examples of outpatient procedures are medical exams or small surgeries, undertaken in outpatient units. The most central healthcare region within a healthcare network region (row xv) is the healthcare region containing the municipality to which the total travel distance, for all inhabitants in the healthcare network region, is minimal. The distance variable (row xvi) is the distance for all inhabitants in the healthcare region to the most central municipality used for the measure in row xv.

Dependent variable: AME dummy

	1	2	3	4	5	6	7	8
Population	-0.00154	-0.00535	-0.00677	-0.00861	-0.000964	-0.00313	-0.00377	-0.00405
(in thousands)	(0.00185)	(0.00424)	(0.00506)	(0.00527)	(0.00152)	(0.00333)	(0.00253)	(0.00272)
Most central	3.176*	7.023*	8.779	10.30*	2.186*	3.909	4.189*	4.489
(dummy)	(1.735)	(4.182)	(5.551)	(5.776)	(1.291)	(2.830)	(2.315)	(2.761)
Distance to most	4.53e-08	9.19e-08**	9.46e-08**	8.99e-08**	3.88e-08	6.88e-08*	6.69e-08*	6.01e-08*
central (in kms)	(3.24e-08)	(4.21e-08)	(4.70e-08)	(4.51e-08)	(3.01e-08)	(3.63e-08)	(3.70e-08)	(3.49e-08)
Teaching hospital	-3.236**	-11.99**	-13.98**	-15.52**	-2.209*	-7.275**	-7.637**	-7.679**
(dummy)	(1.629)	(5.341)	(6.734)	(7.102)	(1.205)	(3.502)	(3.076)	(3.285)
Teaching hospital in	-0.966	-1.027	-1.660	-1.698	-0.874	-0.816	-1.257	-1.266
neighboring region	(0.728)	(0.896)	(1.106)	(1.058)	(0.678)	(0.808)	(0.962)	(0.927)
Doctors per capita		3194.6**	3760.9**	4161.6**		2161.4**	2439.1**	2447.7**
		(1401.2)	(1645.4)	(1715.4)		(1065.0)	(1157.4)	(1102.3)
Mortality rate		1349.1**	1271.5*	773.7		1087.4**	1023.9*	728.4
		(632.7)	(705.4)	(707.3)		(534.0)	(594.3)	(614.5)
PSDB_0912, dummy			2.264**				1.672**	
(most pop. municipality)			(0.968)				(0.800)	
PSDB_0912				4.834**				3.362*
(weighted)				(2.163)				(1.715)
Constant	-0.258	-13.52***	-14.03**	-11.40**	-0.276	-10.53**	-10.72**	-9.052*
	(0.694)	(4.928)	(5.638)	(5.225)	(0.647)	(4.182)	(4.861)	(4.627)
Estimation method	ML	ML	ML	ML	PML	PML	PML	PML
N	57	57	57	57	57	57	57	57
pseudo R^2	0.160	0.365	0.452	0.459				
AIC	77.97	65.87	61.03	60.51	27.44	44.95	41.11	42.19

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. ML – Maximum Likelihood, PML – Penalized ML.

Table 4. Logit regressions of the AME dummy on population, a dummy representing whether a healthcare region is the most central in its healthcare network region, the distance measure (from Table 3) and dummies for whether the healthcare region has, or is bordering a healthcare region with, a teaching hospital (column 1); then adding doctors/capita and mortality rate (col. 2); subsequently adding the dummy for whether the most populous municipality in the healthcare region had a PSDB mayor in the 2009-2012 election period (col. 3), or the population-weighted average of the 2009-2012 PSDB mayor dummies for all municipalities in the healthcare region (col. 4). Columns 5-8 are robustness regressions, using Firth's (1993) Penalized maximum likelihood (PML) method.

region.[32] Similar to the case of Poupatempo, the initial evidence points towards political effects being relevant in the allocation of AME.

We next study political effects in the regression framework, testing the swing- and core voter hypotheses (with the evidence in Table 3 pointing towards the core voter hypothesis). As in the Poupatempo analysis, we constructed two variables to test the swing voter hypothesis, the absolute PSDB vote (win/lose) margin, and the effective number of mayor candidates (based on the most populous municipality in each healthcare region).[33] As for the core voter analysis, we use the 2009-2012 PSDB mayor variable reported on row xvii of Table 3 as the main indicator of potential alignment with the central level.

We do not find support of the swing voter theory, i.e. that municipalities with more contested elections are prioritized. The estimated coefficients on the two variables are not significant (the swing voter regressions are discussed in Appendix 4). Table 4, column 3, instead adds the 2009-2012 PSDB mayor dummy to the above regressions. This variable is typically significant at the five percent level, lending some support to the core voter theory, i.e. that PSDB strongholds may have been favored when deciding on where to allocate AME units. Column 4 instead uses the population-weighted PSDB mayorship measure (Table 3, row xviii), with similar results.

After running each regression, we use the estimated model to predict the "top 31" healthcare regions, in propensity score. More than 75 percent of the actual AME units are explained by the models in columns 2-4 of Table 4, and the degree of explanation goes up when the

[32] The data in row xviii is thus a more "comprehensive" political measure considering the entire healthcare region. Evidence that mayors of different municipalities cooperate in getting resources to their region support such a measure (e.g. AME Casa Branca, 2009).

[33] The variables were constructed in a manner similar to the Poupatempo analysis (but using instead 2008 municipal election data). For the PSDB vote margin variable, around 30% of municipalities had no PSDB candidate; we then used the coalition PSDB belonged to. Four municipalities had neither a PSDB candidate nor a coalition to which the party belonged; these municipalities were excluded from the swing voter analysis.

political variable is added. Four healthcare regions with an AME unit see a drastic increase in propensity score when the political variable is added (going from column 2 to column 3), and move from being unexplained to being explained by the model. Each of these regions had a PSDB mayor in its most populous municipality in the 2009-2012 period (the political variable used in the regression) and also in the preceding period (2005-2008).[34] These and other municipalities are further discussed in section 6, in which we introduce additional model selection measures, for robustness.

5. Quantifying the effect on citizens' travel distances from politically induced allocations

There are a large number of Operational Research methods that aim at determining the optimal allocation of public services, according to different objective functions (refer to e.g. Marianov and Serra, 2002; Revelle and Eiselt, 2005; and de Smith et al., 2018). For Poupatempo, the official objectives of the program and discussions with the "New Operations" planning unit inspired a p-median formulation, a standard problem in location-allocation analysis. Using such an optimization problem, the goal is to allocate a number of additional Poupatempo units in order to minimize the average travel distance to the service, while taking already existing units into account.[35] The p-median problem for the 16-unit Poupatempo expansion was described and analyzed in Fredriksson (2017), which also contains additional references.

The p-median method is used to construct a counterfactual allocation to the Poupatempo units deemed to be politically motivated, as follows: Fix Poupatempo units in all actual locations, except for the locations deemed to be politically motivated, from the regression analysis. Then, instead of locating these units in their actual locations, solve for the distance-

[34] The four municipalities are Caraguatatuba, Franca, Piracicaba and Votuporanga, which are also the municipalities where the AME units are located (Table A2).
[35] Or, alternatively, to minimize travel time.

minimizing localization of said units. Finally, calculate the change in citizen travel distance between the thus obtained allocation and the actual allocation.

A similar process is used for AME. The AME official objectives are in line with facilitating citizens' spatial access to the service, and the fact that AME units were located in central as well as remote locations, is consistent with a p-median formulation, the solution of which will tend to both allocate units in population centers as well as disperse the units. As an individual can, in principle, only visit an AME unit within her own healthcare network region, however, the problem formulation needs to be slightly different to that of Poupatempo. A constraint that forbids (or puts an infinite cost on) travel outside the healthcare network region is thus added to the problem. Similar to the Poupatempo analysis, all actual AME units will be fixed, except those deemed politically motivated, from the regression analysis. Potentially different locations for those units will then be found through the p-median optimization. The AME optimization problem is furthermore solved with the additional "constraint" that also university teaching hospitals are considered to serve the same function as AME units, which is in line with the discussion and results in section 4.2.[36,37]

Travel distance data between municipalities, pre-reform municipality population data, the latitude and longitude position of municipality centres, and the IBM C-PLEX optimization software are used in the p-median optimization (similar to the analysis in Fredriksson, 2017).

In order to illustrate the method with the results derived so far, the first two rows of Table 5 summarize the results, for the Poupatempo and AME analyses in sections 4.1 and 4.2, an

[36] All AME units, except those deemed political, from the regression analysis, will thus be placed in their actual locations, as will five university teaching hospitals, and the p-median problem will then solve for the optimal placement of an additional number of AME units, corresponding to the number of actual AME units deemed political. In the AME p-median optimization problem, municipalities with 20000 inhabitants or more are considered candidates for placement of a unit.

[37] For Poupatempo, the fact that individuals may use pre-existing units in metropolitan São Paulo is incorporated into the optimization problem. For AME, metropolitan São Paulo is another healthcare network region, hence such an inclusion of "border effects" is not necessary.

analysis that will be further elaborated on in section 6. Table 5 suggests that a substantial improvement in travel distances would have been possible, through the alternative locations suggested by the p-median analysis, and in particular so for AME.

Figure 2 shows, with Caraguatatuba and Tatuí being considered politically explained Poupatempo units (refer to section 4.1), the counterfactual allocation (Figure 2a) and the spatial distribution of "winners and losers", compared to if the units had instead been allocated in the counterfactual municipalities (2b). There is an overall loss, as depicted in the Poupatempo row of Table 5.

6. Robustness analysis and further model development

This section undertakes a robustness analysis of the results derived so far, and further develops the method for analyzing political effects.

An important concern is that the regression models presented may not be the "best models", and that the results (i.e., the extent of "misallocation" and which locations are deemed as politically motivated) are not robust to variations in which independent variables are included. In order to address this concern, the following approach, which will be exemplified analyzing AME, is followed. We first iterate through (a subset of) the possible regression models. As an example, with seventeen independent variables that can be either included or excluded in a model, there would be 2^{17} = 131071 possible models. Some of the variables will be highly correlated however, and/or may represent the same underlying phenomenon or variation, hence not all combinations of variables (i.e., only a subset) will be allowed, which reduces the number of models.[38] We then use the small sample Akaike Information Criterion

[38] Quadratic terms, interactions between variables, etc., are not considered. Importantly, the list of variables comes from a priori knowledge and theorizing about important factors in public service allocations (sections 3-4), hence the approach should not be interpreted as a complete search through any variable in a data set (as an example, for the Poupatempo analysis, a complete SEADE dataset would have consisted of around one thousand variables).

1	2	3	4	5	6	7	8	9	10
Service	**Number of units analyzed**	**Number of units explained once political effects are included**	**Number of alternative locations suggested by the p-median model**	**Net number of units politically explained**	**Average one-way travel distance in the actual allocation (km)**	**Average one-way travel distance in the counterfactual allocation (km)**	**Reduction in one-way travel distance (km)**	**Percentage reduction in travel distance (%)**	**Reduction in aggregate round-trip travel distance, if each citizen visits the service once a year (million km)**
Poupatempo	16	2	2	2	40.21	37.95	2.26	5.6	94
AME	31	4	3	3	29.63	26.26	3.37	11.4	141
Robustness analysis of the AME results (section 6), based on the small sample Akaike Information Criterion (30 models)									
Average	31	3.57	2.83	2.83	29.63	26.56	3.07	10.4	128
Median	31	4	3	3	29.63	26.68	2.95	10.0	123
Modal	31	4	3	3	29.63	26.93	2.7	9.1	113

Table 5. Improvement in citizen access in case the Poupatempo and AME units, deemed as politically motivated from the analysis in sections 4.1 and 4.2, were replaced by optimally placed units. The bottom part of the table is explained in section 6.

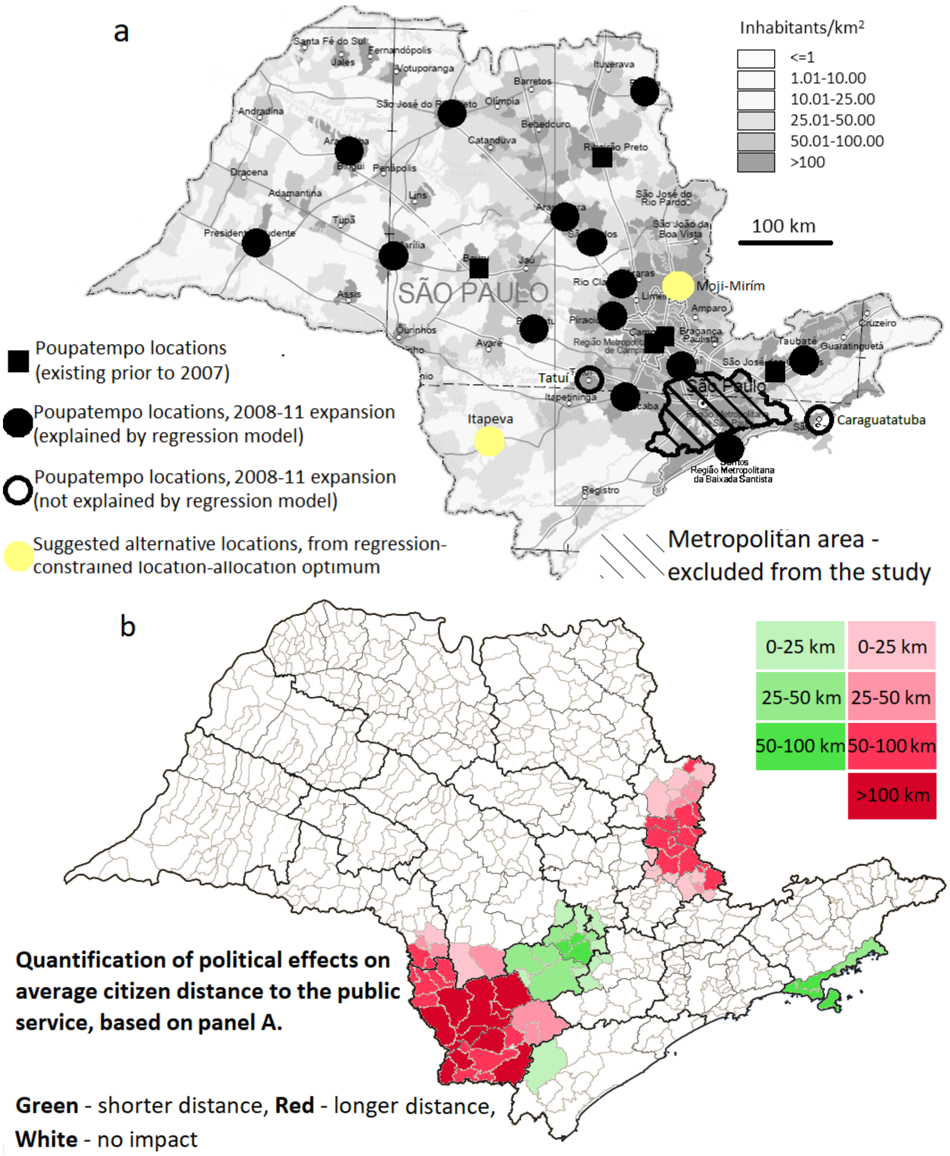

Figure 2a Actual allocation (black circles, solid and hollow) and "regression-constrained" optimal (counterfactual) allocation (solid circles, black and yellow), where two units are chosen with the minimum-distance algorithm. **2b** Impact on municipality level distances to the public service, comparing the allocation deemed political, to the counterfactual allocation.

(AICc) to select the (e.g.) 30 models with the lowest AICc score.[39] For these 30 models, we analyze which variables are typically included, whether the political variable is included and the significance level of the political variable.[40] Next, the political variable is dropped from each of the selected models and the regression re-run, which gives us model pairs, without and with the political variable. For each such model pair, the actually implemented service units/locations that move from being unexplained to being explained once the political variable is included (i.e., in the case of AME, moving from being outside to being among top 31, in propensity score ranking), are considered as potentially politically motivated. We check, across the 30 regression pairs, whether there is consistency across models in which units are deemed political. We next run the location-allocation analysis in which the p-median algorithm selects the optimal locations for the units deemed political, i.e. selects the optimal locations rather than the locations potentially selected for political reasons. We again check if there is consistency across the different model specifications. Importantly, any location that was explained by the regression model only once the political variable was included, but that is part of the p-median optimum, is removed from the list of locations deemed political.

For such a robustness analysis of the AME results, we considered, after analyzing correlations between the different variables, population (Table 3, row i), the two teaching hospital variables (rows iii-iv), the two spatial variables (rows xv-xvi), and the political variable (row xvii, the PSDB mayor variable for the most populous municipality), all without constraints for inclusion/exclusion in a particular model. Constraints regarding joint inclusion in any one model were instead imposed on the variables representing population growth, the hospital bed variables, the medical profession variables, the hospitalization variables,

[39] The Akaike information criteria are discussed in e.g. Burnham and Anderson (2002).
[40] If the political variable is not included in one or several of the 30 regressions, this fact will need to be considered when making the overall judgment about the plausibility of political effects.

mortality rate and GDP/capita.[41] We thus obtained 7040 different models, and report results for the 30 models with the lowest AICc.[42]

Across the 30 selected regression models, the political variable is always included and is significant at the five per cent level or higher. Ten healthcare regions emerge as politically explained in at least one of the 30 regression pairs then constructed, and three healthcare regions (and their corresponding most populous municipality, hosting the AME unit) move from having an average propensity score ranking outside the top 31 to having an average propensity score among the top 31 (Caraguatatuba, Franca, Votuporanga). We will first discuss one of these healthcare regions and municipalities, Votuporanga, the first to get an AME unit in the study area, then report more general results. The map in figure A1 in Appendix 5 displays five municipalities discussed in this section.

Votuporanga had a PSDB mayor between 2001 and 2008, i.e. for two election periods, who was active in the field of attracting health resources to the region, during and also after his mayorship, when he became a state parliamentarian, and later leader of the state parliament. Articulation for AME and other health resources was, among other channels, mediated by PSDB state parliamentarians (Prefeitura de Votuporanga, 2007) and was also done directly with the PSDB state governor (Pignatari, 2013a, 2013b, 2013c). The former mayor was later an advisor for the health sector entity that houses the Votuporanga AME unit and was also awarded with special honors by said entity (ALESP, 2011B; Pignatari, 2012). The health sector entity itself had, during the mid-2000's, as administrator a local and well-established

[41] Due to potential multicollinearity problems, maximum one of the two hospital bed variables was allowed in any one model (Table 3, rows v-vi), maximum one medical profession variable (rows vii-x), maximum one of the two variables representing inpatient beds and inpatient hospitalizations (rows vi, xii), maximum one of the population growth and mortality rate variables (rows ii, xiii) and maximum one of the mortality rate and GDP/capita (rows xiii, xiv) variables. Finally, neither of the two hospitalization variables (rows xi-xii) was allowed in the same model as a medical profession variable (rows vii-x).

[42] The model in Table 3, column 3, turns out to be among the 30 models, ranking number seven in terms of the AICc criterion.

businessman and PSDB party member since 1995 (Prefeitura de Votuporanga, n.d.). In 2008, with support from the incumbent and then outgoing mayor, the former health entity administrator was voted to become the new mayor, and went on to also govern the municipality for two periods (2009-2016) (Diário de Votuporanga, 2020). When inaugurating the Votuporanga AME unit, the state governor thanked both the mayor ("a great partner", "it is a shame he cannot candidate himself anymore", "I will not get involved", "but I am sure you will find a good solution"), the then ex-administrator of the health entity and mayor to become ("for his work for the health entity and the municipality") and a then much influential state PSDB parliamentarian ("who is hard-working for this region") (Governo do Estado de São Paulo, 2007, authors' translation of excerpts of the governor's speech). There are several other municipalities and healthcare regions with similar descriptions, sometimes more detailed in how the PSDB mayor, PSDB governor, and mediating PSDB state parliamentarians (working for the region, or working for his region), secure resources for a municipality or region (e.g., in the case of the municipalities of Franca and Ituverava, located in the same healthcare network region, ALESP, 2011a, Engler, 2011a, 2011b, 2011c and Governo do Estado de São Paulo, 2012).

The three healthcare regions that move from being, on average, unexplained to explained, across the 30 regression pairs (i.e., Caraguatatuba, Franca, Votuporanga) were also among the healthcare regions politically explained in the regression in section 4.2, which lends credibility to the approach. Franca and Votuporanga were discussed in the references in the previous paragraph and Caraguatatuba in section 4.1.[43] When solving for the optimal

[43] Interestingly, the four-time PSDB mayor of Caraguatatuba (1997-2004, 2009-2016) and also former state parliamentarian, argued, while a state parliamentarian, for AME units in three different municipalities (ALESP, 2007a, 2007b, 2007c), but only Caraguatatuba was implemented at the time.

allocation of said three units[44], other municipalities are typically chosen by the location-allocation algorithm.

A fourth healthcare region and municipality, Itapeva, is often politically explained in the 30 regression pairs and has, as the above municipalities, a high increase in its propensity score ranking, once the political variable is added. Itapeva is typically optimal in the location-allocation problem, however, and is hence not considered political.

Six additional healthcare regions (and corresponding municipalities with the AME unit) are suggested as potentially political, in the analysis of the 30 regression pairs. These healthcare regions, however, do not move from being, on average, unexplained, to being explained, when the political variable is included. It is also true, however, that none of these six units are optimal when the location-allocation algorithm chooses a (potentially) alternative location. As an example, the healthcare regions with AME units in Catanduva and Ituverava are indicated as political allocations in 10 and three of the 30 regression pairs, respectively, and are never optimal when the location-allocation algorithm chooses a (potentially) alternative location.

The bottom part of Table 5 summarizes the average, median and "modal" data, with respect to the political analyses, across the 30 regression models. The average row shows how many units are deemed political on average, before and after solving for the optimal allocation of the potentially political allocations, and the reduction in average distance that would result (assuming one round trip per year per inhabitant). The median row shows the median of each of the different variables. The modal row displays the data for the combination of AME units that most often appear, jointly, as politically explained, across the 30 regression pairs.

[44] That is, when, for each of the 30 regressions, the units deemed political, are instead chosen optimally.

Overall, there is quantitative and qualitative evidence that political motives were important when allocating AME units in Caraguatatuba, Franca and Votuporanga. The case of Franca, in the northeast corner of the state (see Figure A1), merits further discussion. As indicated in the above references, there is evidence that Franca and Ituverava were part of the same political effort to allocate AME units. Ituverava is less populous than Franca and has a less central location in the healthcare network region. It also sees one of the largest average increases in propensity score ranking, once the political variable is added, but is, on average, ranked within top 31 also without the political variable.[45] In those instances, however, where both Franca and Ituverava are politically explained in the regression analysis, the location-allocation algorithm re-allocates a unit to Franca, but not to Ituverava. The evidence suggests that one of the Franca and Ituverava units is politically motivated, whereas one unit is optimal from a location-allocation perspective.[46]

7. Discussion and conclusion

The paper develops a method to quantify how political factors influence citizens' spatial access to public services, using tools from political economy, econometrics and Operations Research. We apply the method to two rather different public services in the state of São Paulo, Brazil. We find evidence of political factors having an influence on which municipalities or regions get access to a public service, an effect which, on average, leads to lower spatial access than what would have been possible with the same number of public service units. Through its regression analysis results, that uncover political effects, and the

[45] Among the healthcare regions with an average propensity score rank below 31, without the political variable, the healthcare regions with AME units in Catanduva and Ituverava are the two regions with an average ranking closest to 31, i.e. the "least explained units, among those explained".

[46] We have also re-run the robustness analysis excluding the three healthcare regions with AME units implemented before the 2008 election (Américo Brasiliense, Santa Fé do Sul, Votuporanga). We obtain, for the 54 healthcare regions included, similar regression results. All 30 regressions include the political variable, which is always significant at the five percent level or better. Caraguatatuba, Catanduva, Franca and Itapeva are the municipalities most often politically explained in the regression analysis. The result for Ituverava is also similar.

additional spatial analysis that follows, the paper contributes to the literature on distributive politics, which has typically focused on intergovernmental transfers and other public goods.

During the course of the present project, we conducted interviews with several central administrators as well as a high level PSDB politician, in addition to using open sources of politicians describing their own influence, with respect to both public services. With some exceptions administrators largely confirm that political effects exist and that some allocation decisions are made for political reasons. In fact, an interview question such as “We want to learn more about the public service under study. Which factors influence the spatial allocation decisions?” often get direct, unsolicited, administrator answers about political allocation effects. Politicians instead describe and shed light on which channels, contacts and relations are important, if municipalities or regions seek additional resources for public service projects.

A 2011 report from the São Paulo state audit office (an independent audit mechanism, as established in the Brazilian constitution) stated that “it is worth noting that the distribution of AMEs is not even between the healthcare regions, which is aggravated by it not being based on an updated investment plan…” The report further argues that there is a lack of information in general about the AMEs and, more specifically, that a transparent analysis of which regions should get an AME unit is missing (authors’ translation of the second paragraph, page 25, of Tribunal de Contas do Estado, 2011, and additional analysis of the text). Although such statements should be put into context (both Poupatempo and AME are highly demanded public services with positive evaluations), the methods used in this paper are useful for all parts of the analysis; as an additional tool for suggesting locations (location-allocation analysis), in explaining allocations (regression), and in assessing the impact on citizens from misallocation (a combination of the two).

It is important to note that the problem studied relates to how a certain budget for a public service can be optimally spent. The results should not be interpreted as implying that certain municipalities, such as Caraguatatuba, should never get services. For both Poupatempo and AME, after several years, additional units were planned and implemented. A municipality that was not optimal in a first build-out, may well be so when a more granular service network is established.

It has been argued in the literature that municipalities or regions that are not "awarded" a certain public service, may be compensated by getting another service (e.g. Kramon and Posner, 2013). Although a somewhat speculative conclusion, such effects were not present, at large, in the Poupatempo and AME allocations here studied. Analyzing a "spatial compensation effect" is complicated by the fact that the number of service units differ between the two programs. Three tentative conclusions are drawn, however. First, both the southeastern tip of the state and the "larger southwest" of the state seem to be underrepresented in terms of both services (Figure 1). Across different p-median specifications, additional Poupatempo and AME units are typically allocated to these areas, at the expense of other areas. Second, the areas with many AME units (such as the northeast of the state), have most probably gained such beneficial AME access for reasons unrelated to Poupatempo decisions. In the case of Votuporanga and surrounding units, for instance, a successful collaboration between political actors and the health sector entities housing the units, is likely to have been pivotal.[47] Third, there is some evidence that the municipalities gaining Poupatempo units also gained AME units, e.g. Caraguatatuba and Franca, discussed from a political perspective in the preceding sections. 12 of the 16 Poupatempo municipalities

[47] As a corollary, the fact that the underserviced (red) areas in terms of Poupatempo (Figure 2B) have several AME units, is likely to depend on AME allocation decisions, rather than on "compensation motives".

either have av AME unit in the municipality itself or within the same urban area, or a university hospital in the municipality, but reasons therefore are several.

References

ALESP. (2007a). Assembleia legislativa do Estado de São Paulo. Indica ao Sr.Governador que determine a implantação de unidade de Ambulatório Médico de Especialidade (AME), no município de Lorena. Retrieved March 1, 2023, from https://www.al.sp.gov.br/propositura/?id=734392.

ALESP. (2007b). Assembleia legislativa do Estado de São Paulo. Indica ao Sr.Governador que determine a implantação de unidade de Ambulatório Médico de Especialidade (AME), no município de Taubaté. Retrieved March 1, 2023, from https://www.al.sp.gov.br/propositura/?id=734327.

ALESP. (2007c). Assembleia legislativa do Estado de São Paulo. Indica ao Sr.Governador que determine a implantação de unidade de Ambulatório Médico de Especialidade (AME), no município de Caraguatatuba. Retrieved March 1, 2023, from https://www.al.sp.gov.br/propositura/?id=734359.

ALESP. (2011a). Assembleia legislativa do Estado de São Paulo. Inauguração do AME de Franca. Retrieved June 10, 2022, from https://www.al.sp.gov.br/noticia/?id=264353.

ALESP. (2011b). Assembleia legislativa do Estado de São Paulo. Senador é homenageado por trabalhos feitos em prol da saúde. Retrieved March 1, 2023, from https://www.al.sp.gov.br/noticia/?id=299590.

Alston, L., & Mueller, B. (2006). Pork for Policy: Executive and Legislative Exchange in Brazil. *Journal of Law, Economics and Organization* 22(1): 87-114.

AME Casa Branca. (2009). Início da obra do AME de Casa Branca. Retrieved June 10, 2022, from http://amecasabranca.blogspot.com/2009/09/inicio-da-obra-do-ame-de-casa-branca.html?m=1.

Ames, B. (1995). Electoral strategy under open-list proportional representation. *American Journal of Political Science* 39(2): 406–433.

Arretche, M., Rodden, J. (2004). Política distributiva na federação: estratégias eleitorais, barganhas legislativas e coalizões de governo. Dados 47(3): 549–576.

Barradas Barata, L.R., Bittar, O.J.N.V., Magalhães, A., Alves, S.A., & Carvalho, E.R.A.P. (2009). Comparação de grupos hospitalares no Estado de São Paulo. *Revista de Administração em Saúde*, 11(42): 8-15.

Barradas Barata, L.R. Mendes, J.D.V., Bittar, O.J.N.V, Yamada, A.T.T., Falcão, L.H.B. (2010). Ambulatory Care Facilities in São Paulo State. *Revista de Administração em Saúde* 12(48): 125-130.

Banerjee, A., & Somanathan, R. (2007). The Political Economy of Public Goods: Some evidence from India. *Journal of Development Economics* 82(2):287-314.

Bittar, O.J.N.V. & Magalhães, A. (2010). Teaching hospitals in São Paulo state: six year follow-up. Revista de Administração em Saúde 12:155-213.

Brollo, F., Nannicini, T. (2012). Tying your enemy's hands in close races: the politics of federal transfers in Brazil. *American Political Science Review* 106 (4): 742–761.

Bugarin, M., Marciniuk, F. (2017). Strategic partisan transfers in a fiscal federation: evidence from a new Brazilian database. *Journal of Applied Economics* 20(2): 211–239.

Burgess, R., Jedwab, R., Miguel, E., Morjaria, A., & Padró I Miquel, G. (2015). The value of democracy: Evidence from road building in Kenya. *American Economic Review* 105: 1817–1851.

Burnham, K., Anderson, D. (2002). Model selection and Multi-model inference (2nd ed.). Springer, Berlin.

Carlitz, R. (2017). Money Flows, Water Trickles: Understanding Patterns of Decentralized Water Provision in Tanzania. *World Development*. 93: 16-30.

Case, A. (2001). Election goals and income redistribution: Recent evidence from Albania. *European Economic Review* 45: 405-423.

Castells, A., & Solé-Ollé, A. (2005). The regional allocation of infrastructure investment: the role of equity, efficiency and political factors. *European Economic Review* 49(5):1165-1205.

Castor, B. (2002). Brazil is not for Amateurs: Patterns of Governance in the Land of "Jeitinho". Xlibris Corporation, USA.

Cox, G., & McCubbins, M. (1986). Electoral politics as a redistributive game. *Journal of Politics* 48: 370-89.

Dahlberg, M., & Johansson, E. (2002). On the vote-purchasing behavior of incumbent governments. *American Political Science Review* 96(1): 27–40.

de Smith, M., Goodchild, M., & Longley, P. (2018). Geospatial Analysis: A Comprehensive Guide (6th ed.). London, UK: Drumlin Security Ltd.

Dellmuth, L., & Stoffel, M. (2012). Distributive politics and Intergovernmental transfers: The local allocation of European Union structural funds. *European Union Politics* 13(3): 413-433.

Diário de Votuporanga. (2020). Juninho Marão afirma: Não serei candidato nestas eleições! Retrieved March 1, 2023, from https://diariodevotuporanga.com.br/juninho-marao-afirma-nao-serei-candidato-nestas-eleicoes/.

Diário Oficial Estado de São Paulo. (2008). Poder Executivo Seção 1. Saúde. Gabinete do Secretário. Resolução SS – 39, de 3-4-2008. Retrieved June 10, 2022, from https://www.prefeitura.sp.gov.br/cidade/secretarias/upload/arquivos/secretarias/saude/legislacao/0001/ResolucaoSS_2008_00039.pdf.

Dixit, A., & Londregan, J. (1996). The determinants of success of special interests in redistributive politics. *Journal of Politics* 58: 1132-55.

Drazen, A., & Eslava, M. (2010). Electoral manipulation via voter-friendly spending: Theory and evidence. *Journal of Development Economics* 92: 39-52.

Engler, R. (2011a). Alckmin inaugura o AME de Franca. Retrieved June 10, 2022, from http://robertoengler.com.br/noticia2.asp?id=288.

Engler, R. (2011b). AME de Ituverava vai se chamar Comendador Takayuki Maeda. Retrieved June 10, 2022, from http://robertoengler.com.br/noticia2.asp?id=336.

Engler, R. (2011c). Engler visita Poupatempo de Franca e tira novo RG. Retrieved June 10, 2022, from http://robertoengler.com.br/noticia2.asp?id=370.

Ferraz, C. (2007). Electoral Politics and Bureaucratic Discretion: Evidence from Environmental Licenses and Local Elections in Brazil. Unpublished manuscript.

Ferrer, F., & Lima, C. (2006). Avaliação de custos pela inovação na prestação de serviços: Atestado de antecedentes criminais eletrônicos. Um dos serviços do e-Poupatempo.

Ferreira, I., Bugarin M. (2005). Transferências voluntárias no federalismo fiscal brasileiro: Efeito do ciclo fiscal de meio de mandato sobre as eleições municipais. In: ESAF (org.), Finanças públicas: IX Prêmio Tesouro Nacional IX. Brasília, ESAF.

Ferreira, I., Bugarin M. (2007). Transferências voluntárias e ciclo político-orçamentário no federalismo fiscal brasileiro. *Revista Brasileira de Economia* 61: 271-300.

Finan, F. & Mazzocco, M. (2021). Electoral Incentives and the Allocation of Public Funds. *Journal of the European Economic Association* 19(5): 2467-2512.

Firpo, S., Ponczek, V., & Sanfelice, V. (2015). The relationship between federal budget amendments and local electoral power. *Journal of Development Economics* 116: 186-198.

Firth, D. (1993). Bias reduction of maximum likelihood estimates. *Biometrika* 80: 27–38.

Fredriksson, A. (2014). Bureaucracy intermediaries, corruption and red tape. *Journal of Development Economics* 108: 256-273.

Fredriksson, A. (2017). Location-allocation of public services – Citizen access, transparency and measurement. A method and evidence from Brazil and Sweden. *Socio-Economic Planning Sciences* 59: 1-12.

Fredriksson, A. (2020). One Stop Shops for public services – Evidence from Citizen Service Centers in Brazil. *Journal of Policy Analysis and Management* 39: 1133-1165.

Golden, M., & Min, B. (2013). Distributive politics around the world. *Annual Review of Political Science* 16: 73-99.

Governo do Estado de São Paulo. (2007). Inauguração AME Votuporanga. Retrieved March 1, 2023, from https://www.saopaulo.sp.gov.br/discursos/inauguracao-ame-votuporanga/.

Governo do Estado de São Paulo. (2012). Alckmin discursa durante inauguração do AME em Ituverava. Retrieved June 10, 2022, from https://www.saopaulo.sp.gov.br/discursos/alckmin-discursa-durante-inauguracao-do-ame-em-ituverava/.

Governo do Estado de São Paulo. (2016). Poupatempo, Legislação. Retrieved June 2, 2016, from https://www.poupatempo.sp.gov.br/.

Grossmann, P. (1994). A Political Theory of Intergovernmental Grants. *Public Choice* 78(3/4): 295-303.

Jarocinska, E. (2022). Discretionary Grants and Distributive Politics Evidence from Spain. *Comparative Economic Studies*. https://doi.org/10.1057/s41294-022-00186-3

Kramon, E., & Posner, D. (2013). Who Benefits from Distributive Politics? How the Outcome One Studies Affects the Answer One Gets. Perspectives on Politics 11(2): 461-474.

Laakso, M., & Taagepara, R. (1979). Effective number of parties: A measure with application to West Europe. *Comparative Political Studies* 12: 3-27.

Lara, B., & Toro, S. (2019). Tactical distribution in local funding: The value of an aligned mayor. *European Journal of Political Economy* 56: 74-89.

Lindbeck, A., & Weibull, J. (1993). A model of political equilibrium in a representative democracy. *Journal of Public Economics* 51: 195-209.

Litschig, S. (2012). Are rules-based government programs shielded from special interest politics? Evidence from revenue-sharing transfers in Brazil. *Journal of Public Economics* 96 (11-12): 1047–1060.

Marianov, V., & Serra, D. (2002). Location problems in the public sector. In Z. Drezner & H. Hamacker (Eds.), *Facility Location: Applications and Theory* (pp.119-150). Berlin Heidelberg: Springer-Verlag.

Min, B. (2011). Electrifying the Poor: Distributing Power in India. Manuscript.

Mota Prado, M., & da Matta Chasin, A. C. (2011). How innovative was the Poupatempo experience in Brazil? Institutional bypass as a new form of institutional change. *Brazilian Political Science Review* 5: 11–34.

Palaniswamy, N., Krishnan, N. (2008). Local Politics, Political Institutions, and Public Resource Allocation. International Food Policy Research Institute Discussion Paper 00834.

Paulics, V. (2003). Poupatempo, Central de atendimento ao cidadão. In G.S. Lotta et al. (Eds.), *20 Experiências de Gestão Pública e Cidadania*. São Paulo, Brazil: Gestão Pública e Cidadania.

Pignatari, C. (2012). Deputado Carlão Pignatari cobra ação concreta de lideranças para salvar Santas Casas da crise. Retrieved March 1, 2023, from https://carlaopignatari.com.br/deputado-carlao-pignatari-cobra-acao-concreta-de-liderancas-para-salvar-santas-casas-da-crise/.

Pignatari, C. (2013a). Deputado Carlão Pignatari pede mutirão de cirurgias para desafogar AME. Retrieved March 1, 2023, from https://carlaopignatari.com.br/deputado-carlao-pignatari-pede-mutirao-de-cirurgias-para-desafogar-ame/

Pignatari, C. (2013b). Deputado Carlão Pignatari pede aumento oo Pró-Santa Casa para Votuporanga. Retrieved March 1, 2023, from https://carlaopignatari.com.br/deputado-carlao-pignatari-pede-aumento-do-pro-santa-casa-para-votuporanga/

Pignatari, C. (2013c). Governador Alckmin anuncia R$ 2,8 Milhões para Santa Casa de Votuporanga. Retrieved March 1, 2023, from https://carlaopignatari.com.br/deputado-carlao-apela-e-governador-alckmin-anuncia-r-28-milhoes-para-santa-casa-de-votuporanga/.

Prefeitura de Votuporanga. (2007). Deputado Paulo Barbosa diz que fortalecerá saúde e educação do município. Retrieved March 1, 2023, from http://www.votuporanga.sp.gov.br/arquivodenoticias/2007/12/13_deputado.html.

Prefeitura de Votuporanga. (n.d.). Prefeito. Retrieved March 1, 2023, from http://www.votuporanga.sp.gov.br/secretarias/prefeito/index.html.

ReVelle, C., & Eiselt, H. (2005). Location analysis: A synthesis and survey. *European Journal of Operational Research* 165: 1-19.

Rosenn, K. (1971). The Jeito, Brazil's institutional bypass of the formal legal system and its developmental implications. *American Journal of Comparative Law* 19(3): 514–549.

Schady, N. (2000). The political economy of expenditures by the Peruvian social fund (FONCODES), 1991-95. *American Political Science Review* 94(2): 289-304.

Shi, M., & Svensson, J. (2006). Political budget cycles: Do they differ across countries and why? *Journal of Public Economics* 90: 1367-1389.

Tavits, M. (2009). Geographically Targeted Spending: Exploring the Electoral Strategies of Incumbent Governments. *European Political Science Review* 1(1):102_123.

Tribunal de Contas do Estado. (2011). Relatório de fiscalização de natureza operacional sobre investimentos em serviços próprios no SUS/SP. Diretoria de Contas do Governador, TCA nº 12.821/026/11(TC 143/026/11).

Weibull, J. (1976). An axiomatic approach to the measurement of accessibility. *Regional Science and Urban Economics* 6: 357-379.

Yamada, A. (2008). Ambulatório Médico Especializado. Presentation, São Paulo state Health Secretary.

Appendix 1 – Poupatempo units

1	2	3	4	5	6	7	8	9
Pupatempo muncipality	**Population in 2007**	**Ranking**	**Announced**	**Opening**	**Time to implement (days)**	**PSDB_announcement**	**PSDB_opening**	**PSDB_weighted**
Sorocaba	558377	1	2005-01-17	2011-11-22	2500	1	1	1,00
Santos	420107	2	2004-08-04	2008-10-09	1527	0	0	0,00
São José do Rio Preto	392682	3	2005-05-27	2009-02-13	1358	0	0	0,00
Jundiaí	355627	4	2007-10-25	2009-10-23	729	1	1	1,00
Piracicaba	354214	5	2007-10-25	2010-03-12	869	1	1	1,00
Franca	309996	7	2007-10-25	2010-12-28	1160	1	1	1,00
Taubaté	268360	10	2007-10-25	2010-01-11	809	1	0	0,54
São Carlos	213169	13	2007-10-25	2010-12-14	1146	0	0	0,00
Marília	211119	14	2007-10-25	2011-02-19	1213	1	0	0,36
Presidente Prudente	202480	15	2006-10-27	2010-12-07	1502	0	0	0,00
Araraquara	200588	17	2007-10-25	2010-10-29	1100	0	0	0,00
Rio Claro	180672	19	2008-05-30	2010-12-22	936	0	0	0,00
Araçatuba	178059	21	2007-10-25	2011-02-19	1213	0	0	0,00
Botucatu	121534	30	2009-04-12	2011-01-21	649	1	1	1,00
Tatuí	103231	38	2009-03-05	2010-12-20	655	1	1	1,00
Caraguatatuba	94099	42	2009-12-07	2010-10-28	325	1	1	1,00
Correlations with Time to implement						*-0,27*	*-0,22*	*-0,27*

Table A1. 16 Poupatempo municipalities, population and population ranking among the 52 candidate municipalities (columns 2-3), announcement date, opening date and "time to implement" (4-6), dummy for if PSDB (Social Democracy Party) held the mayorship at announcement and opening and fraction of time with PSDB mayor between announcement/opening (6-9). Gray=announced after October 2007.

Appendix 2 – AME units

1	2	3	4
Healthcare network region	**Healthcare region**	**Municipality**	**Opening**
RRAS13	CENTRAL DO DRS III	Américo Brasiliense	2008/07
RRAS12	DOS LAGOS DO DRS II	Andradina	2010/03
RRAS12	CENTRAL DO DRS II	Araçatuba	2010/07
RRAS16	BRAGANÇA	Atibaia	2010/06
RRAS13	NORTE-BARRETOS	Barretos	2011/10
RRAS09	BAURU	Bauru	2010/01
RRAS17	LITORAL NORTE	Caraguatatuba	2009/01
RRAS15	RIO PARDO	Casa Branca	2010/05
RRAS12	CATANDUVA	Catanduva	2012/07
RRAS11	ALTA PAULISTA	Dracena	2009/08
RRAS12	FERNANDÓPOLIS	Fernandópolis	2012/06
RRAS13	TRÊS COLINAS	Franca	2011/02
RRAS08	ITAPETININGA	Itapetininga	2010/06
RRAS08	ITAPEVA	Itapeva	2010/09
RRAS08	SOROCABA	Itu	2010/09
RRAS13	ALTA MOGIANA	Ituverava	2012/07
RRAS12	JALES	Jales	2009/12
RRAS16	JUNDIAÍ	Jundiaí	2012/04
RRAS14	LIMEIRA	Limeira	2010/02
RRAS15	BAIXA MOGIANA	Moji-Guaçu	2010/09
RRAS14	PIRACICABA	Piracicaba	2009/05
RRAS07	BAIXADA SANTISTA	Praia Grande	2009/08
RRAS11	ALTA SOROCABANA	Presidente Prudente	2010/02
RRAS09	LINS	Promissão	2011/07
RRAS14	RIO CLARO	Rio Claro	2010/01
RRAS12	SANTA FÉ DO SUL	Santa Fé do Sul	2008/09
RRAS07	BAIXADA SANTISTA	Santos	2009/01
RRAS15	MANTIQUEIRA	São João da Boa Vista	2009/07
RRAS12	SÃO JOSÉ DO RIO PRETO	São José do Rio Preto	2012/02
RRAS17	ALTO VALE DO PARAÍBA	São José dos Campos	2009/11
RRAS10	TUPÃ	Tupã	2010/06
RRAS12	VOTUPORANGA	Votuporanga	2007/12

Table A2. Healthcare regions and municipalities with “general” AME units, month of implementation of each unit, and the healthcare network regions (RRAS) each unit belongs to. The total number of healthcare regions with an AME unit is 31.[48] 26 of the 31 healthcare regions with an AME unit has the unit located in the region’s most populous municipality (the exceptions are the AME units in Américo Brasiliense, Atibaia, Casa Branca, Itu and Promissão).

48 The healthcare region of Baixada Santista is an exception in that it is the only healthcare region with two AME units.

Appendix 3 – Additional regressions (Poupatempo)´

Tables A3 (Poupatempo) and A4 (AME) contain additional regressions, discussed in the main text. In order to test the swing voter hypothesis, in column 1, we replace the (Table 2, column 3) 2005-2008 PSDB mayor dummy with the absolute PSDB vote (win/lose) margin in the 2004 mayor election, as discussed in section 3.2. The result indicates that a large rather than a small win/lose margin is associated with obtaining a Poupatempo unit, i.e. not supporting the swing voter hypothesis. In column 2 the political variable is instead the effective number of mayor candidates in the 2004 election. Municipalities with fewer, rather than more, candidates, seem more likely to obtain a Poupatempo unit (although the result is not significant). Column 3 is a spatial lag regression, in which we explicitly take into account the fact that the placement of a Poupatempo unit can depend on the placement of neighboring units.[49] The political variable, from Table 2, column 3, remains significant.

[49] The additional (spatial lag) control variable for the regression in column 3 was constructed as follows: A distance cut-off was first derived by calculating the longest distance from any of the 52 Poupatempo candidate locations, to the closest other candidate location. If the distance between two candidate locations A and B were shorter than the cut-off, the weight (for the spatial influence of A on B, and vice versa) was then defined as the inverse of the distance between the two. Otherwise, the weight was set to zero. This procedure resulted, for each candidate location (e.g., A) in a vector of 52 weights (with the weight A-A being zero). The weights in the vector were then normalized (dividing with the sum of the weights). Finally, for each candidate location (e.g. A), the vector of weights was multiplied with the dependent variable vector, thus producing a scalar for each candidate location.

Dependent variable: Poupatempo dummy	**1**	**2**	**3**
Renewals (in thousands)	0.000992***	0.00101**	0.00104**
	(0.000359)	(0.000431)	(0.000528)
Accessibility30	-0.0000978**	-0.0000861**	-0.000179**
	(0.0000397)	(0.0000373)	(0.0000809)
Illiteracy rate	-101.1	-89.90	-265.9*
	(67.31)	(67.93)	(137.8)
Population growth	31.45	11.75	31.57
	(78.59)	(78.59)	(79.64)
PSDB absolute vote margin (2004 mayor election)	0.0629*		
	(0.0377)		
Effective number of mayor candidates (2004 election)		-1.500	
		(0.936)	
PSDB mayor (dummy) (period: 2005-2008)			6.112*
			(3.284)
Constant	0.414	5.545	13.91*
	(5.096)	(5.958)	(7.934)
Spatial weight matrix control	NO	NO	YES
N	52	52	52
pseudo R^2	0.596	0.599	0.700
AIC	37.91	37.73	33.27

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A3. Columns 1 and 2: Logit regressions of the Poupatempo dummy on the number of driver's license renewals, the spatial accessibility measure, adult illiteracy rate, average yearly population growth (i.e., the same variables as in Table 2, column 2), and two different political variables relating to the 2004 mayor election; the PSDB absolute vote (win/lose) margin (column 1) and the effective number of mayor candidates (column 2). Column 3: The regression from Table 2, column 3, controlling also for spatial dependence.

Appendix 4 – Additional regressions (AME)

In order to test the swing voter hypothesis, in Table A4, column 1, we replace the (Table 4, column 3) 2009-2012 PSDB mayor dummy with the absolute PSDB win/lose margin, as discussed in section 4.2. The result seems to indicate that a large rather than a small win/lose margin is associated with obtaining an AME unit, i.e. not supporting the swing voter hypothesis. In column 2 the political variable is instead the effective number of mayor candidates in the 2008 election. Municipalities with fewer, rather than more, candidates, seem more likely to obtain an AME unit (although the results are not significant).

Dependent variable: AME dummy

	1	2
Population (in thousands)	-0.00519 (0.00471)	-0.00561 (0.00444)
Most central (dummy)	7.655* (4.565)	7.252 (4.413)
Distance to most central (in kms)	9.18e-08** (4.41e-08)	9.27e-08** (4.23e-08)
Teaching hospital (dummy)	-11.80** (5.549)	-12.28** (5.601)
Teaching hospital in neighboring region (dummy)	-1.899* (1.076)	-1.053 (0.904)
Doctors per capita	2872.6** (1427.7)	3320.0** (1460.6)
Mortality rate	1773.6** (786.9)	1330.7** (638.3)
PSDB absolute vote margin (2008 mayor election)	0.00544 (0.0166)	
Effective number of mayor candidates (2008 election)		-0.252 (0.527)
Constant	-16.07*** (5.896)	-12.93** (5.081)
N	53	57
pseudo R^2	0.405	0.368
AIC	61.62	67.64

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A4. Columns 1 and 2: Logit regressions of the AME dummy on population, a dummy representing whether a healthcare region is the most central in its healthcare network region, the distance measure (from Table 3), dummies for whether the healthcare region has, or is bordering a healthcare region with, a teaching hospital, doctors/capita, mortality rate (i.e. the same variables as in Table 4, column 2), and two different political variables relating to the 2008 mayor election; the PSDB absolute vote (win/lose) margin (column 1) and the effective number of mayor candidates (column 2) (both in the most populous municipality within the healthcare region).

Appendix 5 – Map showing five AME municipalities discussed in section 6

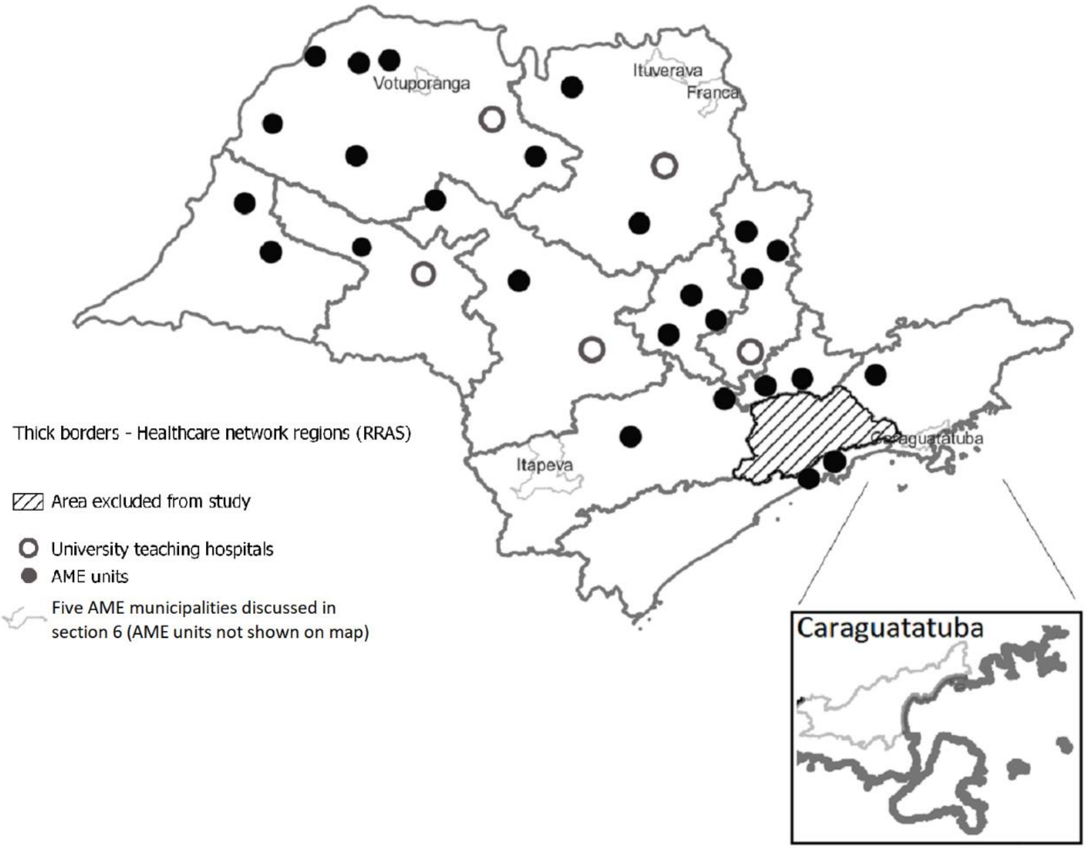

Figure A1. Map of São Paulo, similar to Figure 1B, showing the location of five AME municipalities discussed in section 6. The borders of the five healthcare regions in which the five AME municipalities are situated, and other healthcare region borders, are not shown (but are shown in Figure 1B).