

City Size and Public Service Access: Evidence from Brazil and Indonesia

Alison E. Post and Nicholas Kuipers

Most global population growth over the next two decades is projected to occur in small- and medium-sized cities in low- and middle-income countries. Expectations derived from the literature on fiscal federalism suggest that this is a cause for concern, as larger cities are thought to deliver public goods more effectively than smaller ones owing to economies of scale. Drawing on detailed cross-sectional data from Brazil and Indonesia, we show that smaller municipalities tend to possess more basic public health clinics and schools per capita, scattered throughout their territory, than larger cities. We theorize that the greater prevalence of such facilities in small cities reflects a relative lack of non-state alternatives, fewer concerns regarding “urban” problems faced in larger cities, and politicians’ greater ability to secure and claim credit for such facilities. We illustrate the logic of this argument in case studies of otherwise-similar cities of different sizes in Brazil, and with shadow cases from Indonesia. Our analysis underscores how jurisdiction size and non-state service provision can affect government services.

According to U.N. projections, 86% of global population growth over the next two decades will occur in cities of low- and middle-income countries (LMICs) (Montgomery 2008, 762). Meanwhile, over the last four decades, many LMICs have decentralized the provision of basic goods and services to municipal governments (United Cities and Local Governments 2008). Taken together, these twin


developments may have adverse consequences, as local governments of varying capacity are called upon to provide public services to burgeoning populations (Post 2018).


In this article, we consider how the size of cities affects access to local public goods and services. This perspective is motivated by the observation that most city-dwellers in LMICs live in small- and medium-sized urban centers; moreover, the bulk of future population growth is projected to occur in such settlements (United Nations 2015, 20).¹ Most research on urban politics in LMICs is focused on megacities like Lagos, Shanghai, and São Paulo.² Yet these accounts do not reflect the experience of the modal city resident seeking public services. In other words, we call for a reconsideration of the ways in which small- and medium-sized settlements are different from their larger peers in delivering services.

The conventional wisdom is that service delivery is much poorer in smaller cities—one that derives in part from predictions of the fiscal federalism literature, which suggests that larger cities often deliver better public goods more effectively because of economies of scale. Consistent with this, reports from international organizations highlight severe service deficits in smaller cities.³ Scholars and policy analysts examining sectors like water and sanitation point to the importance of economies of scale when arguing that provincial, rather than municipal, provision may be most effective (World Bank 2003, 165–77; Lentini 2014, 25). Meanwhile, other literatures in political science devoted to local service provision in LMICs—the local public goods provision literature and subnational

A list of permanent links to Supplemental Materials provided by the authors precedes the References section.

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state capacity literature—emphasize factors other than city size when explaining variation in local government performance.

The data presented in this article show that the conventional wisdom derived from the fiscal federalism literature and related policy analyses is incomplete, and that the oversight on the part of newer literatures in political science should be remedied. In Brazil and Indonesia—two large, highly decentralized countries from different world regions—smaller municipalities tend to possess more basic public health clinics and schools per capita, scattered throughout their territory, than larger cities. Meanwhile, rates of access to infrastructure services like water and electricity do not vary consistently with city size. Explaining such differences, we argue here, requires considering not only the economies of scale of public provision and the proximity of elected officials to constituents—mechanisms emphasized in the federalism and decentralization literatures that vary with city size—but also the presence and organizational power of non-state service providers, externalities associated with urban growth, and the ease of credit-claiming by elected officials.

Based upon case study research in Brazil and Indonesia, and drawing inspiration from a growing literature in political science on the non-state provision of services, we develop a theory of variation in policy priorities and service delivery in cities of different sizes that emphasizes how the availability of quality non-state services affects public demand for—and private lobbies against—the expansion of state services. We hypothesize that citizens in smaller cities prioritize investments in basic health and education facilities because there are few low-cost, quality substitutes for government offerings, and because they face few characteristically “urban” problems, such as congestion and insecurity. Residents of larger cities, in contrast, prioritize investment in a wider set of policy areas because they experience more negative externalities from urban growth and can turn to a larger supply of low-cost, quality non-state providers of basic social services. Moreover, public officials in smaller cities find it easier to earn political returns for investments in “divisible” infrastructure for service delivery, such as schools and clinics, because they can coordinate lobbying and credit-claiming more effectively than politicians in larger cities. Public officials in larger cities, in contrast, find that such efforts are less visible to constituents, and can face resistance to state expansion from private providers of competing services.

It is worth underscoring that our analytical focus is on access to public services, and especially the physical proximity of facilities such as schools or clinics to the populations that will use them. Service access is, of course, affected by other factors, such as staffing levels. We consider staffing as an auxiliary measure, but stress that much variation in staffing is likely affected by factors

outside of our theoretical account, which emphasizes the credit-claiming opportunities presented by new facilities. It is equally important to stress that service access is distinct from service quality; as we will show, service quality does not always correlate with service access.

In the rest of this article, we first highlight the relative inattention to city size in the literatures on local service delivery, and show that the literatures on federalism and decentralization emphasize different mechanisms than we do here. We then show that the geographic dispersion—one measure of accessibility—of basic social and health services varies systematically with city size in Brazil and Indonesia, whereas access to infrastructure services does not. We then propose a theoretical argument to explain this pattern, and show how it is predicated upon different mechanisms than accounts emphasizing other factors that often covary with city size, such as ethnic diversity. We then turn to case studies of similar cities of differing sizes in Brazil to illustrate plausibility of the theoretical argument. We conclude by showing that similar processes are at work in Indonesia, and by outlining implications for future research. These include a) the importance of considering the independent effect of jurisdiction population size when analyzing local public goods provision and politics more broadly; b) the analytic utility of considering multiple policy areas in tandem; and c) the importance of understanding how the availability of non-state providers affects the governmental provision of local public services.

The Existing Literature

Neither of the two principal bodies of political economy research examining the provision of local services emphasizes city size. The “local public goods provision” literature in political economy examines variation in the reach and quality of public services such as infrastructure, education, and preventative health care provided by local governments. A major focus within this literature is on how ethnic fractionalization either dampens demand for public service delivery or weakens the ability of jurisdictions to supply services. Large-N observational studies in this literature often include the settlement population as a control variable or a means of scaling the dependent variable, but scholars rarely discuss city size as an important driver of service access in its own right (e.g., Banerjee and Somanathan 2007; Gisselquist, Leiderer, and Niño-Zarazúa 2016).⁴ The experimental turn in this literature (e.g., Habyarimana et al. 2009) has also neglected settlement size, focusing on factors that can be manipulated at the individual level, such as the ethnicity of the individual with whom one might cooperate to provide a public good.⁵

A vibrant and growing literature on state capacity in LMICs also has yet to systematically explore the relationship between city size and public service delivery. Recent work does consider variation in local government state

capacity (e.g., Harbers 2015; Amengual 2016; Holland 2017). However, while Harbers (2015) and Luna and Soifer (2017) examine the extent to which capacity varies with size, they do not provide a theoretical account of the relationship they observe.

The fiscal federalism and decentralization literatures, in contrast, do focus centrally on the relationship between city size and service delivery—but highlight different mechanisms than we do here. A first strand of the literature emphasizes how citizens' ability to monitor and pressure public officials is greater in smaller polities (see Treisman 2007). Scholarship examining the effects of decentralization, however, has suggested that such beneficial dynamics often fail to emerge, and that smaller-scale polities may be more vulnerable to elite capture (e.g., Bardhan and Mookherjee 2006).

A second set of arguments, most commonly associated with the fiscal federalism literature, emphasize scale economies. Oates (1972) argued in favor of multi-tiered governmental systems because they allowed policies to be handled by the tier of government that delivers services most efficiently and in line with local preferences.⁶ Alesina and Spolaore (2003) extend this logic to model the optimal government size based on the interplay of scale economies and preference heterogeneity across space. In sum, most of the existing literature either does not focus on city size, or suggests that larger jurisdictions are often better-positioned to deliver services due to scale economies.

An Empirical Puzzle

How do the arguments outlined in the existing literature hold up against available evidence? Analysis of data on access to basic health and welfare services in urban centers in two large, middle-income democracies suggests that these predictions may not always hold. We assemble comparable administrative data for Brazil and Indonesia, each of which is highly decentralized, making the cases representative of global decentralization trends (United Cities and Local Governments 2008, 67, 191). As the most populous countries in their respective regions, these countries are also important to understand in their own right. The size of these countries also means that they contain many cities, making our analysis less vulnerable to outliers. We deliberately chose countries that are otherwise very different from one another. While Brazil urbanized rapidly during the middle of the twentieth century, Indonesia is currently witnessing high rates of urban growth. There are also myriad cultural and institutional differences between the countries. If similar relationships between city size and service delivery are observed in these very different settings, this would suggest that similar relationships likely hold elsewhere.

Within each of these countries, we analyze the distribution of primary health care centers and elementary and

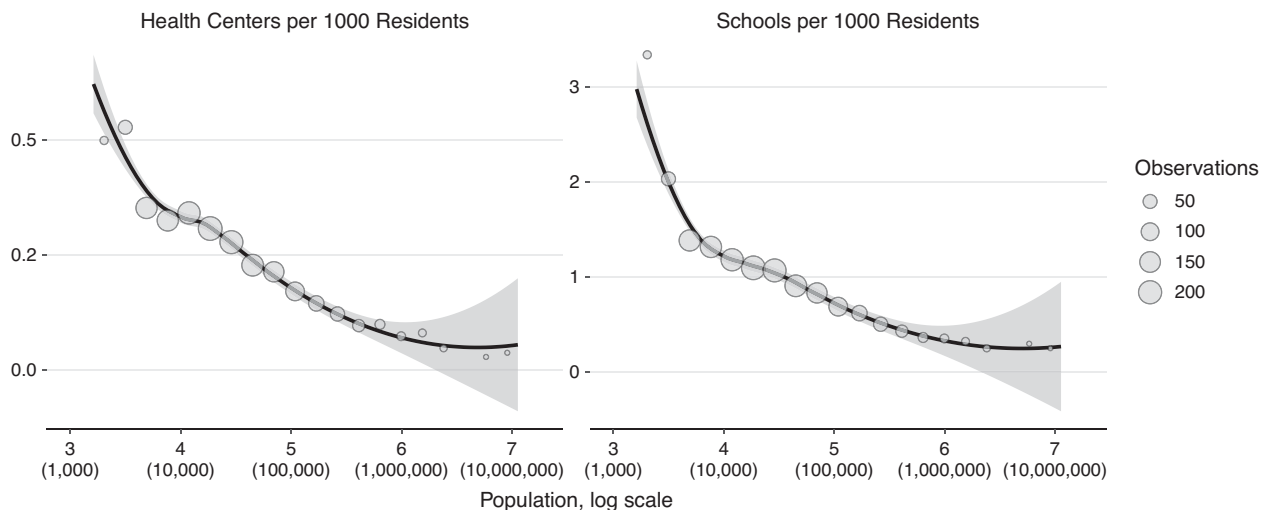
secondary school facilities for cities—i.e., local governments that have been designated as “urban” by their national governments based on their population and population density (see the appendix that follows the References section for more detail). We focus on basic health and education services because most LMICs attempt to deliver both throughout their territory, because of their fundamental importance for development, and because we could obtain consistent administrative data across our country cases. We also examine piped water supply and electricity for the case of networked infrastructure services for similar reasons. Except in the case of electricity, local governments play a strong role in policy-making and investment planning in each of these policy areas.

We first present data on the relationship between city size and the provision of basic health and educational services. Figure 1 depicts the unadjusted relationship between city size and the provision of local public services for Brazilian municipalities.⁷ Here, we observe trends that are inconsistent with the conventional wisdom derived from the fiscal federalism literature: accessibility is greater in smaller cities than it is larger ones. Consider first the left panel, which measures the number of health centers per capita. Cities with fewer than 10,000 residents boast approximately six times as many public health centers per capita as those with greater than 1,000,000 residents (0.37 versus 0.06). We fit a local linear regression, which suggests that the trend is monotonic for all population values but not necessarily linear. Similar trends are visible for public schools: cities with fewer than 10,000 residents have nearly five times more public schools per capita than those with greater than 1,000,000 residents (1.47 versus 0.30).

We observe similar patterns in Indonesia (figure 2). Comparing local service provision for cities with fewer than 100,000 residents to those with greater than 1,000,000, we find that the former possess more than eight times as many local public health centers per capita (0.26 versus 0.03). A similar trend obtains when looking at the number of public schools, with smaller municipalities reporting more than four times as many schools per capita when compared against their larger counterparts (1.06 versus 0.25). At least in Indonesia, local governments wield greater discretion in the construction of secondary schools (see Tajima, Samphantharak, and Ostwald 2018); yet, these trends hold even after disaggregating according to school type (refer to figure I in the online appendix).⁸

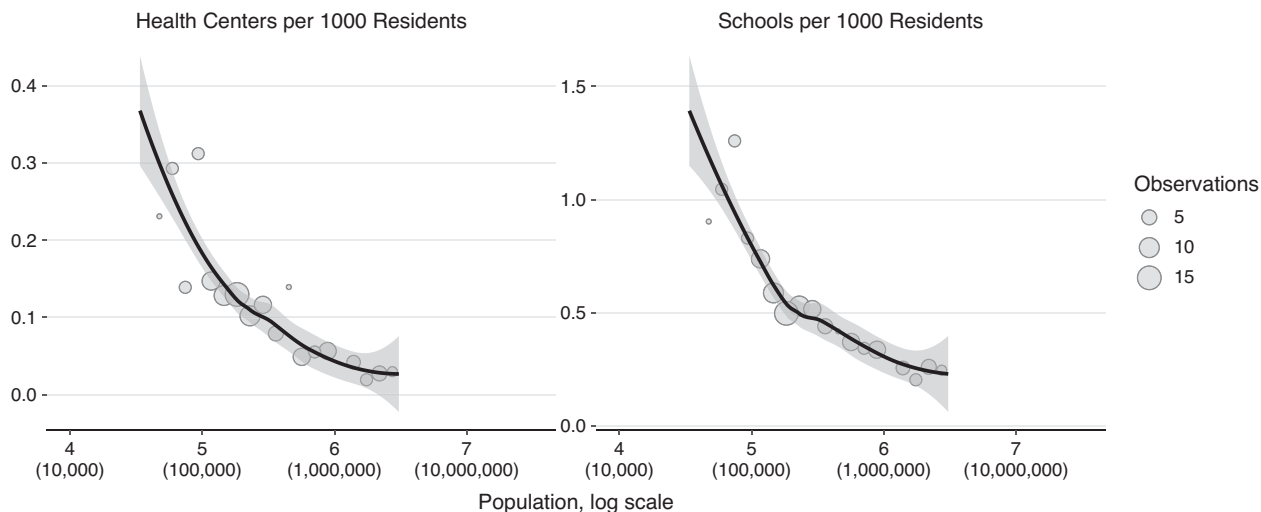
Existing explanations for the relationship between city size and public goods provision might emphasize the importance of several mediating variables. For instance, authors interested in economies of scale might point to the tendency for larger cities to have greater population density, thus obviating the pressure that smaller, less-dense municipalities may feel to ensure access through adequate

Figure 1
Relationship between city size and local public services, Brazil



Note: Figures show the relationship between (logged) population and per capita provision of basic services. Points represent binned values, sized to the number of city observations in each bin. Bins exist at 20 equal intervals along the x-axis values. The black line represents a local linear regression line fitted to the full dataset, with 95% confidence intervals plotted. Population data from the 2010 census; per capita doctors from the 2011 survey of municipal governments; per capita health centers from the 2013 health census; per capita schools from the 2011 school census (refer to the in-print appendix for more detail).

Figure 2
Relationship between city size and local public services, Indonesia



Note: Figures show the relationship between (logged) population and per capita provision of basic services. Points represent binned values, sized to the number of city observations in each bin. Bins exist at 20 equal intervals along the x-axis values. The black line represents a local linear regression line fitted to the full dataset, with 95% confidence intervals plotted. Population data from the 2010 census. All outcome data comes from the 2011 Census of Village Governments (PODES) aggregated to the *kota* level (refer to in-print appendix for more detail).

geographic dispersion. Meanwhile, authors working in the tradition of federalism and political decentralization might point to the tendency for the citizens of smaller municipalities to have more homogenous preferences—owing to low levels of ethnic and political diversity—thus enabling

easier coordination and, in turn, greater public goods provision.

We evaluate these arguments by modeling the relationship between city size and public service provision, controlling for several theoretically motivated genres of

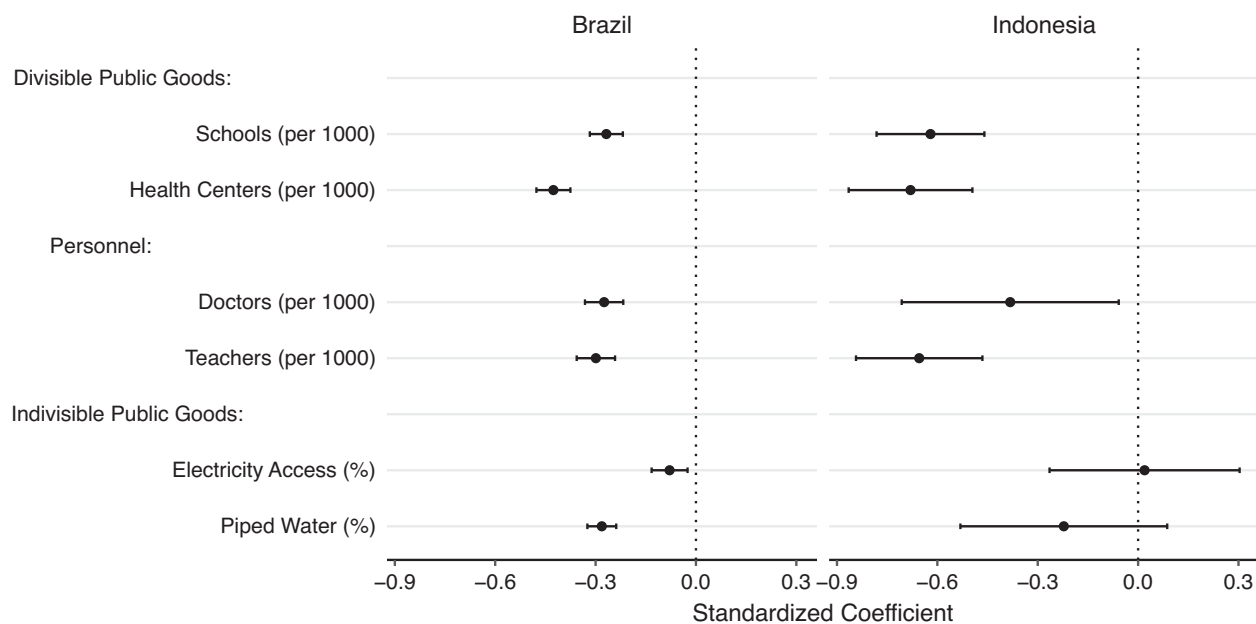
mediating variables proposed by the existing literature. We estimate these models using OLS, controlling for factors associated with urbanization (growth, density), diversity (racial, religious, political), and degree of economic development.⁹ We provide greater detail about these specifications and the underlying data in the appendix that follows the References section (tables A.1 and A.2).

The conditional associations between city size and local public service provision in Brazil and Indonesia are presented in figure 3. The regression coefficients offer a clear indication that smaller cities provide more basic health and education facilities and services per capita than larger ones—above and beyond the explanations offered in the existing literature. Looking at Brazil, the first difference estimate for the community health center model, for example, suggests that changing from a city of 100,000 to 500,000 would lead to a 43% drop in the supply of health clinics per thousand households. These relationships are more consistently significant, and typically much larger, than those for variables capturing alternative explanations: while a one standard deviation (s.d.) increase in logged population leads to a 0.42 s.d. decrease in the number of health clinics, a one standard deviation increase in racial diversity is associated with a 0.01 s.d. drop. Strikingly, these results hold even when subsetting to cities that exist within large metropolitan areas—places where one might expect residents of smaller peripheral cities to avail themselves of services

in neighboring cities.¹⁰ In the right panel, we see strikingly similar findings for Indonesia: for the relationship between city size and the provision of health centers implies that the predicted effect of changing from a small city of 100,000 to a large city of 500,000 would be a 51.6% reduction in the per capita supply of clinics. Cities in Indonesia rely heavily on transfers from the central government in the form of both the general allocation grants (DAU) and special allocation grants (DAK); in the online appendix (figure II), we show that the conditional bivariate relationship between city size and public service provision remains negative, even controlling for DAU and DAK per capita.¹¹

We interpret our results for per capita facilities as an indication that small cities are placing a greater emphasis on providing access to health and education facilities by distributing them throughout their territory. To assess the plausibility of this interpretation, we also analyze data on physical proximity to health facilities. For Indonesia, we draw on a large-scale household survey to show that secondary school students in the smallest cities report travel times to and from school that are nearly 50% lower than those in the largest cities (refer to figure IV in the online appendix). Later in the paper, we analyze average distance to the nearest clinic in our two case study cities in Brazil, showing that the distance the modal resident needs to travel to access healthcare is significantly lower in the smaller city of Pederneiras than in Sorocaba.

Figure 3
Conditional association between city size and local public goods



Note: Both panels show the standardized coefficients of the relationship between logged city size and provision of local basic services. Data sources are listed in the in-print appendix.

While our primary focus is on the distribution of local basic health and education facilities, we also observe that smaller cities allocate more staff to these facilities than larger ones. In [figure 3](#), we examine the relationship between city size and the provision of teachers (government-employed) and doctors (both government- and privately-employed) per capita, also finding a strong negative relationship. Given that staffing does not follow economies of scale—i.e., a doctor can only see so many patients—this relationship strongly suggests that the political logic of service delivery differs across cities of different sizes.

Finally, we also consider the quality of public services provided in cities of different sizes. We focus on two outcomes that reflect high-quality health and education service delivery: childhood vaccination rates, as well as an index of primary school quality in Brazil and high school examination scores in Indonesia. In Brazil, we find that smaller cities report greater shares of children having been vaccinated for polio; in Indonesia, there is no relationship between city size and vaccination rates (refer to [figure V](#) in the online appendix). We also analyze the relationship between primary school quality and city size in Brazil (IDEA) and high school examination scores in Indonesia (UN), and find no relationship ([figures VI and VII](#) in the online appendix). In sum, these analyses suggest that the conventional wisdom regarding the relationship between city size and access to local public goods and services may not hold. Particularly with respect to the availability of basic health and education facilities, but also according to other measures as well, smaller cities appear to be providing higher rates of access than larger ones in these two large, decentralized democracies. Service quality, meanwhile, is not necessarily better in larger cities.

A Theory of How Policy Priorities Vary with City Size

What, then, explains why smaller cities—at least in these countries—appear poised to provide better access to basic health and education services? Based on field research in Brazil and Indonesia, we developed a novel, alternative theoretical explanation of why smaller cities tend to possess more basic social and health facilities, scattered throughout their territory, than larger cities. Our argument emphasizes the greater incentives for and ability of political elites to secure such facilities in smaller cities, and how the availability of quality private services affects public demand for—and private lobbies against—the expansion of state services.

We focus first on citizen preferences regarding local public services—the “demand side”—and how these vary between smaller and larger cities. We hypothesize that citizens in smaller cities prioritize investments in basic health and education facilities because they face few characteristically “urban” problems, such as congestion

and insecurity, and because there are few low-cost, quality substitutes for government offerings. Classic theories in urban economics suggest that as cities increase in size and density, they exhibit important “diseconomies of scale” (see [O’Sullivan 2009](#), ch. 4; [World Bank 2009](#), 144). Households may be able to use wells and septic tanks in small cities, but groundwater becomes contaminated in larger cities, making well water unsafe. Relatedly, it may be possible to walk or drive to work quickly in small cities, but congestion costs and commute distances often increase exponentially with city size. Norms and social networks may keep crime levels low in small cities, but greater anonymity in larger cities can lead to higher rates of theft and assault. These “peculiar needs of urban life” ([Kuznets 1966](#), 103) exhibit strong externalities, and are therefore typically not addressed by the private market. Voters will therefore demand that governments in larger cities address these “urban problems,” dividing their support between a wider set of policy priorities in larger cities than smaller ones, e.g., supporting expenditures on infrastructure and policing alongside spending on basic social services.

Over time, citizens in larger cities also enjoy access to a greater supply of (often low-cost) private substitutes for basic social services such as education and health. This is because social service providers operating in larger cities benefit from access to a larger customer base. In contrast, private clinics and schools in smaller cities will find it hard to amass a sufficient number of pupils or patients able and willing to pay the fees that would make such an enterprise profitable. If this logic holds, we would expect to find more low-cost non-state, private providers of basic health and education services in larger cities than smaller ones. The presence of private substitutes would contribute further to diversification of citizens’ public spending priorities in larger cities relative to the more focused concerns regarding health and education in smaller ones.¹² While residents of small cities within metropolitan areas could theoretically travel to access private schools or clinics in neighboring cities, such trips can be costly and time-consuming, and are generally more worthwhile for accessing specialized facilities.

Turning to the “supply side,” the political incentives faced by public officials will also vary with city size, reinforcing the greater focus on basic social service delivery in small cities. We start by building on scholarship showing that the ease of credit claiming can vary by policy area, institutional environment, and patterns of partisan control (e.g., [Mettler 2011](#); [Harding 2015](#); [Harding and Stasavage 2014](#); [Bueno 2018](#)). The literature on pork barrel politics suggests that elected officials find bringing public works projects to their districts to be a particularly effective means of developing a personal vote (e.g., [Mayhew 1974](#); for a review, see also [Grimmer, Messing, and Westwood 2012](#)). Owing to the irrevocability of construction, politicians may not be able to condition these projects on political support, as is the case

with clientelistic benefits. But the visibility of public works projects offers clear opportunities for credit claiming.¹³ Extending this logic, we argue that elected officials will find basic infrastructure for social service delivery to be attractive because facilities are *divisible*, and can be spread out across space and allocated to specific geographic constituencies that prize close access. After all, it is easier to claim credit for new physical structures than for adequate staffing or supplies; moreover, service offerings at these facilities can be easily adjusted.

Elected officials in smaller cities will typically face fewer coordination problems in securing funds from other tiers of government and legislative support for such projects, and in claiming credit for new facilities once they are built than politicians in larger cities.¹⁴ If we assume that the socioeconomic elite is smaller in smaller cities, then it will be more straightforward for elected officials tied to these elites to work out compromises regarding project prioritization, and to coordinate efforts to lobby higher tiers of government for funding for such facilities.¹⁵ Relatedly, it will be easier for elected officials to coordinate their efforts to claim and attribute credit for projects following their implementation. Recent research has shown that voters will not credit elected officials for projects brought to their districts in the absence of deliberate and frequent messaging (Grimmer, Messing, and Westwood 2012). Such efforts will be more visible in small cities. In larger cities, in contrast, the size of the political elite will typically be larger, which will complicate coordination to secure projects and attribute credit, which in turn will depress the frequency with which city officials in larger conurbations secure such projects—particularly on a per capita basis.¹⁶ Such projects will also be less visible within larger cities, leading politicians to focus on other means of connecting with voters, and thereby leaving existing facilities to service larger numbers of constituents. This provides greater market opportunities for private social and health providers to offer local services, further contributing to their greater presence in larger cities.

The more significant presence of non-state social service providers in larger cities will also militate against the expansion of infrastructure for basic social services relative

to smaller cities. Non-state providers can serve as a strong lobby against the expansion of state services, as new facilities in particular may represent direct competition with their business offerings. Non-state providers also provide elected officials with an alternative route for increasing service access for the population. Where a sufficient number of non-state providers exists, officials can contract with them to serve portions of the populations—an avenue for service expansion that can be quicker and less costly than opening up new public facilities. Overall, the demand and supply side dynamics described earlier reinforce one another, leading over time to a greater emphasis on basic health and education facilities in smaller cities than in larger ones.

We summarize these arguments regarding systematic differences regarding smaller and larger cities in [table 1](#). The table also includes the aggregate prediction we derive from these differences, which we expect to be continuous rather than dichotomous in nature. As cities grow larger, the tendencies we have outlined for larger cities should become more pronounced.

Before turning to our case study analysis, it is worth underscoring that we are interested in explaining differences *across* cities, in contrast to recent scholarship that has sought to explain the distribution of projects *within* particular cities (e.g., Auerbach 2020). We emphasize factors such as the ability to lobby other tiers of government collectively, and differences in the visibility of projects across cities of different sizes, which we do not anticipate to vary significantly within cities.

Detailed Evidence from Brazil

Our correlational analysis showed a strong negative relationship between city size and the number of basic health and educational facilities per capita in two middle-income countries in different regions, with different cultures, and at different stages of development. We illustrate our theoretical logic explaining this pattern through a more in-depth analysis of municipalities in Brazil, a country with rich data on the prevalence and quality of service provision by state and non-state providers at the municipal

Table 1
City size and the policy priorities

	Smaller Cities	Larger Cities
Citizen policy preferences	Narrowly focused on access to basic social services	Encapsulate wider range of services
Presence of non-state social service providers	Marginal	Significant
Political coordination + credit claiming	Easier	Harder
Aggregate prediction	Concentrated policy emphasis on basic social service facilities	Dispersed policy priorities

level. Following Lieberman (2005) and Gerring (2006), we identify cases that are “on the line” in the state of São Paulo, Brazil, for qualitative analysis. In the conclusion, we also discuss two shadow cases in Indonesia, which were chosen using the same procedure.

Brazil’s federal government decentralized service provision in education and health during the 1990s and early 2000s (Falleti 2010, 171–76). Municipalities now play the primary role in the delivery of elementary school education and basic health services (Arretche 2003, 333). The most prevalent type of public clinic, the *Unidade Básica de Saúde* (UBS), is administered by municipalities, whereas more specialized services or clinics may be operated by state governments. While municipalities can be reimbursed for many services delivered through the national health system, municipalities typically spend much more than what they receive in transfer payments (Arretche 2003, 333). Responsibilities for primary schools were also transferred to the municipal level. By 2000, 80% of primary schools were operated by municipal rather than state governments (Falleti 2010, 172). Middle and high schools, on the other hand, are often administered by state governments. During the same period, enrollment in elementary education became almost universal, and basic health care shifted from a centralized model funded by user contributions to one in which basic services were delivered by the government, free of charge (Arretche 2003, 332).

We conducted case studies of two cities in the state of São Paulo, Brazil¹⁷: Pederneiras, a city of ~41,000 (2010) and Sorocaba, a city of ~587,000 (2010).¹⁸ Located in the country’s manufacturing belt, these cities both have similar human development indices, similar levels of racial diversity, and income per capita (36,941 and 46,888 Reais per capita, respectively).¹⁹ In the previous decade, Pederneiras grew 13% between 2000 and 2010, while Sorocaba’s population grew 19%.

Data was collected between fall 2018 and spring 2019. A study author traveled to each city and requested interviews with a) the mayor; b) the chair of the city council; c) additional city councilors chairing or serving as members of the health and education commissions in the city council, from a range of different political parties; d) the municipal health and education secretaries; and e) members of the city’s participatory councils for health and education, if such councils appeared to exist and be active (assessment based on council websites). Additional details on our sampling frame and interview protocol can be found in the online appendix.²⁰ Eight interviews were conducted in Pederneiras and nine in Sorocaba. A study author also visited multiple public health clinics in each city. Subsequent to these visits, the authors collected supplementary data to verify and augment the information provided by interviewees, such as electoral returns, legislative records of funding for new clinics and schools, and

public statements in the press and social media regarding new projects.

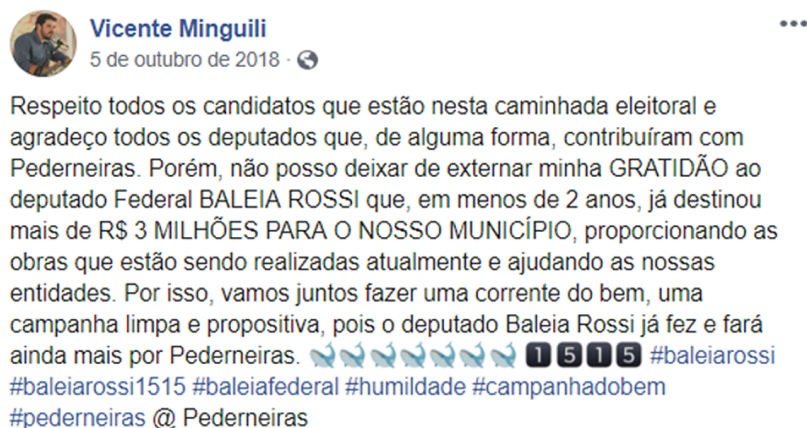
Citizens and Officials Prioritize Basic Health Facilities in Pederneiras

Health is by all accounts the most important issue to voters in Pederneiras, dominating recent election campaigns, and voter requests of elected officials.²¹ The city council president reported that 70%–80% of the roughly 100 phone calls he received every day related to health, typically taking the form of requests for medicine, to obtain earlier appointments in public clinics, and to secure hospital transfers.²² According to one councilor, “Everyone has the city councilors’ cell phone numbers, social media accounts, WhatsApp accounts ... and they will write you at one or two in the morning.”²³ One councilor noted that voter demands for health services were insatiable whereas existing public services were actually sufficient.²⁴ The public health sector was the main focus of these demands because private offerings were relatively expensive and not as bountiful; whereas the city had built fourteen basic health units between the 1970s and the present, dispersed throughout the city (figure X in the online appendix), there were only eight private ones, catering to wealthier residents.²⁵ Doctors working in public clinics typically operated these private practices in off hours to supplement their government salaries.

Elected officials could also address constituent concerns about health services by securing new facilities or additions to existing ones, such as new ambulances or treatment rooms. All of the public officials we interviewed in Pederneiras described the great emphasis they placed upon such efforts. City officials explained that these projects were typically funded via budget amendments (“emenda de despesa”), or project-specific amendments that state or national legislators can attach to budget legislation. City councilors described working across party lines to approach federal deputies with requests to fund projects: “we tend to work together, to combine strategies,” traveling together to Brasília to make requests.²⁶ Federal and state deputies, in turn, have incentives to respond to requests from localities that help them secure electoral support in state-wide elections. This helps them cultivate support in specific geographic bailiwicks. Local councilors can help deputies obtain credit for the projects they fund by repeatedly emphasizing their contributions.²⁷

Pederneiras councilors helped secure federal budget amendments for the municipality worth ~\$R1.7 million for the construction or refurbishment of at least five health facilities between 2001 and 2019.²⁸ On a visit to two city clinics, we were shown numerous examples of facilities recently funded through budget amendments, including a new women’s health clinic and dental examination room. Pederneiras councilors from different parties had recently

Figure 4
Mayor Vicente Minguili Facebook post crediting deputy Baleia Rossi



Note: Mayor Minguili expresses his gratitude to federal deputy Baleia Rossi for securing \$R 3 million for Pederneiras in less than two years

developed a relationship with Baleia Rossi, a federal deputy from the Movimento Democrático Brasileiro (MDB) representing the state of São Paulo. He is affectionately called the city's "padrinho," or godfather. Rossi secured over ~\$R3 million in budget amendments for Pederneiras.²⁹ The small number of local elites facilitated efforts to approach Rossi, and helped him receive credit for these contributions to the city through Facebook posts (see figure 4), by mentioning him repeatedly at city council meetings, and by assisting with his re-election campaigns.³⁰ The visibility of projects and the credit he received helped Rossi improve his electoral returns from 1% in 2014 to 11% in 2018, the largest number of votes in the city, despite having (reportedly) only visited the city twice.³¹

Local officials also publicly claim credit for efforts to build new facilities and improve the frequency and quality of services in existing centers. The current mayor, for instance, produced a video describing his health sector initiatives. In between segments emphasizing the slogan "Easier, More Agile, More Efficient, to attend the entire population," Mayor Minguili described his efforts to extend the opening hours of clinics and public pharmacies and to open new clinics (figure 5). Minguili also frequently broadcasted his accomplishments in health, education, and infrastructure on his Facebook page. (These were the most frequent policy areas mentioned in his posts during his first six months in office, November 2015–July 2016).³²

Similar dynamics, though less pronounced in recent years, can be observed in the education sector, where municipalities are responsible for elementary schools. Historically, voters pushed for the construction of basic educational facilities in their neighborhoods. Over time, this has produced a fairly even distribution of facilities throughout the city. Currently, there are ten municipal

elementary schools dispersed throughout the city, and ten state elementary and middle schools providing most residents with easy access (refer to figure XI in the online appendix).³³ Given near universal rates of enrollment, voters currently only contact their elected officials about education when they are seeking transfers between schools or are looking to secure spots in state-sponsored day care facilities, where the local government is still working to meet federal requirements to provide universal access.³⁴ The five private schools in the city cater to upper income brackets rather than the general population.³⁵

All of the elected officials with whom we spoke suggested that large-scale infrastructure, policing, and transportation were not as important concerns for their voters as health and education. The lack of concern about water and sanitation services in the city can be attributed to the fact that connection rates in the state of São Paulo are close to universal, and the quality of services provided by the state water utility and the privatized electricity provider are good.³⁶

In sum, the dynamics of the Pederneiras case suggests that voter concerns focus centrally on access to basic social services, due in no small part to a lack of non-state alternatives, and the lack of few competing concerns. City officials make significant efforts to address these concerns by obtaining funds to finance the construction of new facilities and additions to existing ones. The small size of the political elite reduces collective action costs and facilitates credit-claiming for new facilities.

Broader Range of Services Promoted in Sorocaba

As in Pederneiras, access to health services is, by all accounts, the most important issue for voters in the larger city of Sorocaba (~587,000 inhabitants compared with ~41,000 in Pederneiras). The three city council members

Figure 5
Mayor Vicente Minguili, Mayor of Pederneiras, promoting his health policies in promotional video



Note: The displayed caption states “One more health center in town.”

we interviewed all cited health as the most common issue about which voters contacted them.³⁷ A recent ombudsman office survey suggests that city residents are more dissatisfied with health services than with other services offered by the city.³⁸ Citizens complained about wait times at existing facilities, as they did in Pederneiras. However, our interviewees suggested that voter concerns in Sorocaba are more oriented toward access to oversubscribed specialized services, such as cancer treatment and mental health, rather than the accessibility of basic clinics. The head of the city council stressed that “people have to wait two years for surgery for cancer, and can die before receiving treatment.”³⁹ Another councilor stressed that “one can wait six months for an appointment when one has breast cancer.”⁴⁰ Meanwhile, there are significant private alternatives for basic health needs: in 2009, Sorocaba was home to 182 private and non-profit health facilities, compared with 41 public ones—a very different service provision landscape than the public-sector dominated one in Pederneiras.⁴¹

While elected officials report that education is also a top priority for voters, their concerns primarily focus on access to nursery slots and facilities rather than local elementary schools. The lack of public pressure to build new elementary schools reflects not only greater voter concerns for creating nursery spots, but also the greater range of low- and moderate-cost private alternatives for public education. Sorocaba possesses 105 private kindergarten, elementary and middle schools, compared with 164 public ones; about one-third of elementary and middle school

students are enrolled in private school.⁴² Approximately 80% of these private establishments—franchises such as Anglo and Objetivo (figure 6)—charge low to moderate rates of tuition made possible by economies of scale.⁴³ The growth in such private offerings has helped meet demand for new schools in the southern zone of the city, which has grown rapidly in recent years.⁴⁴

In contrast with Pederneiras, Sorocaba residents also approach their elected officials regarding a wider set of “urban problems.” Citizens surveyed by the city ombudsman’s office reported almost as high rates of dissatisfaction with public security as with health (~50%).⁴⁵ While Pederneiras officials never mentioned constituent concerns about security, Sorocaba city councilors stressed that constituents were concerned about children being exposed to drugs near and on school premises.⁴⁶ Citing security as a primary area of voter concern, the city council president stressed that there were fifty-one locations for cocaine and crack distribution in the city, where prostitutes also congregate.⁴⁷ Councilors also mentioned street maintenance and infrastructure as another key area of voter concern.⁴⁸

Historically, elected officials responded to long-standing voter concerns about education and health by expanding access to basic services, especially as the city grew. As of 2018, the city possessed forty-two municipal health facilities.⁴⁹ The city’s thirty-two basic clinics were built primarily in the 1980s and early 1990s; they came to comprise a large, geographically dispersed network.⁵⁰ Recently, however, elected officials have pushed more for the construction of specialized health centers, with

Figure 6
Billboard advertising school franchise in Sorocaba



Photo by Alison Post, Sorocaba, November 2018

equipment and personnel, for existing units rather than new clinics; only one new UBS was built between 2010 and 2020. Following his successful election as mayor in 2016, José Crespo announced that health would be his main focus and one of his main initiatives as mayor would be to expand the number of doctors and operating hours at public clinics.⁵¹ Yet existing municipal clinics are clearly in need of maintenance and repair, as our visit to what was described to us as one of the best clinics (the Aparecidinha UBS) in the city confirmed (figure XIII in the online appendix). And the city has far fewer clinics per capita than smaller cities, meaning that on average residents live further away from facilities than in smaller towns.

As officials expand more specialized health service offerings, they have taken advantage of the presence of the robust population of private and philanthropic health-care providers in the city through contracts with these providers to roll out new “public” services quickly.⁵² The city’s Vice-Secretary for Health stressed that there was a lack of capacity—especially of hospital beds—in both the public and private sector. “We contract out when we lack operational capacity, but even the private sector doesn’t have sufficient operational capacity.”⁵³ The mayor has also piloted out-sourcing within the education sector as a means of meeting recent requirements for universal access to nursery school spots.⁵⁴ Contracting with existing non-state providers not only obviates the need to construct facilities and the long waits associated with capital projects, but also helps municipal officials stay within the 60% legal limit on the percentage of municipal expenditures that can go to personnel costs.⁵⁵ Out-sourcing was also appealing to the administration because it avoids the long waits

associated with contracting public sector employees.⁵⁶ Out-sourcing, then, is one explanation for why there are fewer government health clinics and public schools per capita in Sorocaba than in Pederneiras and other small towns.

As in Pederneiras, councilors have also worked to secure federal budget amendments; half of the budget amendments destined for Sorocaba between 2001 and the present funded health-related projects.⁵⁷ However, in contrast to Pederneiras, the vast majority of these fifty-seven health-related budget amendments funded new equipment or facilities at private institutions such as the Santa Casa de Misericórdia and Santa Lucinda hospitals, and for equipment and research at other specialized facilities such as a childhood cancer research group.⁵⁸

At the same time that city officials have pushed to develop specialized health services and expand the availability of nursery spots, they have also poured resources into services that address standard “urban problems” like crime. In Brazil, state governments are legally responsible for policing. Despite the fact that the state government provides services, Sorocaba—like many other medium and large-sized cities in Brazil—has decided to fund an additional municipal police force (“Guarda Municipal”) to supplement state services.⁵⁹ It currently employs 455 officers, and city officials hope to hire an additional 300 officers.⁶⁰

In sum, residents of Sorocaba approach their city officials with a wider array of concerns than their counterparts on in Pederneiras. Sorocaba officials responded to these pressures by investing in specialized health facilities and a municipal police force, and as a result there are fewer

basic health and educational facilities per capita. These dynamics are due at least in part to the prevalence of non-state providers, which gives citizens outside options and facilitates government out-sourcing.

The greater emphasis placed by Pederneiras politicians on the provision of basic health facilities distributed through the urban territory comes across clearly in a quantitative comparison of the dispersion of facilities in each city. While in Pederneiras, residents located at evenly-spaced points throughout the city need to travel on average 0.75 km (s.d. 0.36) to reach the nearest basic clinic, residents of Sorocaba must travel 1.26 km (s.d. 0.84).⁶¹

Turning to Brazil-wide data, we can see that the greater presence of non-state providers of basic health and education services in larger cities is not unique to these two cases. The Brazilian government collects data on the presence and utilization of private and public providers at the municipal level.⁶² Figure 7 (panel A) shows that the percentage of health facilities that are private is higher in larger cities than in smaller ones.⁶³ In figure 7 (panel B), a similar pattern is evident: a much smaller percentage of students is enrolled in private school in smaller cities than in larger ones.

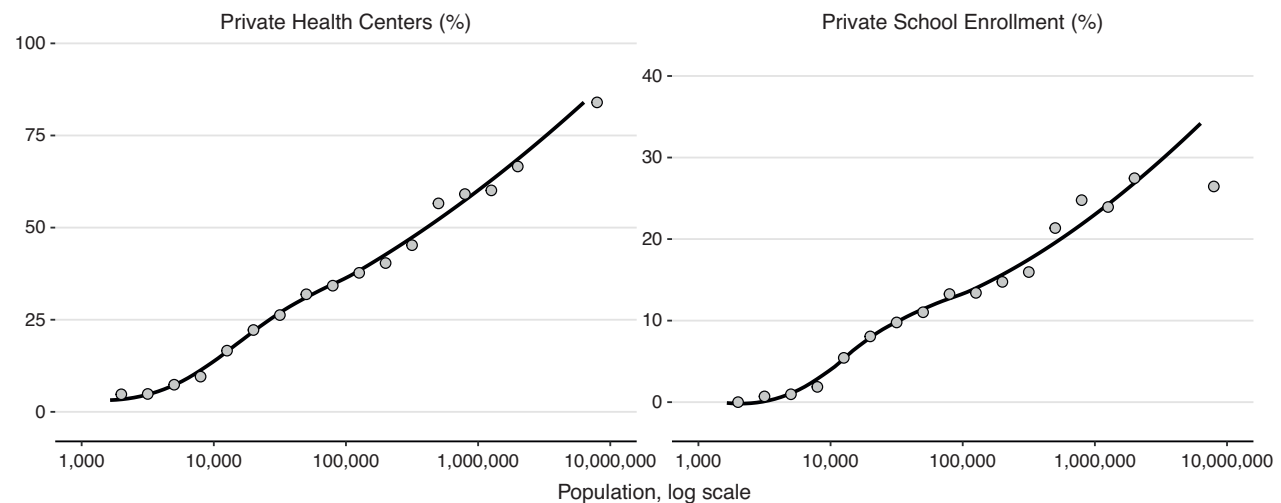
Conclusion

Our analysis of the relationship between city size and public service delivery in Brazil and Indonesia suggests that smaller cities emphasize the construction of geographically-dispersed public facilities offering basic social services like elementary and secondary education and primary health care. They appeal to voters because

there are few high-quality private sector substitutes for public services. Residents of larger cities, in contrast, prioritize investment in a wider set of policy areas because they experience more negative externalities from urban growth. Moreover, the supply of non-state social service providers will be higher in larger cities, providing citizens and governments with alternatives to state expansion. Meanwhile, public officials in smaller cities find it easier to earn political returns for investments in “divisible” infrastructure for service delivery, such as schools and clinics, because they can coordinate lobbying and credit-claiming more effectively than politicians in larger cities.

Shadow cases from Indonesia suggest that the causal logic outlined here is at work in a very different cultural, regional, and developmental context.⁶⁴ We interviewed politicians and public servants in two “on the regression line” cities: Sukabumi (~ 300,000) and Semarang (~ 1.5 million). Elected officials and bureaucrats there revealed that the availability of substitutes for state services varies with city size, leading to a greater preoccupation with proximity to public health and education facilities among voters and public officials in Sukabumi. The local head of the Education Department for Sukabumi expressed frustration at *how many government schools* there were.⁶⁵ “People over there wanted a school, though, so they [politicians] gave them one.”⁶⁶ Local officials have found it hard to consolidate students into fewer schools: a policy of “regrouping,” whereby they merge schools together, failed due to parental backlash. A different dynamic predominates in the larger city of Semarang, where a chronic shortage of educational facilities is more acute following a

Figure 7
Percentage of basic health centers that are private and pupils in private schools, Brazil, 2009



Note: Health center data from IBGE (2009) and includes all health establishments in a municipality. Public health facilities include those run by the municipality, state, and federal governments. Private health facilities include those that are both for-profit and non-profit. Data for schools from IBGE (2009), refers to all students matriculated in primary and secondary public schools (municipal, state, and federal), and the students matriculated in primary and secondary private schools.

central government mandate requiring a reduction in the average classroom size from 40 to 28 students. Rather than meet the requirement through public facilities (for which local politicians suggested there was little pressure) a local bureaucrat argued, “it’s a great opportunity for private schools to make a lot more money.”⁶⁷

Meanwhile, problems stemming from rapid urbanization were of greater concern to voters in Semarang. In this larger city, citizens worried more about extending the piped water network.⁶⁸ The groundwater has been corrupted by heavy industry, which has rendered wells of the sort that Sukabumi residents relied upon unpotable.⁶⁹ As a result, citizens increasingly demand piped water from the local authorities.⁷⁰ Elected officials and bureaucrats thus worked to address this broader range of citizen concerns, executing major extensions to the city’s water network in recent years.⁷¹ In sum, our interviews in Indonesia—half a world away from Brazil—also suggest that the availability of substitutes for state services varies with city size, and that this in turn influences the incentives of elected officials and bureaucrats.

It is important to note several scope conditions for these findings. First, the mechanisms that we describe are most likely to emerge in democracies or competitive regimes where voters can pressure political authorities. Second, they are also most likely to emerge during or immediately following periods of rapid urbanization. In such contexts, large fractions of the population lack access to basic services, which are thus likely to be salient political demands. Third, future research should examine whether the disparities we observe decrease over time due to within-country migration, as residents “vote with their feet” in search of localities with superior services. Finally, it is unclear whether the dynamics we describe operate in low-income, rather than middle-income, settings like Sub-Saharan Africa, where private service providers may struggle to find customers even in larger urban areas, and where NGOs can play important roles in service delivery.

Our analysis here has focused on public service access, operationalized in terms of the percentage of the population with access to networked infrastructure and the number of facilities or personnel per capita. It is important not to interpret these measures of access as measures of service quality. Interviews and direct observation of service facilities in our Brazilian and Indonesian cases made it clear that though voters enjoyed better access to basic social services in small cities, these services can be of worse quality than those provided in larger cities. In Indonesia, networked infrastructure like water and sanitation systems were in far poorer condition in small cities. In Brazil, there is no clear relationship between city size and the quality of public education (refer to figure VI in the online appendix). This suggests that politics driving variation in service quality may look distinct from the politics of extending service access, and that scale economies may affect service quality. It also reinforces the

importance of obtaining new types of data that can speak more directly to service quality in future scholarship on local public goods provision (see Kumar et al. 2022).

Stepping back from these caveats, three broad points emerge. First, we call for a renewed attention among political scientists to the role of population size as an explanatory variable in its own right—rather than a factor to be “controlled” for. Our analysis suggests that city size has both an important role to play in structuring the demands that citizens make of their governments, as well as in shaping the incentives that politicians face to deliver facilities and services to their constituents. The foregoing evidence has examined the provision of local public goods and services, although it seems plausible that the logics we have identified may carry into other domains as well. Future research should consider this possibility.

Second, our results provide further evidence of the importance of considering multiple policy areas in tandem when analyzing the politics of local public goods provision, distributive politics, or state capacity (see Kramon and Posner 2013; Batley and McLoughlin 2015; Besley et al. 2004; Gisselquist, Leiderer, and Niño-Zarazúa 2016). As we highlight in the theoretical and qualitative sections of this paper, voter demand for and politician incentives to deliver services can differ systematically between different service areas. These sector-specific dynamics often play out differently against different background conditions: the politics of “divisible” services, we show, varies with the availability of substitutes for state services. Differentiating between the politics animating different service areas in this fashion may help explain why the empirical literature examining the effects of decentralization has yielded such mixed findings (see Treisman 2007).

Finally, our analysis underscores the importance of examining how non-state provision affects patterns of local public goods provision by the state. A vibrant and growing literature now examines these interactions (e.g., Brass 2016; Cammett and MacLean 2014; Nelson-Núñez 2019; Bueno 2018; Post, Bronsoler, and Salman 2017; Thachil 2014). Our contribution is to show how the availability of quality non-state providers tends to vary with city size, and how this affects voter and politician preferences regarding the construction of new facilities for basic social services.

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Supplementary Materials

To view supplementary material for this article, please visit <http://doi.org/10.1017/S1537592722003176>.

Notes

- 1 Montgomery (2008, 762–63) find that “of all urban residents in cities of 100,000 and above in the developing world, only about 12% live in megacities [with over 10 million people].”
- 2 Our review of articles published in three leading urban studies journals in 2016 (*International Journal of Urban and Regional Research*, *Urban Affairs Review* and *Urban Studies*) found that 72% of the articles focused on cities in LMICs examined cities of one million or more. Kumar and Stenberg (Forthcoming) find a similar inattention to small- and medium-sized cities surveying more journals between 2000 and 2019.
- 3 For example, a UN Habitat study reports that “less than 40 per cent of the inhabitants of urban centres with less than 100,000 inhabitants have flush toilets compared to 70 per cent for cities with 1–5 million inhabitants and more than 80 per cent for cities with 5 million plus inhabitants” (United Nations Human Settlements Program (UN-HABITAT) 2006, 37).
- 4 One exception is De Mello (2002), who finds that city size affects budgetary outlays.
- 5 For an exception, see Carpenter, Daniere, and Takahashi 2004.
- 6 Oliver (2012) argues that greater economies of scale allow larger cities to provide a greater range of services.
- 7 See Harvard Dataverse for the replication data and code, <https://doi.org/10.7910/DVN/KGTRVF>.
- 8 During the 1970s and 1980s the Indonesian central government financed a massive primary school construction program in nearly every village; thus, there is relatively little need to build new primary schools, making secondary school construction a better indicator for our analyses.
- 9 We also test for an interaction between our main population variable and a partisan fractionalization measure and detect no consistently statistically significant effects (refer to tables I and II in the online appendix).
- 10 Refer to the online appendix, table III and figure III.
- 11 One concern is that the DAU formula advantages small cities, and thus explains the superior provision of public service facilities in these places.
- 12 We emphasize policy preferences responding to differences in service offerings and objective conditions across cities, rather than underlying social attitudes like Maxwell (2019), because our focus is everyday services rather than attitudes towards contentious social issues.
- 13 Though Brusco, Nazareno, and Stokes (2004, 74, 79) observe that parties monitor clientelistic exchanges more easily in smaller cities in Argentina, our focus is non-clientelistic benefits.
- 14 Funds for such facilities could be secured from higher tiers of government or raised via local taxation. In many countries, smaller cities are more reliant on national and state transfers than larger cities, however.
- 15 In some countries, city councils in smaller cities even have fewer members than those in larger cities (e.g., Brazil).
- 16 It may also be easier for politicians to claim credit for services provided by non-state providers (see Boulding and Gibson 2009).
- 17 The negative correlation between city size and health and education access observed in the broader Brazilian dataset was also observed within the state.
- 18 Instituto Brasileiro de Geografia e Estatística (IBGE).
- 19 IBGE. The Human development indices are 0.739 for Pederneiras and 0.798 for Sorocaba, and the diversity indices are 0.53 for Pederneiras and 0.59 for Sorocaba.
- 20 Following Bleich and Pekannan (2013).
- 21 Interviews 11191802, 11191803, 11191804, 11201801, November 19–20, 2018.
- 22 Interview 11191802, November 19, 2018.
- 23 Interview 11191804, November 20, 2018.
- 24 Interview 11191804, November 20, 2018. This official was a health care professional with the background to evaluate citizen requests.
- 25 Interview 11191802, November 19, 2018; interview 11201801, November 20, 2018. The total number of UBS and USFs constructed is ten, and there is one women’s health clinic. Interviewees included three additional specialized clinics beyond these in their count. Private clinic count from IBGE 2009.
- 26 Interview 11191803, November 19, 2018.
- 27 This political logic was described by all of our interviewees familiar with health policy.
- 28 Budget amendment data from Comissão Mista de Planos, Orçamentos Públicos e Fiscalização for 2001–2019.
- 29 Interview 11201801, November 20, 2018. See also figure 3. Rossi secured money for these projects through federal budget amendments that were sent to the state of Sao Paulo rather than directly to Pederneiras.
- 30 Interviews 11201801, 11201802, November 20, 2018. Rossi’s role securing projects for the city was mentioned twice during the November 19, 2018, city council meeting attended by the research team.
- 31 Interview 11201801, November 20, 2018. Rossi actually hails from Riberão Preto, which is located over

- two hours away in the state of São Paulo. Electoral return data from the Tribunal Superior Eleitoral (<http://divulga.tse.jus.br/oficial/index.html>).
- 32 Of the sixty-five posts in this period, ten focused on education, nine on health, and nine on infrastructure.
 - 33 Data from the Sinopse Estatística da Educação Básica 2018. Brasília: Inep, 2019. Accessed August 9, 2019. (<https://cidades.ibge.gov.br/brasil/sp/pederneiras/pesquisa/13/78117>).
 - 34 Interview 11191802, November 19, 2018. The federal government's 1996 "Basic Guidelines for Education" law requires municipalities to provide for universal access to childhood education starting at age birth.
 - 35 Interviews 11191801, 11191802, 11191803, November 19, 2018.
 - 36 Interview 11201801, November 20, 2018.
 - 37 Interviews with city councilors 11221802, 11231801, 11231802, November 22 and 23, 2018.
 - 38 "Pesquisa Servicos Publicos," October 2018. Prefeitura Sorocaba. Health obtains the worst scores for March 2018, and is virtually tied with transportation for last place in October 2018 (56% and 57% dissatisfaction rates, respectively).
 - 39 Interview 11231802, November 23, 2018.
 - 40 Interview 11221802, November 22, 2018.
 - 41 IBGE 2009. These counts exclude thirty-four SUS facilities (facilities operated by private entities holding contracts with the national health service), and include both types of basic clinics (UBS and USF) and other types of facilities.
 - 42 2018 data from IBGE (<https://cidades.ibge.gov.br>), accessed Aug. 9, 2019. Includes all categories of "ensino fundamental."
 - 43 Interview with Education Secretary of Sorocaba, November 22, 2018.
 - 44 Interview 11221802, November 22, 2018.
 - 45 "Pesquisa Servicos Publicos," October 2018. In March 2018, 56% indicated dissatisfaction with health services and 48% with public security. In Oct. 2018, 48% indicated dissatisfaction with health and 49% with public security.
 - 46 Interview 11221802, November 22, 2018.
 - 47 Interview 11231802, November 23, 2018.
 - 48 Interviews 11231801, 11231802, November 23, 2018. Utility services such as water, gas, and electricity were generally viewed as of sufficient quality, and access is nearly universal.
 - 49 Count from the city administration, and includes UBS and USF, as well as specialized facilities such as laboratories.
 - 50 Data from the Department of Planning, City of Sorocaba.
 - 51 See "Prefeito eleito em Sorocaba concede entrevista ao TEM Notícias." Accessed Aug. 12, 2019. (<http://g1.globo.com/sao-paulo/sorocaba-jundiai/noticia/2016/10/prefeito-eleito-em-sorocaba-concede-entrevista-ao-tem-noticias.html>); "Crespo do DEM, é eleito prefeito de Sorocaba." Accessed Aug. 12, 2019. (<http://g1.globo.com/sao-paulo/sorocaba-jundiai/eleicoes/2016/noticia/2016/10/crespo-do-dem-e-eleito-prefeito-de-sorocaba.html>).
 - 52 These entities must be certified as eligible NGOs (Organização Social or OS in Portuguese) by the relevant government.
 - 53 Interview 11221801, November 22, 2018.
 - 54 Interview with Education Secretary, November 22, 2018; members of Education Participatory Council November 23, 2018; and a City Councilor (11231801). As of 2018, there were 30–38 creches (nurseries) that were "conveniadas", and 28 municipal ones.
 - 55 This rationale was stressed by the Education Secretary and a City Councilor (Interview 11231801). See Lei de Responsabilidade Fiscal/Lei Complementar 101/2000.
 - 56 Interview 11231802, November 23, 2018.
 - 57 Budget amendment data from Comissão Mista de Planos, Orçamentos Públicos e Fiscalização for 2001–2019.
 - 58 Only two provided resources for basic health clinics.
 - 59 For a discussion of similar municipal efforts, see González (2017).
 - 60 Interview 11221802, November 22, 2018; interview 11231801, November 23, 2018.
 - 61 The methodology is described in the online appendix.
 - 62 Data from IBGE 2009. This dataset contains all health facilities located in a given municipality, rather than just basic health clinics.
 - 63 Cities with populations larger than one million are omitted to increase legibility.
 - 64 A fuller version of these shadow cases is available upon request.
 - 65 Interview #74182, July 4, 2018.
 - 66 Interview #74182, July 4, 2018.
 - 67 Interview #712181, July 12, 2018.
 - 68 Interview #74183, July 4, 2018; Interview #75181, July 5, 2018.
 - 69 Interview #711182, July 11, 2018.
 - 70 Interview #711182, July 11, 2018.
 - 71 Interview #711182, July 11, 2018.

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APPENDIX

Data Aggregation

For both countries—Brazil and Indonesia—we merged across administrative data sets to create two municipal data sets. The merging was completed by matching unique municipal identifiers. In the case of Brazil, the national statistics agency (IBGE) assigns each municipality a code. The electoral agency (TSE) uses a different set of unique identifiers. For merging the electoral data, we make use of an administrative crosswalk.^{A1}

In Indonesia, the national statistics agency (BPS) assigns each district (regency) a time invariant unique identifier. In the main estimation sample, this leaves us with 74 cases with full data.

Subsetting to Cities and Treatment of Missing Observations

We followed the Brazilian and Indonesian government definitions regarding what constitutes an urban municipality, our unit of analysis. In defining an "urban" municipality, we follow the emphasis on population and population density by UN-HABITAT and other national statistics agencies. In Brazil, "municipality" simply refers to the lowest administrative unit, meaning it is not a strictly urban classification. However, the Brazilian IBGE classifies municipalities according to their degree of urbanization. We subset on municipalities classified as "units with a high degree of urbanization" based on IBGE's 2017 data release. This yields a subset of 1,509 of Brazil's 5,565 municipalities. In Indonesia, we focus on the district (regency) level of governance. At this level, there are rural jurisdictions (*kabupaten*) and urban jurisdictions (*kota*, or *kotamadya*), which we refer to as "cities." We focus on the latter, since these are the main units of urban service delivery. Consider, for example, that the average area of a *kota* and a *kabupaten*:

271 and 4273 kilometers squared, respectively. In 2011, there were 91 cities in Indonesia, while in 2003, there were 74 cities. In each case, we drop cities that did not exist during prior census waves.

DATA SOURCES

The data from which we constructed the variables used in our analysis was obtained from the sources below.

Brazil	
Variable(s)	Source
*Number of doctors (public and private), per 1000 residents (2011)	Survey of Basic Municipal Information, Brazilian Institute of Statistics and Geography (IBGE) ^{A2}
*2010, 2000 Population (logged)	Decennial Census, IBGE (2010, 2000)
*Illiteracy rate (% individuals)	
*Average monthly income (households)	
*Access to piped water (% households)	
*Access to electricity (% households)	
*Racial fractionalization	
*Public health clinics (UBS per 1000 residents)	Census of municipal health clinics, 2013 ^{A3}
*Schools (per 1000 residents)	
*Private schools (% of all schools)	Census of primary and secondary schools, Instituto Nacional de Estudos e Pesquisas Educacionais (2011, 2019)
*Public schools (% of all schools)	
*Teachers (per 1000 residents, 2019)	
Primary school quality by municipality, 2011	Instituto Nacional de Estudos e Pesquisas Educacionais, annual assessment of educational quality
*Population Density	Measures of municipal area from the IBGE, 2015
*Partisan alignment of mayor and governor (1/0)	General municipal elections, 2006 (Tribunal Superior Electoral data compiled by Lucas Novaes)
*Partisan fractionalization of municipal election	
*Private health centers (%)	
*Public health centers (%)	Census of health centers, IBGE, 2009. Include the UBS and USF centers in the main analysis, as well as private health centers.
*Vaccination rates for typhoid for children 4 and under by municipality (2019)	DATASUS portal ^{A4}
Indonesia	
*Average monthly income (households)	2010 National Socioeconomic-Household Survey (SUSENAS), National Statistics Agency (BPS); covers 200,000 households
*Population (logged)	
*Primary and secondary schools (per 1000 residents)	2011, 2003 Village Potential Statistics Survey (PODES) (Survey of all village chiefs in Indonesia (~80,000), taken every 3 - 4 years), BPS
*Community health centers (per 1000 residents)	
*Doctors (per 1000 residents)	
*Religious fractionalization (Islam, Christian, Catholic, Hindu, Buddhist)	2010 Decennial Census
*Access to piped water (% households)	
*Access to electricity (% households)	
*Partisan fractionalization	From municipal-level electoral returns from the 2009 general elections, Indonesian Electoral Commission (KPU)
*General allocation transfers (DAU) per capita, 2015	Indonesian Ministry of Finance

(Continued)

(Continued)

Indonesia

*Special allocation transfers (DAK) per capita, 2015

*Population Density (population/square km)

Calculated with shapefiles from GADM

* Number of teachers per 1000 residents, 2015

Indonesian civil service agency. Counts do not include temporary or contract teachers

*Proximity to School (minutes)

*Polio Vaccination Rate (% of children)

2014 Indonesian Family Life Survey (IFLS), RAND Corporation, a survey of over 15,000 households in 25 of Indonesia's 34 provinces

*Average national exam (UN) scores by district, 2015

Ministry of Education

MODELS AND ANALYSIS

We estimate ordinary least squares regressions for each country for our measures of service access and quality. We transform our measures for schools, health clinics, teachers, and doctors to per capita counts. The dependent variables capturing access to networked public goods (electricity and water access) are measured in percentage terms. Our main independent variable of interest is city

population, which we include in our main models as a continuous variable. Following convention, we log population size to normalize its distribution.^{A5} Our main results present conventional standard errors, although our estimates are similar if we cluster our standard errors at the state (or province) level. We include a four types of control variables to rule out theoretically motivated alternative explanations:^{A6} (1) urbanization processes, (2) diversity, (3) economic development, (4) partisanship.

Regression Results

Table A.1.
Relationship between City Size and Public Goods, Brazil

	Dependent variable:					
	Health Centers	Schools	Doctors	Teachers	Electricity	Water
	(1)	(2)	(3)	(4)	(5)	(6)
City Size (log(population))	-0.12*** (0.01)	-0.35*** (0.03)	-0.32*** (0.03)	-12.67*** (1.24)	-0.002** (0.001)	-0.05*** (0.004)
Growth (% , 2001-2011)	-0.08*** (0.02)	-0.32*** (0.09)	0.64*** (0.10)	7.78* (3.53)	-0.002 (0.002)	-0.10*** (0.01)
Density (1000/km2)	-0.004 (0.004)	0.001 (0.02)	0.07*** (0.02)	-0.71 (0.62)	0.0003 (0.0003)	-0.001 (0.002)
Racial Diversity Index	-0.01 (0.04)	0.73*** (0.16)	-0.92*** (0.17)	18.82** (6.04)	-0.01*** (0.003)	-0.16*** (0.02)
Average Monthly Income	-0.0000 (0.0000)	-0.0004** (0.0001)	0.0005*** (0.0001)	-0.01 (0.01)	0.0000*** (0.0000)	0.0002*** (0.0000)
Illiteracy Rate	0.42*** (0.08)	3.69*** (0.36)	-0.91* (0.37)	5.03 (13.37)	-0.06*** (0.01)	-0.75*** (0.04)
Electoral Competition Index	0.04 (0.03)	0.09 (0.15)	0.27 (0.16)	-4.72 (5.58)	0.004 (0.003)	0.04* (0.02)
Partisan Alignment (0/1)	-0.01 (0.01)	-0.03 (0.04)	0.06 (0.04)	1.66 (1.41)	-0.0001 (0.001)	-0.004 (0.004)
Constant	0.80*** (0.05)	2.11*** (0.20)	2.42*** (0.21)	89.82*** (7.49)	1.00*** (0.003)	1.21*** (0.02)
Cluster SE?	No	No	No	No	No	No
Observations	1,509	1,509	1,499	1,509	1,509	1,509

Note: *p<0.05; **p<0.01; ***p<0.001

Table A.2.
Relationship between City Size and Public Goods, Indonesia

	Dependent variable:					
	Health Centers	Schools	Doctors	Teachers	Electricity	Water
	(1)	(2)	(3)	(4)	(5)	(6)
City Size (log(population))	-0.12*** (0.02)	-0.39*** (0.05)	-0.30* (0.13)	-7.01*** (1.03)	0.004 (0.03)	-0.10 (0.07)
Growth (2001-2011)	-0.0001 (0.0003)	-0.001 (0.001)	-0.003 (0.002)	-0.002 (0.02)	-0.0005 (0.001)	-0.002 (0.001)
Density (1000/km2)	-0.003 (0.002)	-0.004 (0.01)	0.003 (0.02)	-0.02 (0.14)	0.003 (0.004)	0.01 (0.01)
Religious Diversity Index	0.01 (0.04)	0.25* (0.12)	-0.44 (0.29)	0.31 (2.29)	0.002 (0.06)	-0.33* (0.16)
Average income	-0.00 (0.00)	-0.00 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.00 (0.00)	0.0000* (0.0000)
Electoral competition index	0.22 (0.15)	0.02 (0.46)	3.27** (1.14)	-11.13 (9.01)	0.92*** (0.26)	-0.57 (0.60)
Constant	0.80*** (0.10)	2.51*** (0.30)	1.95* (0.76)	47.74*** (6.04)	0.70*** (0.17)	0.95* (0.40)
Cluster SE?	No	No	No	No	No	No
Observations	74	74	74	73	74	70

Note: *p<0.05; **p<0.01; ***p<0.001

Notes

- A1 We thank Natalia Bueno for the crosswalk.
- A2 Accessed June 20, 2018. <https://goo.gl/XXpFLc>.
- A3 Accessed: June 20, 2018. shorturl.at/cnZ35.
- A4 <https://datasus.saude.gov.br/>. Accessed May 5, 2022.

- A5 As is discussed in the online appendix, we use an ordinal measure for city size categories in supplemental analyses.
- A6 The variables are broadly consistent across the two cases but include important differences due to both data availability and relevance.